

THE BLACK PIG'S DYKE REGIONAL PROJECT 2014

VOLUME 1 of 2

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1.0 INTRODUCTION

The extensive lines of large banks-and-ditches known collectively as the Black Pig's Dyke (BPD) are the amongst the oldest, largest and most celebrated land boundaries in prehistoric Europe. Yet they are also the most elusive. In the public imagination the diffusely scattered linear earthworks formed a cohesive and unified boundary for the ancient kingdom of Ulster, a monumental frontier defence that divided Northern Ireland from the rest of Ireland. The earthworks are also associated with a widespread folk tradition about a cruel schoolmaster with magic powers who was transformed by one of his students into a mystical giant black pig and chased across the countryside, leaving his wake a large track before drowning in a lake. Despite their prominence however, modern scholarship has tended, with some exceptions, to overlook the linear earthworks in favour of other avenues of research such as the great royal sites of later prehistoric Ireland. The absence of research has resulted in the interpretation of the monuments operating in something of a vacuum in which fundamental questions regarding their extent, chronology, associations, purpose and meaning remain largely unanswered. In order to arrive at a better understanding of the BPD this inter-disciplinary study was jointly commissioned by the heritage offices of Monaghan, Longford, Roscommon and Cavan, with the support of the Heritage Council.

1.1 THE BRIEF

The objectives of the Black Pig's Dyke Regional Project were set out in the project brief and subsequently adapted in a research design, which may be summarised as follows:

- to collate and review previous research on the BPD.
- to map in GIS the full extent of the monuments within the study area from historic maps, aerial photography and available LiDAR datasets.
- to map in GIS its associated archaeological landscapes.
- to identify research gaps and recommend future research avenues.
- to develop a regional cultural project proposal.
- to increase public awareness of the monument.

1.2 REPORT FORMAT

This report is divided into two volumes. Volume 1 presents the results of the archaeological and historical study of the Black Pig's Dyke and Volume 2 contains detailed GIS mapping of the linear earthworks of the study area on aerial photography, historical and modern mapping. This introductory section of Volume 1 describes the scope of the project, the methodology that was followed and it then presents the archaeological background to the region and a review of previous research on the Black Pig's Dyke. Detailed descriptions of the monuments associated with the dyke in the study area are contained in the next section, followed by examination of the extent, topographic setting, morphology, chronology and environmental setting of the earthworks. An assessment of the treatment of boundaries and pigs in early Irish literature is set out prior to the final section, which presents a discussion and suggested priorities for further research. The results of a geophysical survey at Corrinny, county Monaghan are contained in an appendix. All of the GIS mapping files have been presented to the partner organisations and will be made available through their online mapping systems.

1.3 THE STUDY AREA

The core study area comprised counties Cavan, Monaghan and Leitrim, and north county Roscommon, north Longford and south Donegal, a total land area of 5130km². The extent of the study area was governed by the occurrence of linear earthworks that had been associated with the BPD, either by the Ordnance Survey, by folk traditions or by archaeologists. The land-block contains all of the linear earthworks that are linked with the BPD in the Republic of Ireland but those in the north - the Dane's cast and the Dorsey - were omitted from the core study area in this phase of works, due to the non-availability of mapping datasets. It is envisaged they will be included in future work. Geographically, the study area forms the northern edge of the Central Plain in south Ulster and north Connaught, and encompasses a broad 120km arc that begins at Donegal Bay and extends through the lake-valleys of the Dartry mountains to the west of the river Shannon - the major north-south route into the region - and continues into the Drumlin belt of the Central Lowlands, finishing in east Monaghan (Aalen et al 2011, 9-13). The region is the heartland of the Drumlin belt and is almost entirely covered with glacial drift deposits interspersed with lakes, and former lakes and damp hollows that have been drained for agriculture. It is drained principally by the Erne and upper Shannon and the Fane, Dromore and

Annalee rivers in Monaghan. The main areas of high ground lie to the west in Leitrim and Fermanagh. Soils are in the main gleys and peats, with more productive grey brown podzolics and brown earths in the east.

1.4 THE STUDY PERIOD

Linear earthworks of various forms were constructed between the Neolithic (eg. cursus monuments) and medieval (eg. the Pale ditch) but the core period of research for this project is roughly the two millennia that encompasses the Middle to Late Bronze Age (1500-600 cal. BC) and the Iron Age (c.600 cal. BC-400 cal. AD) (*see* Warner 2009, 508). In this document this is generally referred to as 'later prehistory' or the 'late prehistoric' period and it forms the focus because, despite the problems with dating the earthworks in the study area (see below), it can be assumed, based on analogies, that they fall somewhere within this broad span. Where relevant, evidence from the Neolithic, Early Bronze Age and Early Medieval periods is also included.

1.5 ARCHAEOLOGICAL METHODS

At the core of the research methodology is the landscape approach, in which the archaeology, history, folklore, placenames and physical topographic landscape of the BPD are integrated in an inter-disciplinary assessment of a regional landscape. The management and analysis of the various datasets took place within a GIS framework, which well suited the landscape approach of the project, allowing the layers of information to be scrutinized against each other. The other mainstay of the team's approach to the project was the 'cold archaeological objectivity' in the study of Irish linear earthworks that was called for as far back as 1980 by Chris Lynn (Lynn 1980, 121). Lynn had called for a move away from attempting to equate the lines of travelling earthworks with protohistorical territorial boundaries in favour of the investigation of each stretch in its own right, without assumptions being made regarding 'date, relation to protohistoric boundaries and other somewhat distant examples, the impassability of intervening gaps etc. without detailed investigation' (Lynn 1980, 121). Thus, as much as possible, all previous assumptions about the earthworks were put to the side in favour of a systematic analysis of the different 'components' of the BPD.



Figure 1: Map of the study area

Work commenced in May 2014 and was completed in November of the same year. The first tasks involved gathering and reviewing all previous research on the BPD and the construction of the GIS database from a corpus of mapping and archaeological datasets. New GIS datasets were then constructed of the extent of the BPD as interpreted on the second edition Ordnance Survey (OS) maps (Monaghan 1857, Leitrim 1882-7, Cavan 1876-80, Longford 1879-81, Roscommon 1889-95). The second edition maps were chosen over the first edition (c.1835-8) because they provide a more accurate depiction of the dyke. New datasets were also mapped of the extent of the earthworks as shown on the Archaeological Survey of Ireland's Record of Monuments and Places mapping (1995-7) and the 2012 Bing aerial photography aerial imagery.

Once the extent of the BPD had been plotted, comparisons were made with a selection of pre-OS historic maps in county Monaghan, the later editions of the OS and toponyms associated with the BPD in Monaghan; this did not lead to any new earthworks being identified though the placenames did indicate a strong likelihood that sections had formerly been present in certain areas. An assessment was also made of the availability of LiDAR datasets but this proved somewhat disappointing as only the Doon of Drumsna, Drumgristin, Maghernakill and a small portion of the Dunclá had coverage. Detailed archaeological inventory entries were subsequently produced for each section of the BPD in the study area.

A preliminary analysis of the datasets was undertaken in order to address key research questions around chronology and function. This included GIS analysis of altitude and slope preferences, along with viewsheds from certain monument classes (eg. hillforts/hilltop enclosures). Furthermore, maps overlaying the earthworks on attributes of the physical landscape (bedrock geology, quaternary geology, soils, waterways) and distributions of later prehistoric and Early Medieval monuments, were also created.

Since the focus of the project was on a desk-study assessment fieldwork was limited to inspections of stretches of the monument in counties Longford, Monaghan and Roscommon, and geophysical surveys at the Doon of Drumsna, county Roscommon and at Corrinny, county Monaghan. In the course of fieldwork consultations were conducted with landowners and a presentation on the interim results of the project was made to the Monaghan heritage forum in September 2014. Others consulted included the Clogher Historical Society, who very kindly provided access to historical maps and other materials. Shortly prior to the submission of this report a workshop was held by the project participants in which presentations were made on the

results and the priorities for further research and the regional cultural project proposal were identified and agreed. Additional outputs from the project in the short-term will include an article on the BPD in the local and national press and the text and imaged for the production of two interpretative panels for display at venues in the region.

1.6 LIMITATIONS

The key source for mapping the linear earthworks of the project area is the first and second edition OS maps, which mark stretches of the monuments with hachures (that denote bank(s) and ditch(es)/solely banks) or dashed lines (denoting lost sections), and refer to it as the 'Black Pig's Dyke', 'Black Pig's Race', 'Worm Ditch', 'the Worm's Cast'. It is clear from the OS letters of John O Donovan that the early surveyors were heavily dependent on local information when deciding whether or not to include sections of linear earthwork as being part of what was perceived as the BPD, and the accuracy of their mapping has to be open to question. Likewise the physical form of the monument as mapped by the OS is questionable. For instance the Leitrim section is shown as a single bank along its entirety but field survey by the Archaeological Survey of Ireland describes it as having a second bank with an intervening fosse, neither of which were mapped. There are also discrepancies between different editions of the OS, with sections missing from the first edition but mapped on the second edition, and *vice versa*. For example, the linear earthwork south-west of Dowra, county Cavan is not marked on the first edition but does appear on the second edition. It was subsequently deemed non-archaeological and delisted by the Archaeological Survey of Ireland, but it is included in the current study. This study, by its nature, has no option but to rely heavily on the interpretative decisions in mapping the extent and form of the monument and therefore all of the sections mapped by the Ordnance Survey are included. With future fieldwork, however, some will almost certainly have to be discounted or altered.

Mapping datasets were made available by the local authorities for counties Monaghan, Cavan, Leitrim, Roscommon and Longford, but it is known that sections of linear earthworks with BPD associations extend into counties Armagh, Fermanagh and Down for which GIS mapping was not available. Whilst these sections were plotted using screenshots of the second edition OS maps, their accuracy is probably in the region of +/- 5m. The accuracy of the trace of the linear

earthworks on the 2012 Bing aerial imagery also had limitations. The main constraint is the fact that most of the stretches of dyke are covered with hedgerows and trees, which makes accurate mapping of the underlying earthworks impossible. Nevertheless the tree-lines can be taken to indicate the general topography of the monument, and it is probably accurate to +/- 2-3m.

In attempting to discover new linear boundaries the main impediment was the absence of LiDAR datasets for those areas where new stretches could potentially be extant, as suggested by placenames and folk traditions. Once LiDAR datasets become available new discoveries will almost certainly be made. In many cases it is also difficult to determine where the earthworks begin and end. For example the west of the Monaghan section joins with the Fane river and may have used this natural boundary until it restarts again as an earthwork at Lislea, county Fermanagh. On the other hand they could be two entirely unrelated stretches. Many sections of the dyke also amalgamate into field boundaries, most of which are probably of 18th-19th century date, but it is difficult, if not impossible without further fieldwork and excavation, to disentangle one from the other.

Issues around the poorly understood chronology of the monument are set out below but another caveat that needs to be stated is that assumptions have also had to be made regarding the date of groups and classes of monuments in the distribution studies. For example, ring barrows/ring-ditches are presented in the distribution studies as being of late prehistoric date, but some at least could also be assigned to the Neolithic and/or Early Medieval periods. There is also a noticeable dearth of recorded archaeological monuments in county Monaghan, relative to the other counties in the study area, which may reflect the differing methodologies that were used in the archaeological survey.

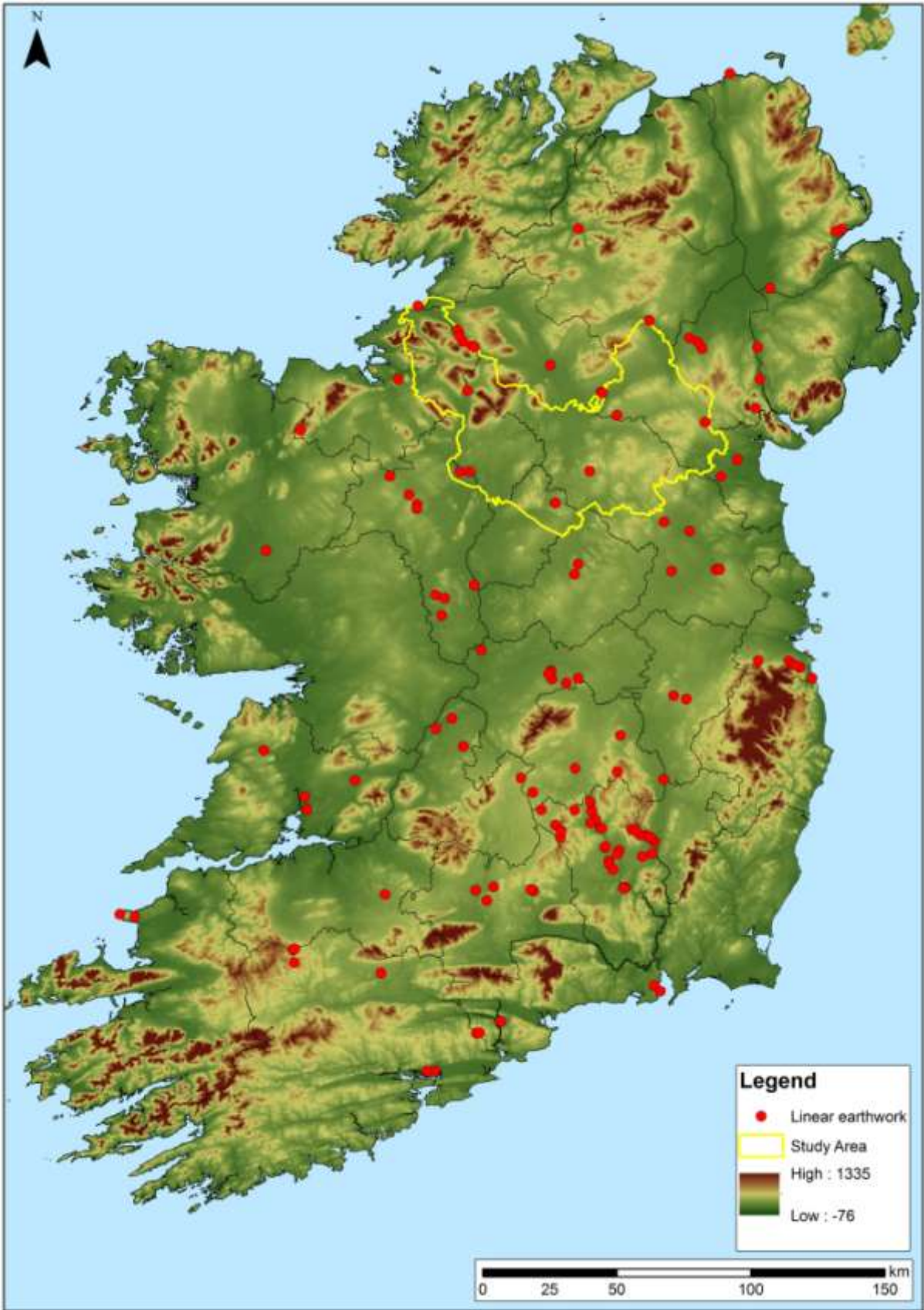


Figure 2: Distribution map of linear earthworks Ireland (sources: Archaeological Survey of Ireland and Northern Ireland Sites and Monuments Record)

2.0 LINEAR EARTHWORKS

Ireland and Britain have the most extensive and oldest series of prehistoric land boundaries in Europe (Spratt 1991, 439). Land boundaries take many forms and their terminology is somewhat confusing. Lengths of ditches and banks (and occasionally pit alignments) were constructed throughout much of Europe from the Neolithic period onwards. Although commonly referred to as 'dykes', 'travelling earthworks' and 'ranch boundaries' the more neutral archaeological term that is generally used is 'linear earthwork', with 'linear ditches' and 'linear boundaries' used to a lesser degree. The expression has no chronological implications. Linear earthworks encompass all artificial linear boundaries outside of the settlement/funerary/ceremonial enclosures and also include ritual monuments such as cursuses. It is important to note at this point that linear earthworks differ markedly in scale and function from prehistoric field boundaries/systems such as those at the Céide Fields, Co. Mayo and the Dartmoor 'reaves'.

Studies of the linear earthworks of the South Downs and Wessex regions have shown that different forms may be identified in these places, though how transferable these typologies are to Ireland is an open question. They include 'cross-ridge dykes' that often traverse spurs and valley heads, 'spur dykes' that cross the spurs between adjacent small valleys known as 'coombes', dykes that cross the upper sides – 'spinal linears' - or run into the heads of valley – 'subsidiary linears' - and lines of pits that extend for considerable distances across the landscape (Harding 2004, 38; Bradley et.al. 1994, 8). The Wessex dykes often extended from the rivers into the hills and mountains or followed the 'upper limits of fertile valleys' (Bradley et.al. 1994, 13; Bradley 2010, 210; McOmish et.al. 2002, 61).

The archaeological surveys of the Republic and Northern Ireland record a total of 179 linear earthworks on the island (171 for the Republic and 8 for Northern Ireland), a portion of which have been included in the published archaeological inventories. Of the 179 examples however, it is not known how many exactly are of later prehistoric date because Neolithic, medieval and later examples are also included. In terms of their distribution, there is a marked concentration of the monuments in the midlands with a particular density in county Kilkenny, east Tipperary and around the Connacht 'royal' centre of Crúachain where there is a remarkable concentration of short stretches of linear earthworks. In Britain, the earthworks occur in particular concentrations in the south and east of the country. Hampshire, for example, it is estimated to have had 800km of linear earthworks and extensive systems are also present in Wessex (the most intensively

studied boundary earthworks), the Fen Edge and on the Tabular Hills of the Yorkshire Wolds (Spratt 1989). They also occur in Scotland and Wales, though with less frequency.

The Irish prehistoric linear earthworks vary enormously in size and form. For instance the Mucklaghs, Rathcroghan, county Roscommon are 100m long whilst the Claidh Dubh in north county Cork is reputedly 22km in length (Figure 3) (Doody 1995). Some are straight whilst others, such as the Claí Rua/Cladh Ruadh, Co. Kerry are more sinuous in plan (O'Donovan 1987; Keegan 2010, 142). There is also great disparity between the scale of the Irish earthworks, with some like the Claidhe Buidhe, Ballynabointra, Co. Cork comprising simply low banks 1m high x 4.6m wide, while the banks of other sections such as Monaghan West (see below) stand to over 9m high. Erosion and later modifications have undoubtedly had an impact but cannot adequately explain such large variations.

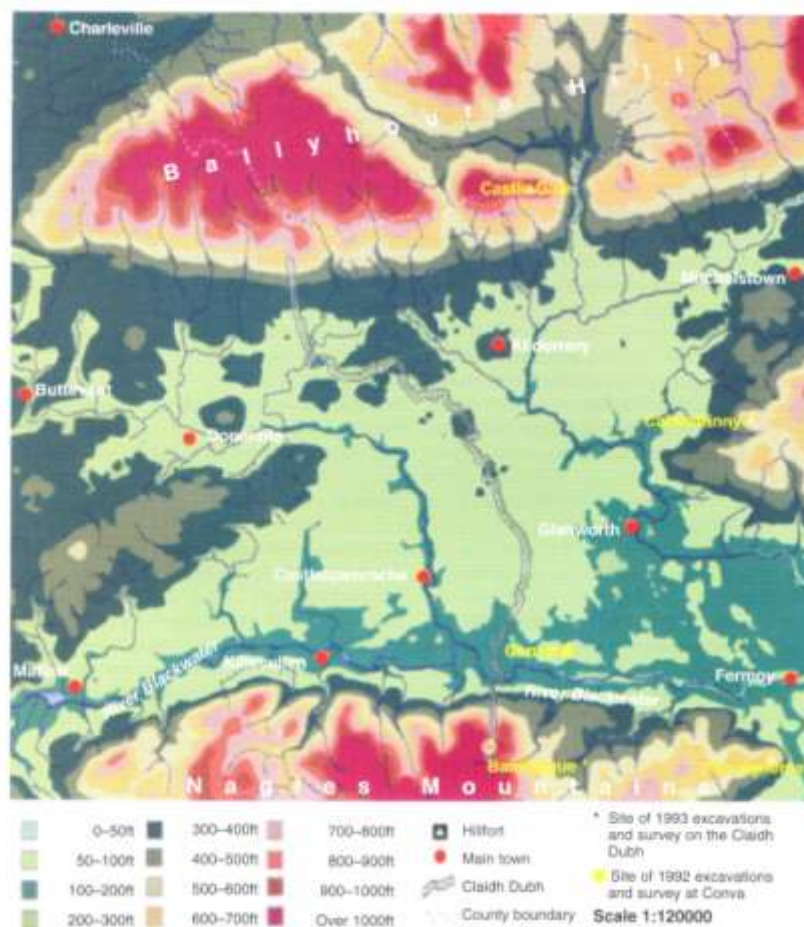


Figure 3: Map of the Claidh Dubh, county Cork (Doody 1995, 12)



Figure 4: The Mucklaghs, county Roscommon (reproduced from Newman 1999)

Irish linear earthworks have not been studied as a group but a brief overview of the later prehistoric examples has been published by Barry Raftery (1984, 83-97) and the Neolithic 'cursus-like' monuments have received some attention from Conor Newman (Newman 1999). An outline of previous work on the south Ulster dykes is presented below. Outside of these the *Claidh Dubh* in county Tipperary is the only other Irish linear earthwork to have been researched in detail, having been surveyed and partially excavated by the Discovery Programme (Doody 1995; Doody 2008; Bhreathnach 2008). The Knockans, Teltown, county Meath was the subject of a brief rescue excavation by John Waddell; this found that the main phase of construction of the monument occurred in the Early Medieval period and overlay an Early Iron Age embankment (Waddell 2011). The linear earthworks of county Waterford were inventorised by Tom Condit and Michael Gibbons who saw them as possibly forming 'part of an agricultural landscape serving as major land division boundaries possibly defining ownership or agricultural use' (Condit and Gibbons 1988, 25). There have also been discreet, and largely uninformative excavations undertaken on the 'Rathduff trench' county Kilkenny (O'Flaherty 1987; Wierzbicki 2012).

The chronology of the Irish prehistoric sites is very poorly understood, largely because of the lack of dateable material that can be associated with their construction phases (see below). Prior to the accumulation of a series of radiocarbon and dendrochronology dates from the Dorsey and

Aghareagh West, county Monaghan it was generally held (*eg.* Herity and Eogan 1977, 230) that the linears post-dated and were influenced by Roman defensive barriers such as the Antonine Wall and Hadrian's Wall. However, in common with linear earthworks in Britain the dates that were obtained concentrated in the Iron Age, therefore preceding the Roman defences by many centuries. Their chronology is discussed further below.

Explanations around the purpose of the Irish and British earthworks will be discussed in detail below but have in general centred on their role as barriers, for territorial/proto-political demarcation and to control the movement of people and livestock (McOmish et.al. 2002, 64; Bradley et.al. 1994, 137). In the historic period, when linear earthworks can be legitimately associated with historical events - for example Hadrian's Wall, the Antonine Wall, the Pale Ditch and the Scot's Dyke - defence and the delineation of borders is their chief purpose.

Because of the prominence of linear earthworks in the landscape they have often become attached to folk traditions and a vast folklore has been created around the monuments. For example, their construction has been attributed to battles with the Vikings in the case of the 'Danes Cast' and superhuman efforts lay behind the raising of the 'Devil's Dyke'. In Ireland the most widespread tradition, which has a particular concentration in the study area, relates to the supernatural rootings of the Black Pig (see below).

3.0 THE REGIONAL LATER PREHISTORIC ARCHAEOLOGICAL LANDSCAPE

The northern Central Plain has in some ways been the 'poor relation' of modern Irish archaeology and the absence of research has resulted in noticeably fewer archaeological monuments in the region than elsewhere in Ireland. There has also been much less archaeological excavation conducted across the study area, mainly as a consequence of fewer infrastructural developments. However, where major road projects have been run through the region, for example the N2 Carrickmacross bypass, they have unearthed a wealth of previously unrecorded archaeology dating from the Neolithic through to the post-medieval period. At the other side of the region Susan Curran's innovative use of LiDAR modelling has revealed 150 'new' sites, mostly ringforts/enclosures, within a small (30km²) area of county Roscommon.¹ Likewise, the Discovery Programme's Lough Kinale project has underlined the enormous wealth of undiscovered archaeology in the region (Fredengren et.al. 2010; *see also* Foley and McHugh 2014).

There is a scatter of late Mesolithic activity in the landscape and it is probable that the lakes and river edges in the study area contain many more sites from this period. The area lies between the main concentrations of passage tombs to the north and south. However, Neolithic settlements such as Monnany, Co. Monaghan Court and court tombs at Cohaw, Co. Cavan and Aghanaglack Co. Fermanagh demonstrate a considerable amount of settlement in the region at this time (Cooney 1979; Walsh 2006). In the Early Bronze Age it is primarily the funerary record that characterises the area, most notably the cemetery mound at Topped Mountain, county Fermanagh and the Early Bronze Age burials excavated at the Kiltierney stone circle in the same county (Plunkett and Coffey 1896; Foley and McHugh 2014 i, 215-217). Perhaps the most spectacular Early Bronze Age site in the region is the rock art landscape at Drumirril, county Monaghan (O Connor 2003).

1

http://www.roscommoncoco.ie/en/Services/Heritage/Heritage_Research_Bursary_and_Community_Heritage/Heritage_Research_Bursary_2012,_Project_Report.pdf (accessed 30/10/2014)

The region in the Middle-Late Bronze Age is generally characterised by the splendid bronze and gold metalwork of the Bishopsland and Dowris industries, for example the hoards from Derryvony and Killersherdiny, county Cavan and Scotstown, county Monaghan (Figures 8-9). There is also a particular concentration of socketed axeheads from the Erne waterway and *fulachta fiadh* are scattered throughout the region, examples of which have been excavated at Monanny and Drumore West, county Monaghan (Halpin 2004; Walsh 2006). The Middle Bronze Age (1500-1200 cal. BC) sees population and farming expansion, whilst the first two centuries of the Late Bronze Age (1200-400 cal. BC) are typified by economic contraction and limited settlement evidence, with perhaps the centralisation of populations in the earliest hillforts.

Whilst there are no hillforts noted within the region on Barry Raftery's 'preliminary' site distribution map, 'new' hillforts and smaller 'hilltop enclosures' have been added to the distribution by Eoin Grogan (Raftery 1994, 60; Grogan 2005 ii, 114, 117; Foley and McHugh 2014, 252-253). These include Doagh Glebe inland promontory fort, county Fermanagh, the hillforts at Ardagh and Bellaheady, county Cavan, Cahermore and Raferagh, county Monaghan, and Mulaghnashee, county Roscommon. The gaps can also probably be filled by some of the larger enclosures on the summits of hills, such as Skinnahergna, Ballymartin and Barnhill Upper county Monaghan (these are classified by the Archaeological Survey of Ireland as 'hilltop enclosures'). High status settlements in lakes - *crannogs* - may also have been alternatives to hillforts at this time.

The slow introduction of iron into Ireland, probably from the 8th century cal. BC (for example at Rossan, county Westmeath), was considered to have occurred in tandem with an influx of Celtic tribes who quickly replaced the indigenous Late Bronze Age culture. However, more recent scholarship advocates that the cultural traditions of the Celtic world were assimilated by the native culture via international connections that were built around the Atlantic trade networks. The language of trade, its 'lingua franca', was Celtic, which new research is suggesting evolved not in central Europe as previously thought, but along the Atlantic facade of Western Europe, including Ireland (Koch 2013). This hypothesis is the subject of heated debate but if correct places Ireland at the core, not the periphery, of the Celtic world.²

² For example see <http://bmcr.brynmawr.edu/2013/2013-12-35.html>

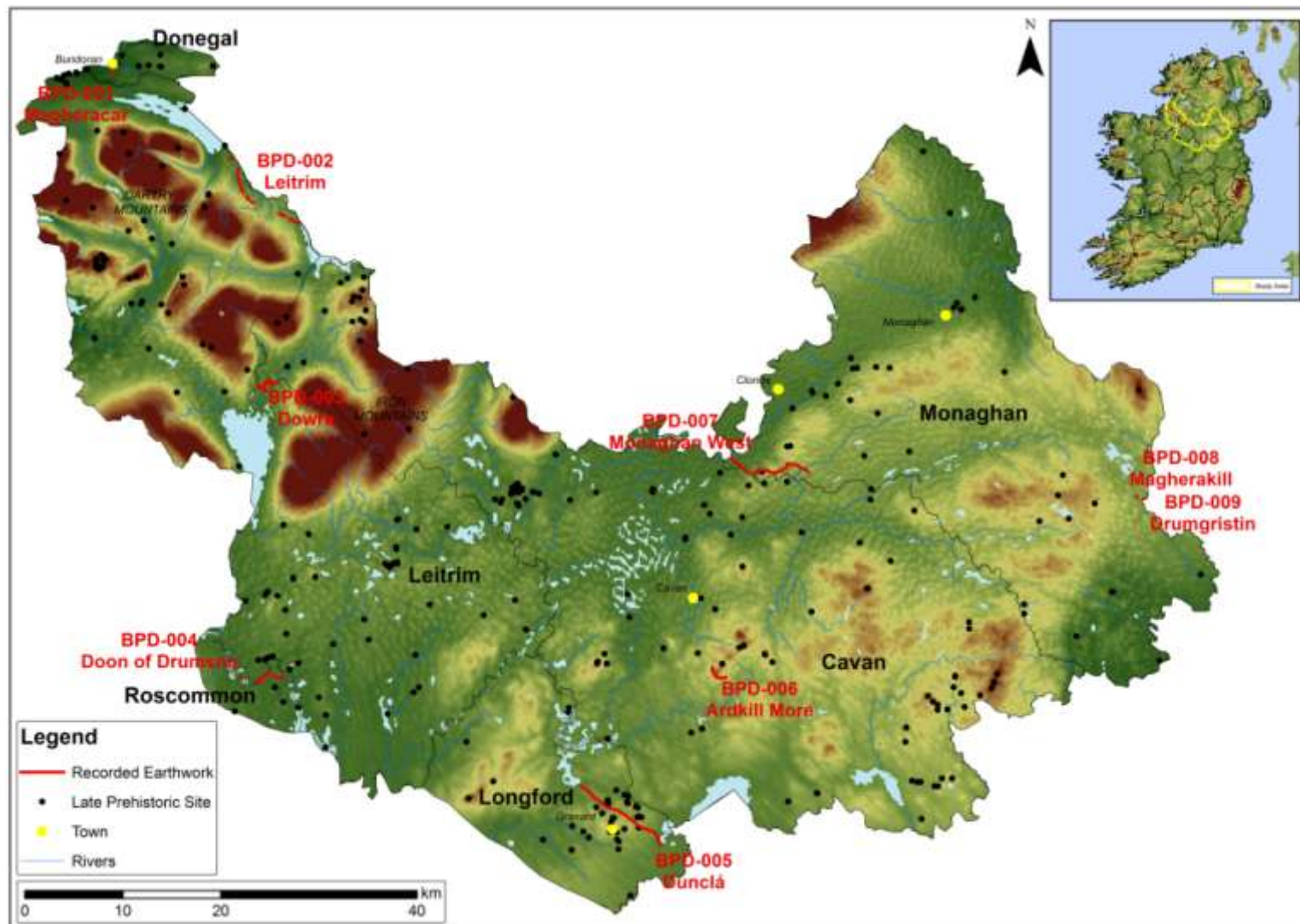


Figure 5: The Late Prehistoric landscape of the study area

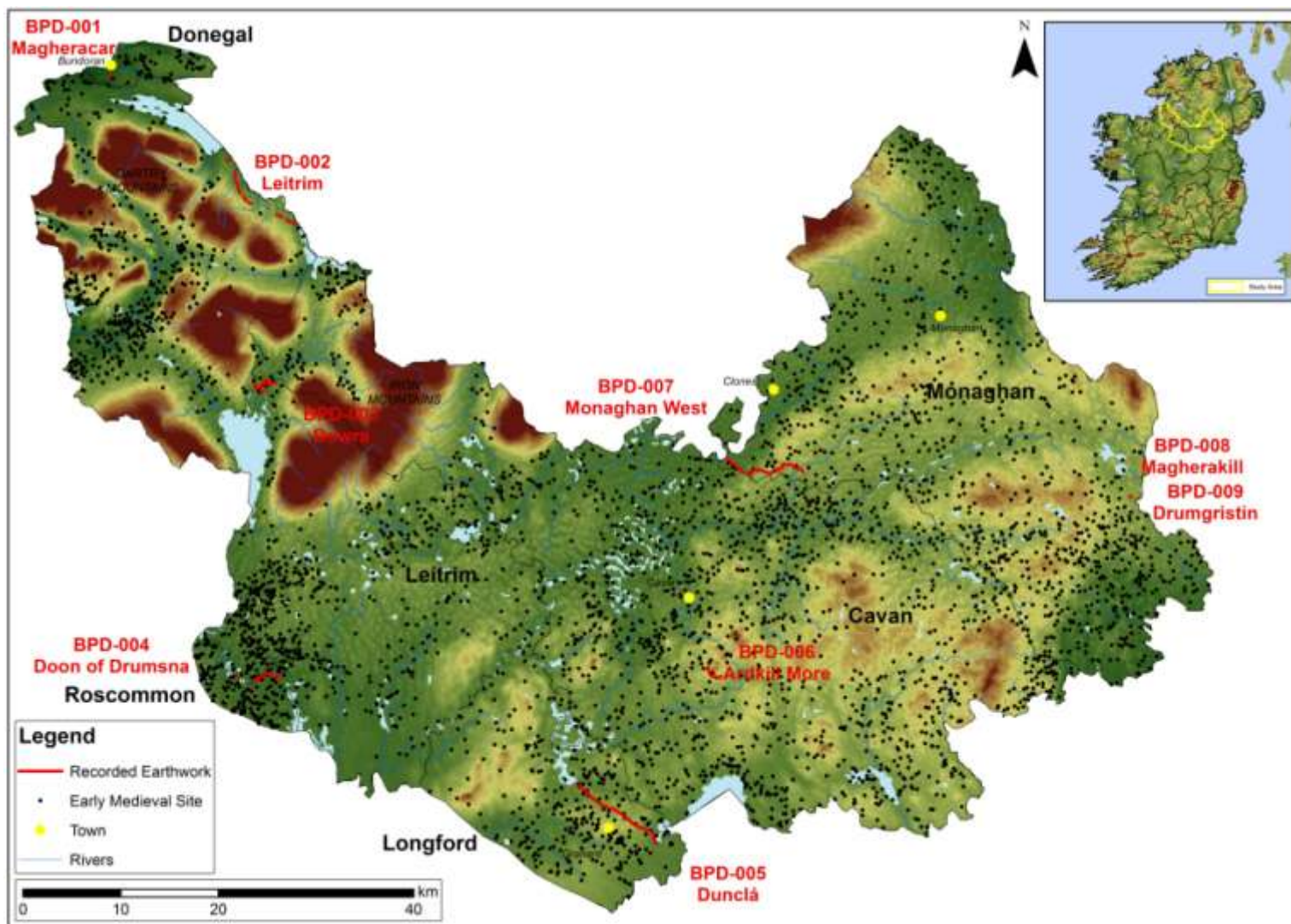


Figure 6: The Early Medieval landscape of the study area



Figure 7: Cemetery cairn on the summit of Topped Mountain, county Fermanagh

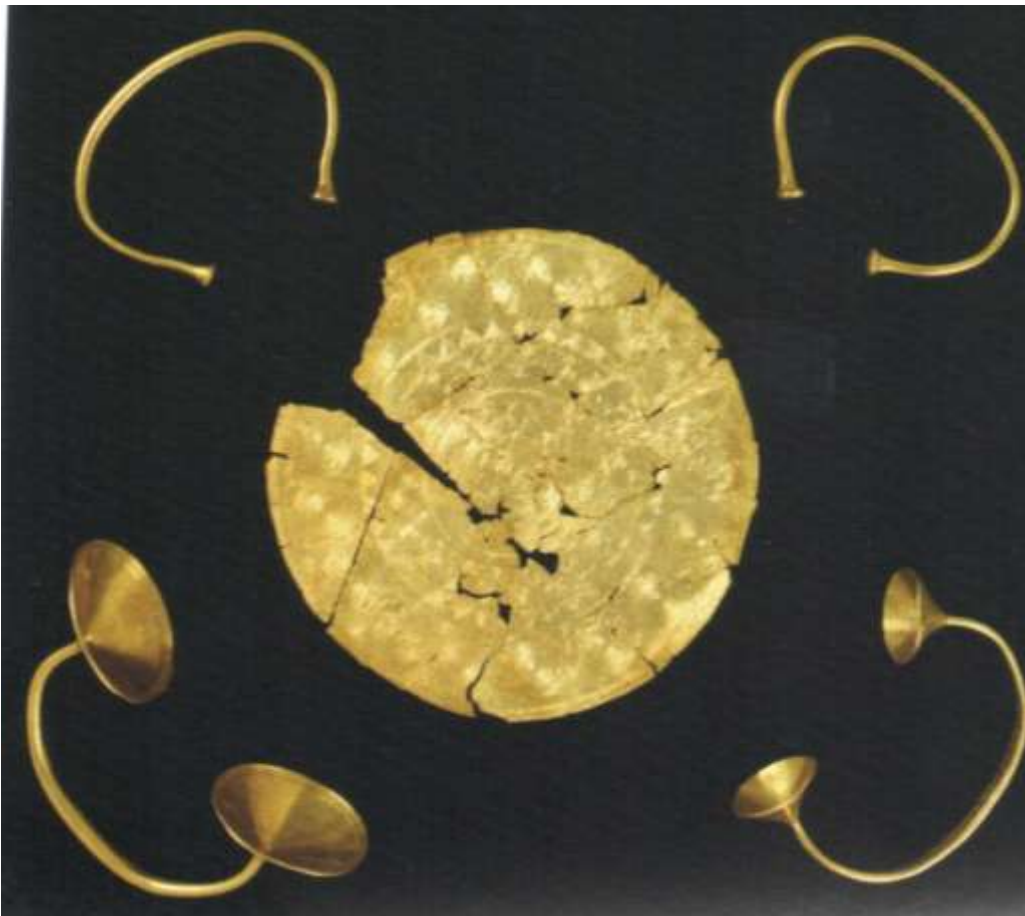


Figure 8: Hoard of Late Bronze Age gold ornaments from Lattoo, Co. Cavan (Frederengan et.al. 2010, 102)

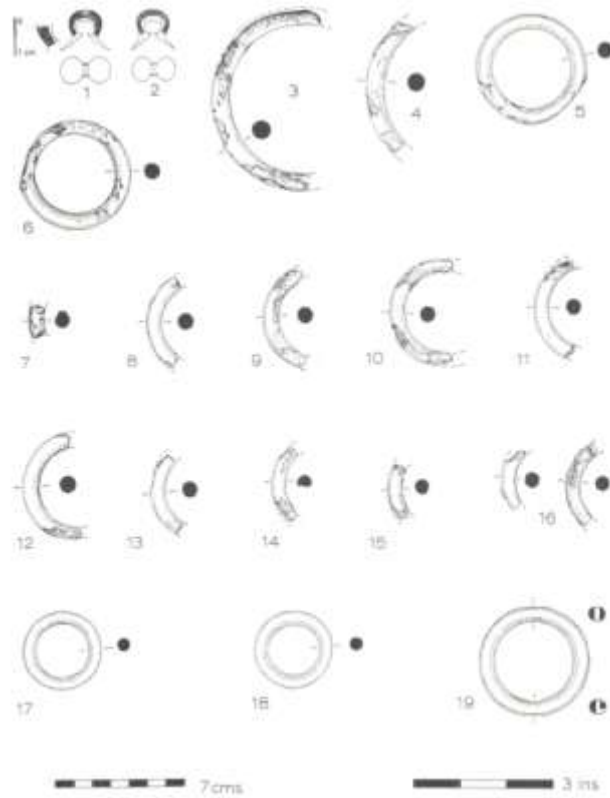


Figure 9: The Scotstown, county Monaghan board of 'sleeve fasteners', bronze rings and amber beads (Eogan 1983, 114-115)

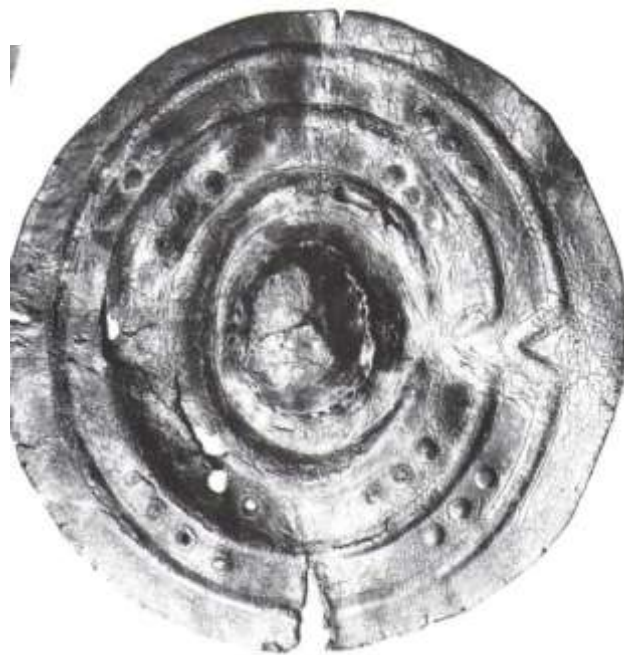


Figure 10: Late Bronze Age leather shield from Clonbrin, Co. Longford (Raftery 1994, plate 7)

Like the rest of Ireland, there is very little archaeology that can be dated to the earliest phases of the Iron Age (c.600-400 cal. BC). However, from the third century BC numerous metalwork finds such as the magnificent Drumlane cauldron from county Cavan show that the north midlands was one of the core areas for the Irish La Tène, and one of the most important areas in the Irish Iron Age. Stone carvings such as the Castlestrange, county Roscommon monolith and the wooden cauldron from Altartate Glebe, County Monaghan underscore the importance of the region at the time. At the same time woodland clearances become widespread throughout the landscape, but settlements within this milieu are still almost unknown.

There has been only one excavation of an Iron Age settlement in the region, at Cloongownagh, county Roscommon. This site, situated eight kilometres north-west of the Doon of Drumsna, was an unenclosed settlement of sub-rectangular and circular structures, one of which (Structure 3b) was radiocarbon dated to 170 cal. BC- 140 cal. AD (1976 +/- 60 UCD-9966) (Henry 2000; Henry 2001). It may be that some of the hilltop enclosures and crannogs in the region were also occupied during the Iron Age, as for example at Clogher hillfort, Co. Tyrone and the 'lake village' at Lough Gara, county Sligo (Kila 016, Kila 046, Kila 021, and Crannóg 61), but this remains to be proven (Fredengren 2000; Becker et.al. 2008, 32; Warner 2009). There are probably many more such settlements awaiting discovery but extricating these places from the more plentiful Bronze Age and Early Medieval archaeological records presents a difficult challenge (Ó Drisceoil and Devine 2012; Becker 2009; Becker 2013). The great royal site of Rathcroghan, county Roscommon, reached its apogee during the Iron Age when enormous ceremonial monuments were constructed. Rathcroghan probably held sway over the western part of the region, with the other royal site of Navan Fort, and perhaps Raffin, being influential in the east.

The wet topography of the region has preserved numerous timber trackways and roads, most spectacularly at Edercloon and Corlea, county Longford, and parts of the vehicles that used these routes have also been found, for example at Doogarymore, county Roscommon (the oldest pair of wheels from Ireland) (Raftery 1990; McDermott et.al. 2009). Large numbers of dug-out canoes from county Leitrim remind us that waterways also provided a key means of transport. Thirteen bog bodies are also known from the region but just one example, from Derrymaquirk, county Roscommon, has been radiocarbon dated, to the Late Bronze Age/Early Iron Age (767-397 cal. BC) (Lucas (ed.) 1961, 88-9).

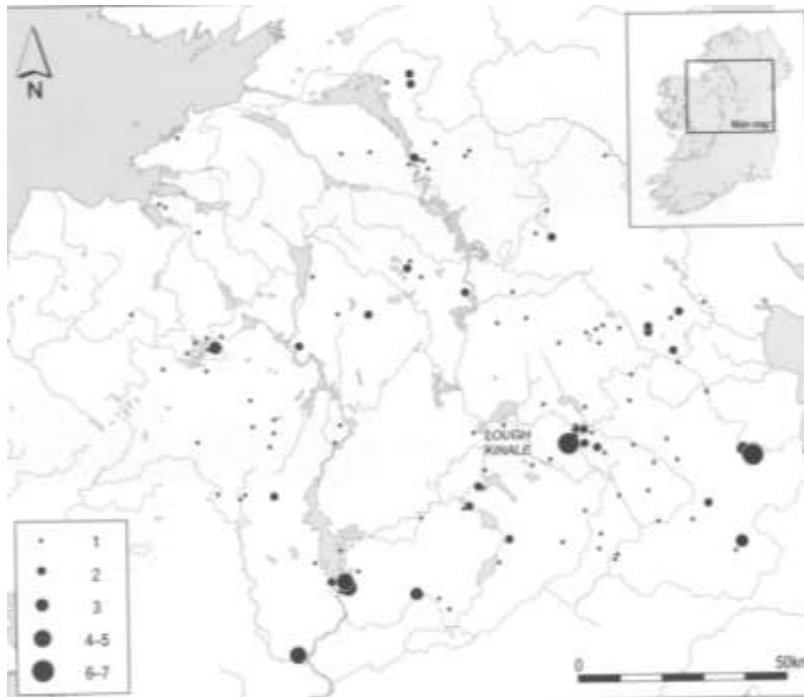


Figure 11: Distribution of Iron Age finds north central Ireland (Frederengan 2010, 108)



Figure 12: The Iron Age 'road' at Corlea, county Longford under excavation (Raftery 1994, plate 24)

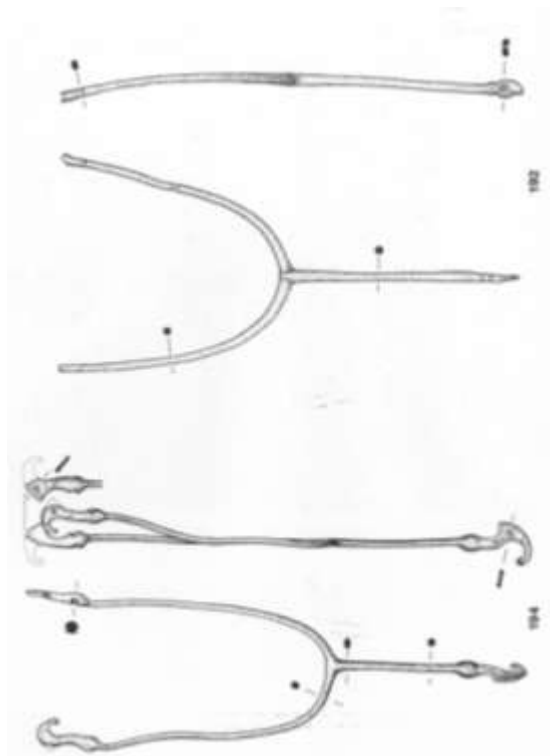


Figure 13: Iron Age horse pendants from Farney, county Monaghan (Raftery 1983, fig. 75)



Figure 14: La Tène bronze disc and horse-bit from Annlore, Killeevan, county Monaghan, 9km north of the BPD (Raftery 1994, plate 34)



Figure 15: An artist's reconstruction of the Dorsey, county Down (courtesy Philip Armstrong, Paint the Past).

The later Iron Age (0-400 AD) sees a dramatic downturn in activity throughout the landscape, which has been well-documented in recent dendrochronological and ice core investigations (Baillie and Brown 2013). These present a scenario where a 'severe environmental event' in 207 BC prefaced a major 'building pulse' between *c.* 160 BC - 40 BC. This boom was halted abruptly in the mid-first century BC, perhaps as a result of volcanic activity, and the first four centuries AD are characterised by a 'massive reduction in population' and a severe downturn in construction activities (*see* Plunkett et.al. 2013; Armit et.al. 2013). This is known as the 'Iron Age lull' and it comes to an end in the sixth century AD with the flowering of the Early Medieval period.

4.0 THE BLACK PIG'S DYKE: SUMMARY OF PREVIOUS RESEARCH

4.1 ANTIQUARIANS AND THE BLACK PIG'S DYKE

The earliest written reference to any of the earthworks known collectively as the Black Pig's Dyke occurs in a 1707 manuscript addressed to Samuel Molyneux in which he describes a 'great ditch' which he termed the 'Dorsey Camp' running through Armagh and into Monaghan and Cavan (Kane 1916-17, 542).³ The Danes Cast in counties Down and Armagh is noted in James Stuart's 1819 'Historical Memoirs of Armagh' (Stuart 1819, 585-7). Stuart traced the course of the earthwork through Down and Armagh and records the locality it traversed as the 'glen of the Black Pig'. In attributing its construction to the Vikings he also draws the analogy with the Antonine wall in Scotland, but stops short of describing it as a territorial boundary.



Figure 16: John O'Donovan (1806-1861)

John O'Donovan's 1835 Ordnance Survey letters recorded the folklore that existed regarding the 'Valley of the Black Pig' and the 'Worm Ditch' in south county Monaghan, and he also described extensive sections of a 'double ditch and broad rampart in all its pristine perfection' in west

³ http://sources.nli.ie/Record/MS_UR_049147

Monaghan (Herity 2012, 155, 194). It was when he was writing from Cootehill, county Cavan that O'Donovan seems to have come to the conclusion that 'these bits of the same continuous ditch' formed a political boundary in ancient Ireland. This was the first time anyone had overtly interpreted the earthworks as a political frontier for Ulster, and he restated his thesis again in his 1841 *Circuit of Ireland* (O'Donovan 1841, 31). At the same time O'Donovan linked the linear earthworks he saw in the study area and further afield, for example at the Curragh, county Kildare, with the traditions around the mythical Black Pig in the surrounding countryside. The first edition Ordnance Survey maps were marked up according to O'Donovan's instructions and this provided the basis for all subsequent interpretations of the BPD. However, it would appear that the traditions had been related to geographical areas such as 'glen of the Black Pig', 'valley of the Black Pig' etc., rather than any specific linear earthworks. As O'Donovan travelled Ireland he appears to have been responsible for attaching the Black Pig tradition to many sections of linear earthwork which may not have acquired the name in the oral traditions. The Ordnance Survey also re-named stretches as the 'Black Pig's Dyke', even when they had previously been called something else. For example the BPD in West Monaghan it is shown as the 'Worm Ditch' on the first edition OS, but it is then renamed as the 'Worm Ditch or Black Pig's Race' on the second edition. Likewise the Granard section is called 'Dunclá' on the first edition but 'the Black Pig's Race' on the 1908 map. Thus, the linking of the black pig folklore with the linear earthworks cannot be traced to before the 1830s, although as Fionnuala Williams has noted there is some correlation between the distribution of the earthworks and the oral traditions, which could be of considerable vintage (Williams 1987, 18). Fionnuala Williams has published a comprehensive account of the extensive folklore around the Black Pig's Dyke (Williams 1987).

Canon Henry William Lett, an amateur archaeologist and naturalist, built on O'Donovan's thesis in his account of the 'Danes Cast' in county Down and associated this linear earthwork with a political boundary, which he called 'the great wall of Uliadh' (Lett and Fennell 1896 and 1897). The two authors appear to have been influenced by the writings of the poet and antiquarian Sir Samuel Ferguson but especially by John O'Donovan (Lett and Fennell 1897, 79). In 1898 Lett also described the Dorsey, regarding it as a cattle krall and a defensive earthwork guarding the pass to the north, which was more or less what O'Donovan had written sixty years beforehand (Lett 1898).



Figure 17: Portrait of William Francis De Vismes Kane (1840-1918) (Carpenter 1918)

William Francis De Vismes Kane, who had a country house at Drumreaske, county Monaghan, was a naturalist who specialised in Lepidoptera (moths and butterflies) and he also took an interest in antiquities (Carpenter 1918). Kane published two detailed studies of the linear ditches of the BPD and he wrote another article on the Doon of Drumsna (Kane 1909; Kane 1915; Kane 1916/17). In the course of his research he provided information on the BPD in Monaghan to the Ordnance Survey who were surveying for the third edition maps. His interpretations of the extent and purpose of the dyke were again influenced by O Donovan and Lett and largely derived from literary and folklore sources. Whilst Kane's work has much value in the detailed descriptions and sometimes plans and sections of extant earthworks, his conclusions are generally held to be largely speculative (*eg.* Walsh 1991, 14).

Kane's view was that the scattered segments of dyke throughout south Ulster and north Connaught were the remains of a once-continuous defensive line that incorporated natural features such as lakes and mountains and was constructed around AD 200 for Celtic Ulster. In an updated version of his earlier paper Kane corrected errors he had made in tracing the route of the earthworks and set out his evidence for a 'triple line of defences against invasion from the south'; this line represented the phased contraction of the Celtic kingdom of Ulster (Kane 1916-17, 543). In his paper on the Doon of Drumsna, county Roscommon, Kane proposed that the massive earthworks were 'evidently designed to prevent incursions into Roscommon from Leitrim at a point where the river Shannon was more or less fordable' (Kane 1915, 324).

4.2 MODERN ARCHAEOLOGY AND THE BLACK PIG'S DYKE

R.A.S Macalister, then professor of Celtic archaeology at University College Dublin, agreed with Kane's hypothesis and saw the Black Pig's Dyke as a 'chain of earthen mounds', the inspiration for which came from Roman Britannia (Macalister 1928, 288). In 1930 H.G. Tempest described in comprehensive detail the Dorsey and provided an indispensable synthesis of 17th-19th century written accounts of the monument (Tempest 1930). His use of aerial photography to interpret the monument was innovative for its time and he concluded that the Dorsey and the BPD linears were built by 'some danish or Irish sept' to a Romano-British model, sometime between the mid-third and fourth centuries AD as frontier defences for the kingdom of Ulster. In 1934 the great English archaeologist O.G.S. Crawford walked the BPD from Bundoran, where he found an unrecorded section of dyke, to Kiltyclogher, county Leitrim (Crawford 1955, 226). His book *Archaeology in the Field* contained a photo of a length of the dyke at Lattone, Co. Leitrim (Crawford 1953, plate 14).



Figure 18: Professor Oliver Davies (1905-1986) examining an artefact in the Natal museum



Figure 19: Sir Shane Leslie photographed in 1939 (National Portrait Gallery, London)

The renowned prehistorian Oliver Davies excavated the South Gate area of the Dorsey in 1938 and found that the 'old coach road' that runs through the eastern gap was an original part of the monument (Davies 1938). He also exposed lines of palisades and a round, post-built structure. The following year he excavated the ditch in the north of the monument (Davies 1940a). His investigations at the apparent intersection of the Dorsey and a linear earthwork to the west which he related with the BPD indicated both were of the same date (Davies 1940b). Oliver Davies' 1955 critique of Kane's interpretation of the BPD represents the first serious attempt to deconstruct the latter's arguments. Davies criticised Kane's over-reliance on oral traditions and his propensity to form unified boundaries from disparate earthworks. Stating that 'frontier delimitation is a pastime better suited to the amateur politician than to a serious scholar' Davies noted that 'Kane chased the Black Pig; where there was no entrenchment on the ground, place-names or traditions about this animal sufficed to construct his frontiers' (Davies 1955, 29, 32). Instead, Davies saw their chief purpose as controlling access through significant routeways: 'the dykes were not defensible fortifications...the purpose of the Irish dykes was to concentrate traffic at defined crossings' (Davies 1955, 29).

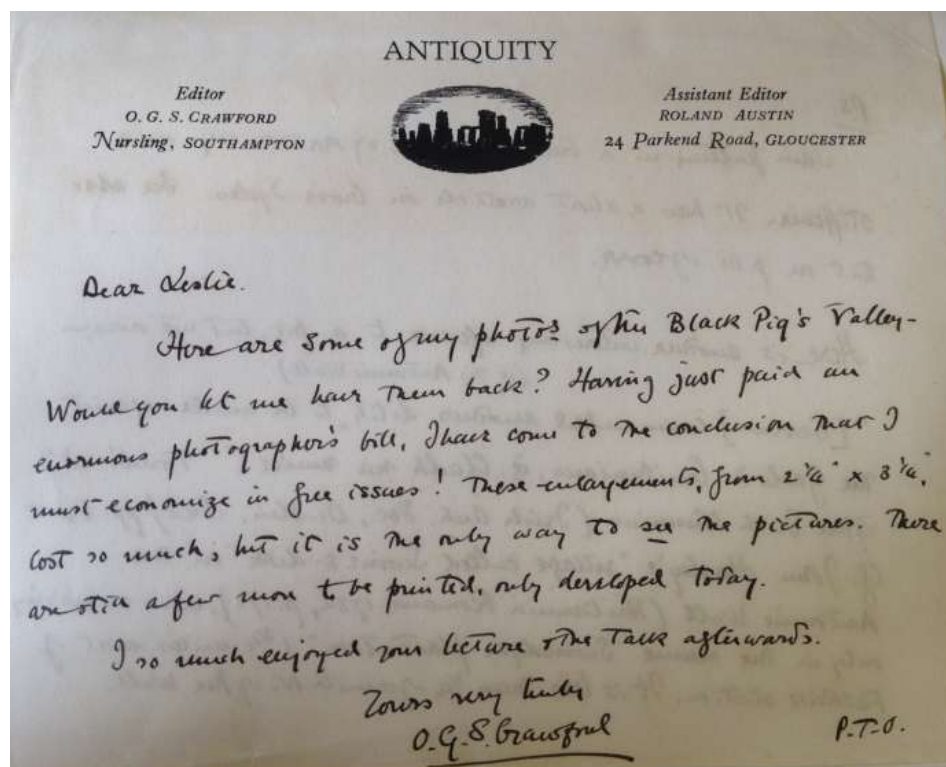


Figure 20: Letter (undated) from O.G.S Crawford to Shane Leslie in relation to aerial photographs of the BPD (NLI 230385)



Figure 21: The 'Worm Ditch' at Drumcore, county Monaghan (Barringer 1955, 11). Note what appears to be a standing stone in the background (this is not included on the sites and monuments record).



Figure 22: Brandon Barringer at the Black Pig's Dyke with 'Miss Phillips' at Aghareagh West, county Monaghan

When Sir Shane Leslie of Glaslough, diplomat and writer, offered his friend Brandon Barringer (1955), director of a publishing company in Pennsylvania, the use of 'the most luxurious headquarters any archaeological expedition ever enjoyed' at his castle at Glaslough he 'could not resist the temptation' to research the dyke' (Barringer 1955, 6). Leslie had been studying the dyke in considerable detail and his notebook containing the fruits of his researches, maps and sketches is in the National Library of Ireland (MS 23 385.)⁴ Barringer, his wife and Leslie, walked west-east across the country seeing 'virtually every earthwork' (Barringer 1955, 10). They even conducted a small excavation at the Dorsey in an attempt to obtain 'piles to bring to the Museum for a Carbon 14 age determination' and another small investigation occurred at Lislea on the Fermanagh side of the Finn river (Barringer 1955, 7, 10, 13). However, these investigations proved unsuccessful and the only discovery was an arms dump from the 'Black and Tan days'. Following their researches Barringer pointed out that the gaps in Kane's postulated line were too extensive to have been simply plugged by natural features and he discounted the theory of a continuous boundary: 'having started out with the idea of putting the Black Pig's Dyke 'on the map' as a line across Ireland, it is hard to have to suggest its removal from the maps on which it now appears, but that seems to me to be the only conclusion justified by the evidence' (Barringer 1955, 17).

Between 1955 and 1980 the BPD only received occasional attention. An impressive aerial photograph of the dyke to the north of Granard, county Longford, taken by the Committee for Aerial Photography of the University of Cambridge sometime between 1963-8, was published by E.R. Norman and J.K.S. St. Joseph (1969, 39). In 1966 Estyn Evans wrote that the various stretches of dyke were built independently to control routeways (Evans 1966). Two years later in 1968 a G. McCabe walked the route of the Monaghan West section and described it in considerable detail, handwritten in red pen. This is contained in the Record of Monuments and Places file of the Archaeological Survey of Ireland. Michael Herity and George Eogan's *Ireland in Prehistory* deals briefly with the BPD, noting that it might have been influenced by the Roman *limes* (Herity and Eogan 1977, 230). Another general account in a similar vein was written by Peter Harbison (Harbison 1988, 192).

In 1980 a significant breakthrough in dating the linear earthworks was present in a paper by Chris Lynn on the preliminary results of his 1977 excavations at the Dorsey (Lynn 1980). Lynn demonstrated through dendrochronological dating that a palisade at the Dorsey was constructed

⁴ http://sources.nli.ie/Record/MS_UR_000426

from timbers felled between 100-90 BC and that this correlated well with the final phase of Site A at Navan Fort, which was similarly dated to 95-4 BC (Lynn 1980; Baillie 1988; Baillie and Brown 1989). Lynn also set out an important research agenda for the study of Irish linear earthworks, one that encouraged the objective analysis of each component of the postulated BPD. Lynn, nevertheless, favoured interpretation of the linear trenches as a territorial frontier and did not discount the 'unified boundary theory' (Lynn 1980, 122). The final report on the excavations was published by Chris Lynn in 1992, in which he speculated that 'linear earthworks had a religious as well as a military function in determining the limits of tribal territory on important routeways' (Lynn 1992). Lynn has also proposed that the Dorsey was not an enclosure, but two successive lines of defence (Lynn 1989), an interpretation subsequently strengthened by dendrochronological dates which indicated the southern line of the Dorsey was built around 50 years after the northern line (Baillie and Brown 1989).



Figure 23: Excavations underway at Aghareagh West (photo: Aidan Walsh)

Aidan Walsh's significant excavations on the Aghareagh West section of the Monaghan West earthwork near Scothouse in 1982 were first reported in *Emania* (Walsh 1987) and an expanded and updated version was subsequently published in the *Clogher Record* (Walsh 1991). The results of Walsh's excavations are described in detail below and from the evidence he gathered he concluded that 'we can begin to think of a frontier composed of various scattered earthworks and suggest that they might be linked together in time, origin and function' (Walsh 1991, 26).

Fionnula Williams published a paper in 1987 on the folklore of the BPD in which she showed that 'the Black Pig's Dyke legend' is associated with many linear earthworks throughout Ireland, with a particular concentration in south Ulster (Williams 1987). Williams found that the earliest

occurrence of the legend occurs as late as 1835, and was collected by John O Donovan. Two years later Chris Lynn's indispensable 'bibliography of northern linear earthworks' was published (Lynn 1989).

In 1993 the Dorsey was the subject of a study by N.B. Aitchison, in which its ritual character and its similarities with Emain Macha were emphasised (Aitchison 1993). Aitchison disagreed with Lynn's theory that the monument was two boundary lines and instead proposed that the Dorsey was built to enclose a river and bog which were used for ritual deposition in the Iron Age. Writing in 1994 Barry Raftery noted the concentration of linear earthworks across the midlands and south Ulster and he briefly compared the construction techniques for the different stretches and whilst he acknowledged that there was a 'generalized correspondence' with the ancient border of Ulster that there was no evidence the dyke ever formed a continuous frontier (Raftery 1994, 83-97). Likewise he questioned if the recorded stretches ever formed 'part of a common phase of construction or even belong to the same cultural horizon' (Raftery 1994, 87). In discussing the function of the earthworks Raftery favoured a role in hindering and controlling the movement of people and cattle.

The linear earthworks of Ulster were described by Jim Mallory and Tom McNeill, who regarded them as 'clearly defensive', being built to protect the northern side, probably from the types of cattle-raiders depicted in the Ulster Cycle from the south (Mallory and McNeill 1995, 150-163). Gabriel Cooney and Eoin Grogan on the other hand saw the scale of the BPD boundaries, the Dorsey and analogous monuments as expressions of the power of the social élites who had them constructed, perhaps as ritual and/or practical responses to perceived threats (Cooney and Grogan 1994, 194). They also made the important point that the extensive utilisation of oak timbers at these sites, in tandem with the other great ritual structures of the period, 'reflects the scale of organisation of human effort that was involved in the construction of these features in the landscape' (Cooney and Grogan 1994, 194).

In decrying how archaeology can be sometimes manipulated 'to make a point' Peter Woodman cited as an example how the significance of the BPD in relation to other linear earthworks had been overemphasised to create a 'historical' boundary in later prehistoric Ireland (Woodman 2000, 21). John Waddell (1998) summarised the evidence for ten different sections of linear earthworks of various forms which may loosely come under the umbrella of the BPD. He noted that such boundaries would have had added significance during the climatic deterioration and

agricultural downturn evidenced from around 200 BC and whilst agreeing with earlier writers that these were fundamentally territorial boundaries he tended towards agreement with Aitchison's ritual explanation for the Dorsey and the Doon of Drumsna (Waddell 1998, 360).

Conor Newman in a 1999 paper on Neolithic linear earthworks, possibly cursus monuments, in county Meath drew a distinction between earthworks that 'have an obvious practical function such as roadways or the demarcation of real geographic/territorial frontiers, like the Dorsey, Co. Armagh ... and ritual linear earthworks' (Newman 1999, 141). A useful table of radiocarbon dates from the former is included. Newman makes the interesting suggestion that the traditional explanation for the BPD may contain 'a germ of agrarian rationale' in that the rootings of pigs would have had an important role in winning territory whose boundary is strengthened by association with a magical pig. A general account of linear earthworks and the Black Pig's Dyke appeared in Mitchell and Ryan (2001, 243).

Further excavations at the Dorsey in 2002 by the Centre for Archaeological Fieldwork, Queen's University Belfast uncovered three palisade trenches, a ditch and a gully that was radiocarbon dated to between the fifth and first centuries BC in the south of the earthworks, along with other features of later date (Hurl and McSparron 2004). The palisades ran alongside a routeway through the Dorsey 'enclosure' and were interpreted as having defined 'zones of control' (Hurl and McSparron 2004, 49).

Short summary descriptions of the BPD were published by Chris Lynn (2003a) and by Andrew Halpin and Conor Newman (2006, 154-55). Lynn cautioned against interpreting associations between the disparate sections of earthworks in the absence of dating evidence, and noted that 'in addition to defence, the earthworks, perhaps marking the boundaries of individual communities, may have had symbolic, legal or religious purposes'. In another paper from 2003 Lynn also notes that the great linear earthworks could be taken as proof for a large population in Ireland during the Iron Age, although alternatively they could infer that scattered mobile communities could be concentrated on constructing these 'major public works' (Lynn 2003b, 23). Chris Lynn also provides an important overview of work on the Dorsey and suggests, based on the similarities in dating that it and the BPD were 'parts of a brief phase of earthwork and timber defences, blocking routeways separated by natural obstacles' (Lynn 2003c, 61).

In 2004 excavations were conducted on the linear earthwork at Magheracar, county Donegal, the results of which are described below (O'Donnchada and Lynch 2013).⁵ A study of a section of the Dunclá, county Longford between Lough Gowna and Lough Kinale was undertaken by Mark Keegan for the Discovery Programme's Lake Settlement Project (Keegan 2010). Keegan described and mapped the 10.6km course of this section of dyke, including a previously unrecognised 1.1km long section along the western shore of Lough Kinale. This was regarded by Keegan as the 'purposeful barring or hindering of access to the southern and western shores' of the lake and the rather slight remains of the earthwork he considered as territorial boundaries rather than a 'defensible frontier line' (Keegan 2010, 143).

Peter Wise was the first to use GIS technology to address the questions around the purpose of the linear earthworks in the north midlands/south Ulster region (Wise 2005). Using very much a processual archaeology approach he argued that rather than defence or control, some linear earthworks were 'built to facilitate a river-trading network by providing 'portage' from one river or lake to another' (Wise 2005, vi, 212). Most recently the two Fermanagh sections of the BPD have been thoroughly documented using LiDAR by Claire Foley and Ronan McHugh (2014 i, 294-304).

⁵ <http://archaeology.nra.ie/Home/ViewResult/925dba76-fbbb-4ac8-ae66-041b2ea71678>

| Section No. | County | Townland(s) | RMP Number(s) | First Edition Designation | Second Edition Designation | Total Length Historic Mapping | Interpolated maximum extent | Total width ditches and banks (Maximum) | Elevation | Form | Approx. Orientation |
|-------------|-----------|---|--|---------------------------|--------------------------------------|--|-----------------------------|---|------------------------|--|----------------------------|
| BPD-001 | Donegal | Magheracar, Drumachrin, Rathmore and Rathglass | DG 109-007 | Not marked | Not marked | 355m length excavated along the route of the N15. | 355m | 15m | 20m above sea level | Univallate with double ditch.. | Larger ditch to the south |
| BPD-002 | Leitrim | Aghavanny, Cornagowna, Corracloona, Corraleskin, Gortnaderry, Gubmanus, Lattone | LE005-005, LE005-009, LE005-014, LE008-009, LE008-012, LE009-001 | Not marked | 'Worm Ditch or the Black Pig's Race' | 3.63km | 10.36km | 10.5m | 50-90m above sea level | Bivallate with medial fosse. | Higher bank to south west. |
| BPD-003 | Cavan | Canbeg, Derrinatawy Glebe, Annagh Upper | CV005-032 | Not marked | 'Worm Ditch or the Black Pig's Race' | 4.41km | 4.41km | Unknown | 50m above sea level | Earthen bank along river bank. Possibly natural. | River to south. |
| BPD-004 | Roscommon | Corry, Cultyconway, Ardaffrin, Lackagh | RO011-058, RO011-080 | Not marked | 'The Doon' | 1.6km cross-spur earthworks 1.52km ancillary earthworks | 3.12km | 156m | 40-60m above sea level | Trivallate. South earthen bank 30m wide x 6m high. separated by a 'paved causeway' 4-10m wide from an outer (northern) double bank 3m x 1m high. Two inturned entrances 16-23m wide. 100m to the south is a second line of ramparts following river Shannon, comprising two earthen banks 4m wide x 0.8m high. | Encloses spur to north. |
| BPD-005 | Longford | Abbeylara, Ballinrud west, Dalystown, Dring, Springtown, Toberfelim, Tonymore north, Tonymore south, Tromra, Ballinulty lower, Carragh, | LF010-018 | 'Dunclá' | 'Dunclá or the Black Pig's Race' | 10.27km | 10.6km | 22m | 120m above sea level | Bivallate with medial bank. | Ditch deeper at south. |

| | | | | | | | | | | | |
|---------|----------|---|-------------------------|--------------|--|--------|--------|---------|--------------------------------|---|--|
| | | Aghnagarron, Ballinrud east, Carrickduff, Ballinrud glebe, Cartronbore, Clogh | | | | | | | | | |
| BPD-006 | Cavan | Ardkill More, Largan, Drumbarry | CV0031-004 | 'Worm Ditch' | 'Worm Ditch or the Black Pig's Race' | 1.36km | 2.15km | 15m | 130-150m above sea level | Single bank and ditch. | Ditch to north-east. |
| BPD-007 | Monaghan | Aghareagh West, Aghnaskew, Annagheane, Cornapaste, Corrackan, Corrinary, Corrinshigo, Drumavan, Drumgrone, Fastry or Racreeghan, Killark, Lattacrossan, Skerrick west, Magherashaghry | MO021-011, MO022-023 | 'Worm Ditch' | 'Worm Ditch or the Black Pig's Race' | 8.7km | 9.85km | 17m | 45-130m above sea level | Bivallate, palisade trench, gulley and possible parallel ditch to north. | Larger ditch and palisade to north. |
| BPD-008 | Monaghan | Maghernakill | MO025-044 | Not marked | 'Site of Ancient Entrenchment' | 150m | 150m | Unknown | 110m above sea level | Unknown | Unknown |
| BPD-009 | Monaghan | Drumgristin | MO025-046 | NA | Site of Ancient Entrenchment | 82m | 82m | 22m | c.110m above sea level | Single bank and fosse | Ditch to north. |

Table 1: Summary table of Black Pig's Dyke sections within study area

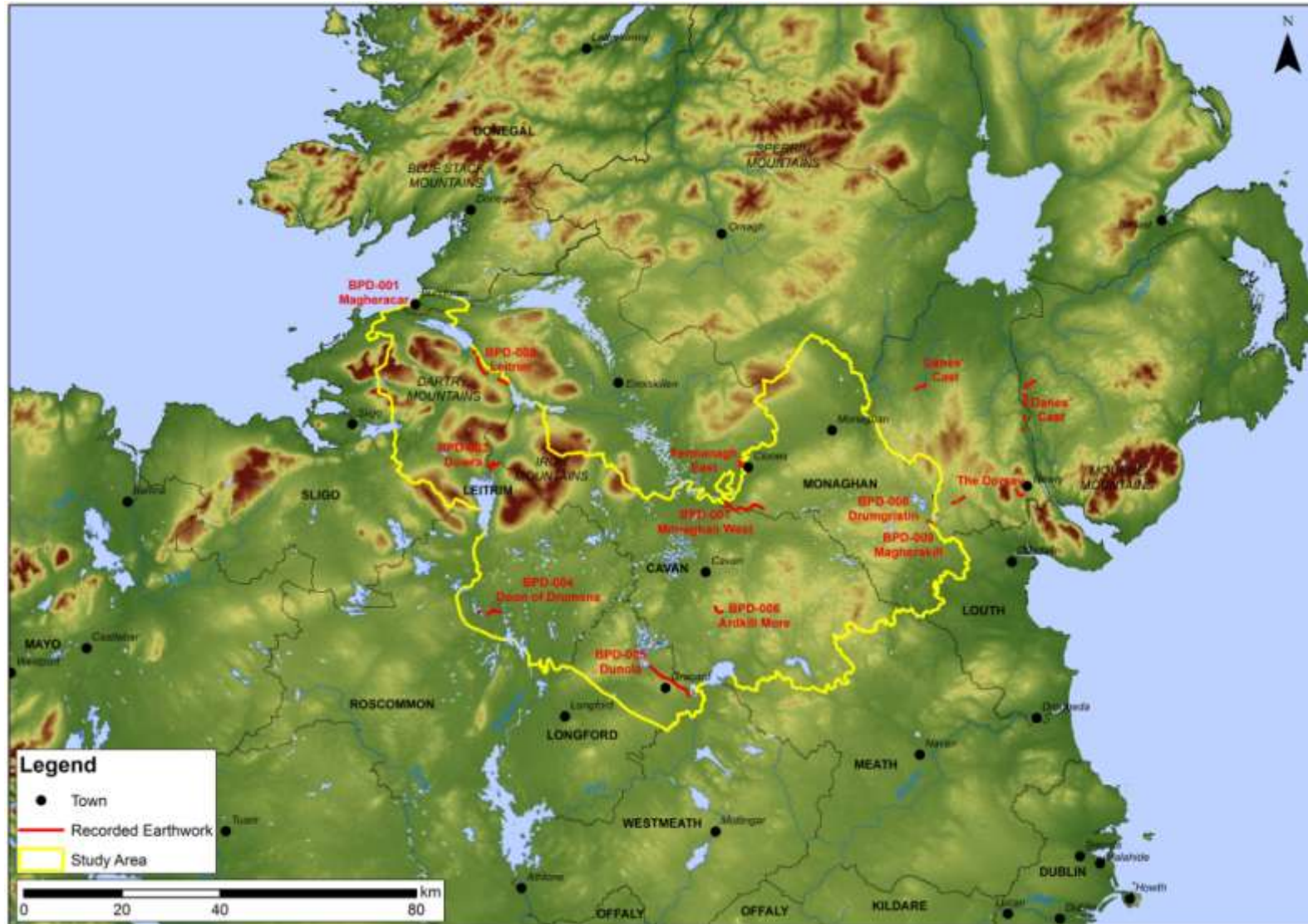


Figure 24: Map of the linear earthworks of the study area and other major linear earthworks of the region

5.0 ARCHAEOLOGICAL INVENTORY

The inventory presents detailed descriptions of each surviving section of the Black Pig's Dyke within the study area, accompanied by mapping in Volume 2. The inventory entries are arranged geographically from west to east. The key attributes of each section are summarised in Table 1.

5.1 BPD-001 DONEGAL: MAGHERACAR

MAGHERACAR, DRUMACHRIN, RATHMORE AND RATHGLASS

RMP DG 109-007

Vol. 2: Map 1-3

The linear earthwork, which was partially excavated in advance of a road development, is positioned on flat lowland on the north side of the Drowes River, 20m above sea level. There is one unclassified megalithic tomb (LE008-013) on a slope overlooking the southern end of this section, 610m to the southwest, and within 2km is a single standing stone and three ringforts.

This section of the monument is not visible on any of the historic Ordnance Survey maps. Kane gave an account of its course running from Bundrowes through the townlands of Maghernakill, Drumachrin, Rathmore and Rathglass towards Lough Melvin in a fragmentary fashion but this was subsequently dismissed by Oliver Davies (Kane 1909, 314, 320; Kane 1917; Davies 1955, 32). No local traditions are known.

Prior to excavations the dyke could be traced for 250m and was orientated east-west, curving to the south-south-west at its western end where it was cut by the present R280 to Kinlough. At its eastern end it terminated immediately to the north of Sruhanafalla. No definite remains of the monument could be seen on the Bing aerial photography. In 2004 archaeological excavation recorded a 355m segment of the linear earthwork (O Donnchadha and Lynch 2005). The earliest activity was represented by a pit of unknown date that was sealed beneath the bank. The bank was of dump construction, 1.5-2m high x 8m wide (max.), and was flanked on either side by a ditch. The northern ditch (Ditch A) measured 3.5m wide x 1.15m deep had steep sides and a flat base. The primary ditch-fills consisted of compact clays with traces of peat organics and

occasional charcoal flecks. Ash charcoal from the basal fill produced a radiocarbon date of 60-420 cal. AD (Beta-206066) and hazel charcoal from the upper fills produced a date of 1024-1218 cal. AD (Beta-205186). The southern ditch (Ditch B) was 5.5m wide x 0.85m deep and had been disturbed by the later insertion of a box-drain.



Figure 25: Magheracar 2 (Area B) under excavation (O'Donnchada and Lynch 2005, plate 2) (courtesy National Roads Authority/Irish Archaeological Consultancy Ltd.)

At the eastern end of the embankment, at the base of the northern slope, a 'Brown Bess' flintlock rifle dating to around AD 1800 was uncovered. Other finds included post-medieval pottery, clay pipes from the topsoil, and a small fragment of slag from a nearby furnace of Early Medieval date. The excavators interpreted the evidence to suggest that the earthworks formed part of the Black Pigs Dyke (O'Donnchadha and Lynch 2005, 23).

5.2 BPD-002 LEITRIM: 'WORM DITCH OR THE BLACK PIG'S RACE'

**AGHAVANNY, CORNAGOWNA, CORRACLOONA, CORRALESKIN,
GORTNADERRY, GUBMANUS, LATTONE**

RMP LE005-005, LE005-009, LE005-014, LE008-009, LE008-012, LE009-001

Vol. 2: Map 4-20

The Leitrim section is located to the east of Dough mountain in the County River valley. Its height above sea level varies from 50m-90m. The stretch begins 1km south of Lough Melvin and

extends intermittently in a general northwest to southeast direction towards Lough Macnean Upper, a distance of 10.36km. The total length of the earthworks as depicted on the second edition OS map is 3.63km and many of the gaps in the monument correspond to areas of marshy wetland. The linear ditch travels over undulating ground which primarily consists of sandstone tills. No archaeological excavations have been conducted along this section. A kilometre to the west of the dyke at Raheelin, Co. Leitrim a hoard of Bronze Age flint flakes were found in 1930 (RMP LE 008-026)⁶ (Jessen 1949, 156-158).

This section does not appear on the first edition Ordnance Survey map (1835-36) but is marked on the second edition map (1882-87) where it is shown as six separate stretches represented as a single-bank earthwork by hachures and called 'Worm Ditch or the Black Pig's Race'. Occasionally, dotted lines are used to represent the conjectural extent of the monument. The course of the monument is mostly unchanged between the second edition and the 25" maps (1909). Kane included this section as being part of his 'No. 1 Frontier' and he refers to it being broken up into several sections, claiming that local farmers had levelled the earthwork in the past (Kane 1909, 322; Kane 1916, 563. Kane also records that it was termed 'Bohereen-Wan' and the 'Great Man's Track' (Kane 1909, 321). Davies also includes reference to this section and records it as running in a gentle sweep from the townland of Grubmanus Bog to Lough Macnean Upper, from bog to bog (Davies 1955, 32). He describes it as being about c.2.5m wide and having rock cut ditches in places.

The RMP has given each of the six sections a separate RMP number but describes them all as following the same line and as being part of the same monument. Each entry from the archaeological inventory is transcribed below, with additional comments (Moore 2003):

-LE005-005

This section is set in an undulating landscape of bog and scrub situated c. 1km south of the south end of Lough Melvin. An overgrown flat-bottomed fosse (width 4.4m; depth 0.7m; length 200m) oriented northwest to southeast and flanked by an earthen bank (width 3.7m; height 0.25m) to southwest and a slight bank (width 1m) to northeast. It continues c. 1km to south (LE005-009---). A boreen seems to be dug into the ditch for c.1km to the south.

⁶ The exact findspot has gone unrecorded.

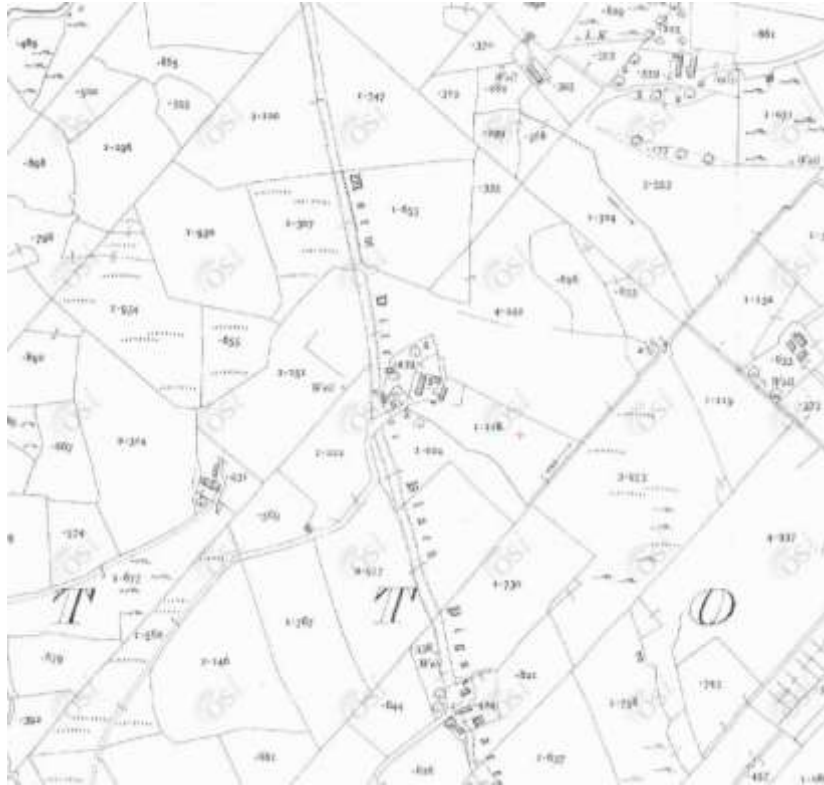


Figure 26: 'Worm Ditch or Black Pig's Race' at Lattone, on second edition OS map

Of the 200m described as extant by the RMP 164m is visible on the Bing aerial photography (2012), which also appears to show traces of the monument extending to the north for an additional 94m before terminating at a patch of marshy wetland. It is possible that the earthworks continue further north beyond this marshland, as there appears to be a linear pattern visible in an area of forestry following the line of the monument.

- LE005-009

This section is set in an undulating landscape with rough pasture. A north-south V-sectioned fosse (width 2.8m; Depth 0.4m) with an earthen bank (width 3m) intermittently visible at the west side (length c. 250m). It is absent from a flat-bottomed valley immediately to south for c. 300m but continues beyond that (LE005-009---), and continues c. 1km to north (LE005-005---).

None of this section is visible on the Bing aerial photography (2012) but the area has patches of tree cover, which may conceal traces of the monument.

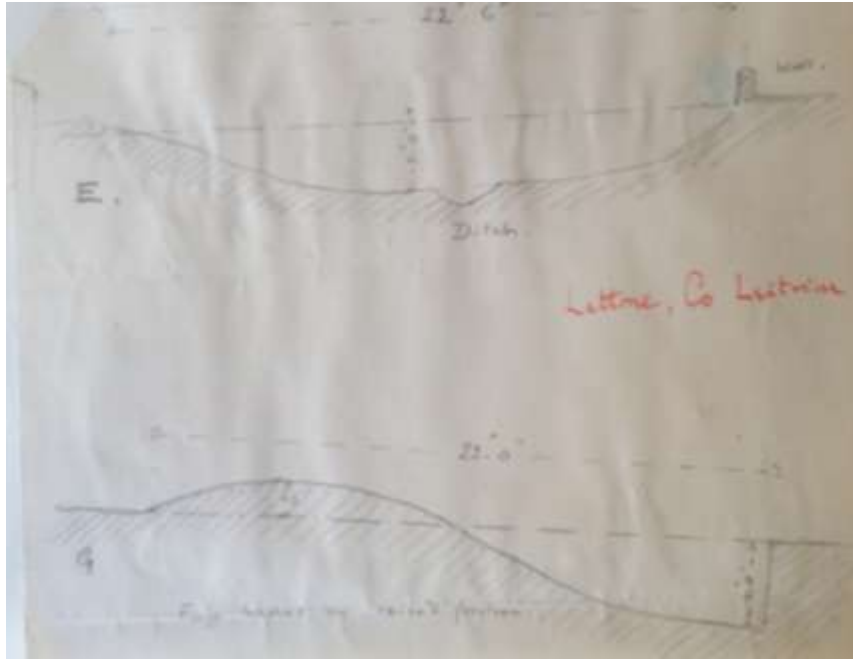


Figure 27: Section through the Leitrim linear earthwork at Lattone, Co. Leitrim, as recorded by Shane Leslie c.1950 (NLI MS23 385).

-LE005-014

This section is located in an undulating landscape. The earthwork (length c. 2km) is oriented north-south and is generally overgrown with scrub but is sometimes grass-covered and in places runs through coniferous forest. It consists of a flat-bottomed fosse (width 3m; depth 0.6m), while at some points it has naturally lower ground to east (width of top 6.5m; width of base 1.5m; depth 1-1.6m), sometimes with a field bank on the outer edge of the fosse. The north end terminates at a flat-bottomed valley but it continues c. 300m beyond that (LE005-009-), while the earthwork also continues c. 600m to south (LE008-009--).

1.22km of this section at its northern end is under heavy forestry. The line of the monument can however be made out on the Bing 2012 aerial photography in the planting pattern of the forestry and it then emerges from the forestry to form part of field boundaries for its remaining extent (935m).

-LE008-009

This section is set on undulating landscape. The earthwork (length c. 1.25km) is in interrupted sections, oriented generally northwest-southeast. It is generally overgrown but is sometimes grass-covered and in places passes through a coniferous forest. It consists of a flat-bottomed fosse (width 3-4.5m), usually with higher ground (height 1.2-1.5m) at southwest and a low bank (width 3-5m; height 0.2-0.5m) at northeast. The north end of this ditch was utilised as a roadway. Towards the south end it becomes a simple ditch (width of base 1.5m; depth 0.3m) with a

field bank at the northeast side. Other sections lie c. 2.6km to southeast (LE008-012---) and c. 600m to north (005-014---)

418m of this section appears to be still extant on Bing aerial photography to the north of the monument. Beyond this there may be traces still surviving within field boundaries but this cannot be said with any certainty from analysis of the aerial photography.

LE008-012

This section of the monument is located in an undulating landscape and consists of a section of an overgrown linear earthwork extending northwest to southeast (length c. 700m). It consists of a fosse (width 2.4m; depth 0.35m) flanked by earthen banks to northeast (width 4m; height 0.55m) and to southwest (width 3m; height 0.4m). It continues c. 500m to the south-southeast (LE009-001---) and c. 3km to northwest (LE008-009---)

A narrow stretch of this monument is visible on the Bing aerial photography (2012) for a distance of 628m. There is a clear gap of 70m in the monument's course at an area of marshy ground to the centre of this stretch. Elsewhere it seems to have been incorporated into a series of field boundaries and country laneways.

LE009-001

This section of the monument is located in an undulating landscape and consists of a discontinuous, overgrown linear feature (length c. 600m) aligned northwest to southeast, consisting of a V-sectioned fosse (width 4.5-5m; depth 0.4m) at the northwest end to a flat-bottomed fosse (width 3.5m; depth 0.45m; max. diameter 1m) at the southeast end, flanked by earth and stone banks (width 2.8m; height 0.35m) on either side. It continues c. 300m to west-northwest (LE008-012---).

Much of this stretch is visible on the Bing aerial photography (2012). Beginning at its northwest end there is a 38m length running southeast towards a small lake. It can be seen to continue on to the southeast of this lake for a further 109m as a double bank with an intervening ditch. Beyond this there is a 50m gap in the earthwork where it crosses an area of marshy wetland, before resuming for a length of 424m through dense woodland. Its line can be seen in gaps in the forestry and along its edge. At this point the monument joins up with a field boundary that may represent an extension towards the Black River, but this is difficult to say with certainty from the aerial photographs alone.

5.3 BPD-003 CAVAN: 'WORM DITCH OR BLACK PIG'S RACE'

CANBEG, DERRINATAWY GLEBE, ANNAGH UPPER

RMP CV005-032

Vol. 2: Map 21-25

The earthworks cross a flat glacial valley between the Iron and Dartree Mountain ranges, with Lough Macnean to the north and Lough Allen to the south. This section does not appear on the first edition Ordnance Survey maps (1835-36) but is marked on the second edition (1876-80) as 'Worm Ditch or Black Pig's Race'. It is represented by hachures running along the River Shannon to the southwest of the village of Dowra, on the border of Counties Cavan and Leitrim. An additional section is shown to branch off to the north for a short distance along the Owennayle river, a tributary of the Shannon. On the Leitrim second edition maps (1882-87) the monument is not identified. The 25" map (1908-11) only shows the short stretch along the River Shannon to the south of where the Owennayle joins it as being part of the 'Worm Ditch or Black Pig's Race'.

Within 6km of the monument are three court tombs, located at the bottom of the valley which is crossed by the linear earthwork. There are no Bronze Age or Iron Age monuments recorded within its vicinity; the next significant phase of settlement in the area appears to have been during the Early Medieval period as indicated by a concentration of ringforts to both the north and south of the monument. These are primarily located on the valley floor. Four ringforts are located within 200m of the south side of the dyke. The closest ringfort to the north side is located at a distance of 350m.

No archaeological excavations have been undertaken on BPD-003. Kane believed it formed part of the northernmost frontier line ('Frontier 1'), between Ulster and Connaught (Kane 1916, 564) and he was unaware of any extant remains between Lough Allen and Lough Macnean (Kane 1909, 320). He postulated that any section of the dyke that might have existed here would only have been constructed in areas where the river formed an insufficient defence in itself.

Its total maximum length as depicted on the second edition Ordnance Survey map is 4.41km. The stretch is marked as commencing at the bridge over the River Shannon in the village of Dowra. It then proceeds in a general southwest direction along the river, appearing intermittently on both banks. After 2.92km it branches in two with one branch continuing in a southwesterly

direction along the River Shannon for a further 669m and the other travelling northwards along the Owennayle River for a distance of 821m.

This Archaeological Survey of Ireland noted that no trace of the monument was visible on the ground, nor was there any local knowledge of its existence (O'Donovan 1995). They described the hachures on the second edition map as referring to the gradual slope from the level of the field to that of the river. There are also no obvious traces of the monument visible on the Bing Maps (2012), although both river banks have heavy tree cover, which makes identification difficult.

5.4 BPD-004 ROSCOMMON: 'DOON OF DRUMSNA'

CORRY, CUILTYCONWAY, ARDAFFRIN, LACKAGH

RO011-058, RO011-080

Vol. 2: Map 26-34

The 'Doon of Drumsna' is set within a tight meander on the river Shannon between Lough Corry and Lough Tap, in north-east county Roscommon. A 188 hectare (1.86m long x 1.3km max, 750m min. width) spur of low-lying land (40-60m above sea level), the Charlestown peninsula, is cut off by a pair of 1.6km long ditches and ramparts that run across the south side of the promontory. The northern third of the spur, the former demesne of Charlestown house, is now covered in forestry, and the remainder is predominantly pastureland. A road connecting Jamestown, county Roscommon on the west and Drumsna, county Leitrim on the east traverses across the promontory and the Shannon via bridging points that perpetuate shallow fords on the river. There are two distinct but perhaps related sections to the Doon of Drumsna, a complex of banks and ditches pierced by two out-turned entrances extending east-west to cut off the promontory, and secondly a predominantly single rampart following the east bank of the river Shannon to the south of the main ramparts. The site is not noted on the first edition Ordnance Survey map (1838) but is marked on the second edition (1889-95) as 'the Doon', with hachured lines representing parallel earthwork banks.



Figure 28: The first edition OS map shows Charlestown demesne (shaded) at the north end of the spur. The Doon of Drumsna earthworks are not marked on the map.



Figure 29: The western section of the Doon of Drumsna earthworks (photo: C. O Drisceoil)

Kane produced a quite detailed survey of the earthworks in a paper published in 1915 (Kane 1915) (Figure 30) and although he describes the Doon as being part of a frontier between 'Cruaghan and Aileagh' he does not specifically link it with his version of the BPD and none of his maps of the latter include this monument (Kane 1915, 326). Tom Condit and Victor Buckley, who excavated at the site to retrieve dateable material (Lanting et.al. 1991), noted that it could have been in use at the same time as the BPD earthworks, but again do not make a direct connection (Condit and Buckley 1989, 14; Condit and Buckley 1993). The Archaeological Survey of Ireland do link the Doon with the BPD, but may be misinterpreting Kane (see below). They interpreted the earthworks as acting to control access from Ulster into Connaught by blocking important fording points on the river Shannon.

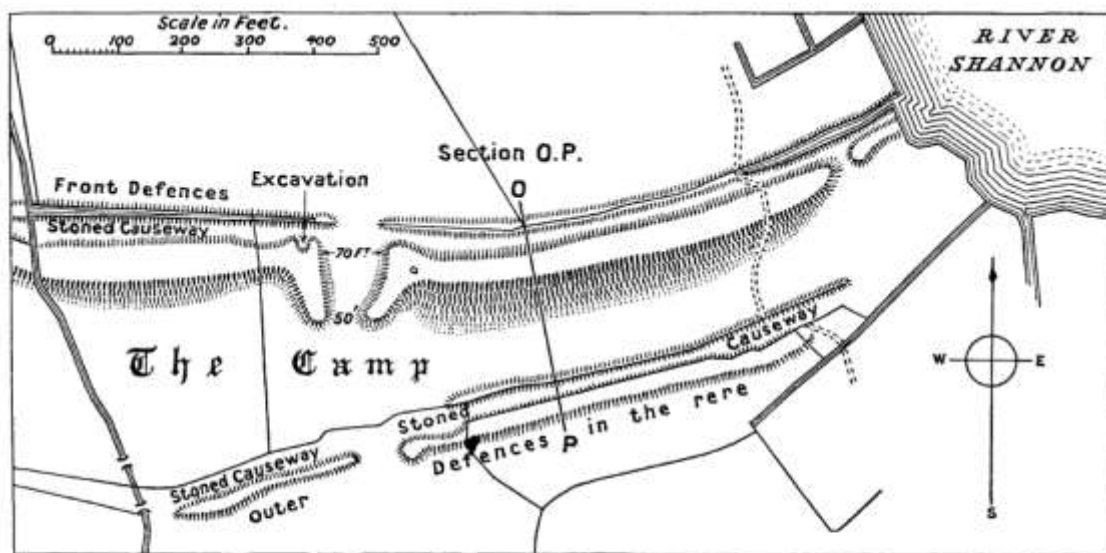


FIG. 1.—Plan of Eastern End of the Dun.

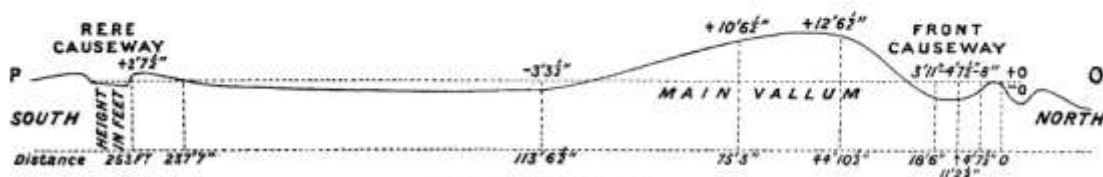


FIG. 2.—Section O-P on Plan.

Figure 30: Kane's plan and section of the eastern section of the Doon of Drumsna (Kane 1915, plate XXIX).

The surrounding archaeological landscape includes monuments of late prehistoric, perhaps Bronze Age, date concentrated on the north side of the River Shannon, opposite the Doon: five *fulachta fia* within c.2km, two mounds (690m and 1.2km away respectively) and a standing stone 1.2km to the south. There are also twelve ringforts and five 'enclosures' within 500m of the monument. It is worth noting that some of the enclosures, in particular those within the

promontory, could be of prehistoric date as suggested by Chris Read's excavations 'within' the Doon at Drumcleavry in 2005 (Read 2007b). In addition, a late Bronze Age sword was recovered from a bog at Canbo, county Roscommon, 9km to the west of the monument (Jessen 1949, 152).

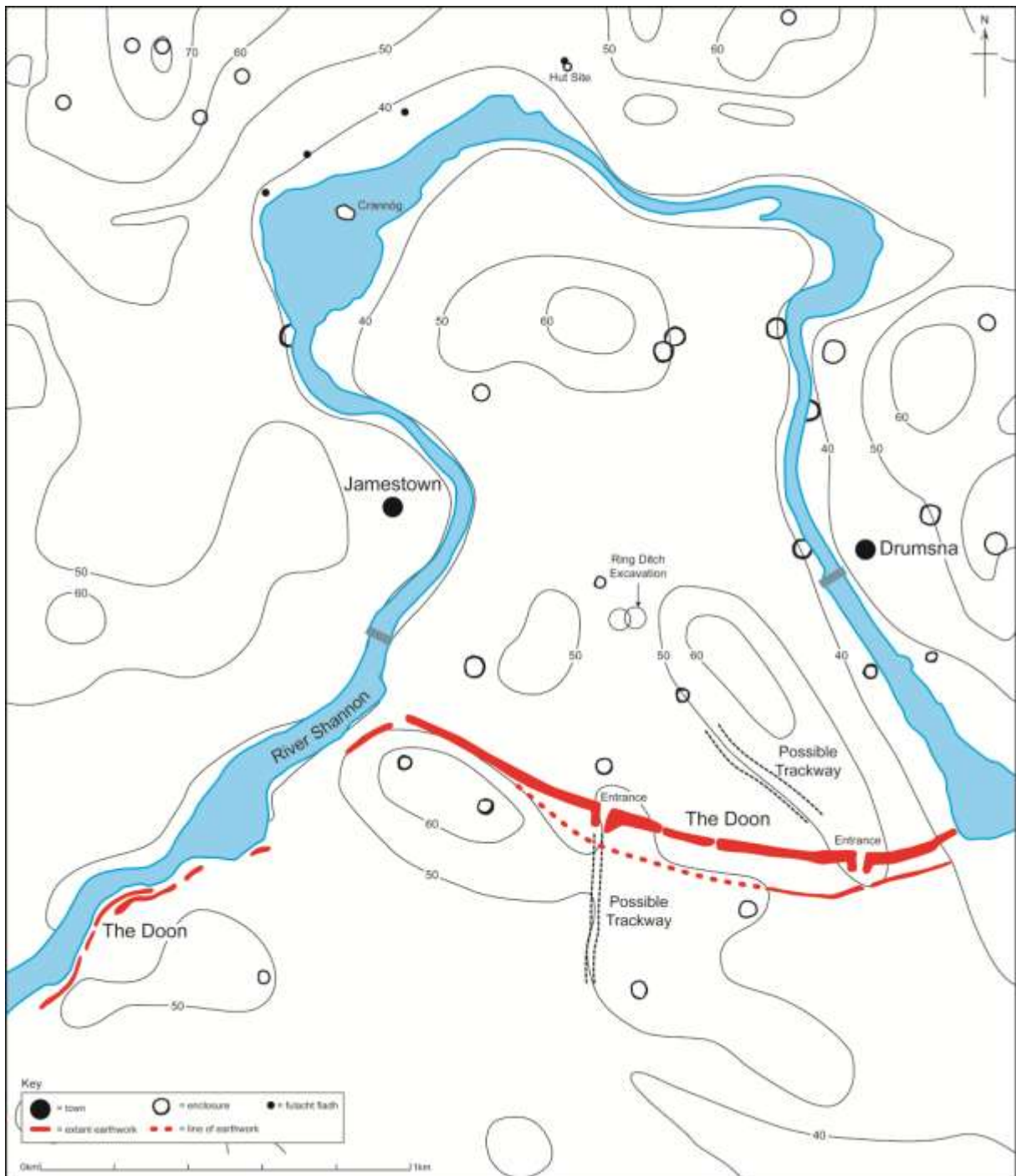


Figure 31: Plan of the Doon of Drumsna, derived from LiDAR model and RMP (Kilkenny Archaeology)



Figure 32: Doon of Drumsna (Google Earth)

The following description of the Doon derives from the Archaeological Survey of Ireland.

Two parallel systems of banks and ditches (length c. 1.6km east-west) cut off a loop of the River Shannon to the north which contains c. 2 km², and the banks continued up-river from its west end along the south bank of the river (length c. 1.2km). This is identified as a defensive earthwork of Connaught against its enemies in Ulster (Kane 1915) and part of the extensive linear defences called the Black Pig's Dyke and the Danes Cast demarking the boundaries of Ulster (Kane 1909). Described as two principal lines of defence, the one to the north consisting of an inner earthen bank (width of base c. 30m; height up to 6m) separated by a 'paved causeway' (width c. 4-10m) from an outer double bank (width c. 3m; height 1m) further north. There are two entrances (width c. 16-23m) with inturned horns (length c. 40m) situated c. 80m and c. 650m from the east end. About 60-100m to the south is a second line of defence surviving only at the east end (length c. 300m) and consisting of two earthen banks (width c. 4m; height c. 0.8m) separated by a fosse or 'causeway'. These works are interpreted as a defensive line of Connaught controlling a number of fords in the loop and west of the loop in Cultyconway. Geophysical survey revealed the possible presence of a central gatepost in the east entrance of the main rampart. Excavation revealed that the main rampart may have been enlarged, while a Carbon 14 date suggests Iron Age construction (Lanting et al. 1991). Archaeological testing at the west end of the banks in Ardanaffrin failed to produce related material (Read 2007a), and archaeological monitoring of works at the S end of the bank in Cultyconway also failed to produce archaeological material.

Most of the earthworks described above and marked on the historic maps remain visible on the Bing aerial photography (2012) and on a LiDAR model produced for this project (Figures 32-5).

The following describes their extent.

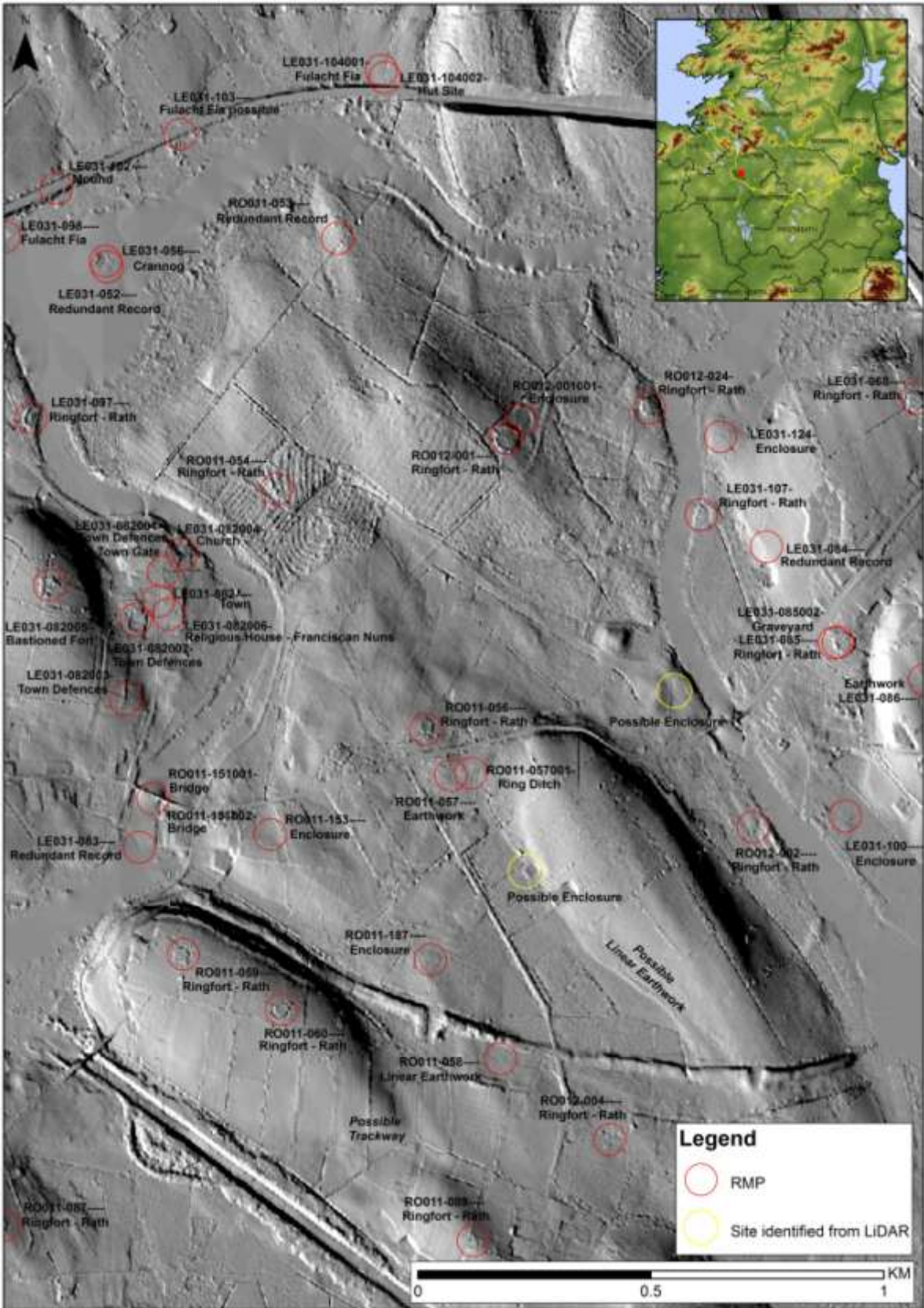


Figure 33: LiDAR 0.5m (hillshade) of the Doon of Drumsna with archaeological monuments marked

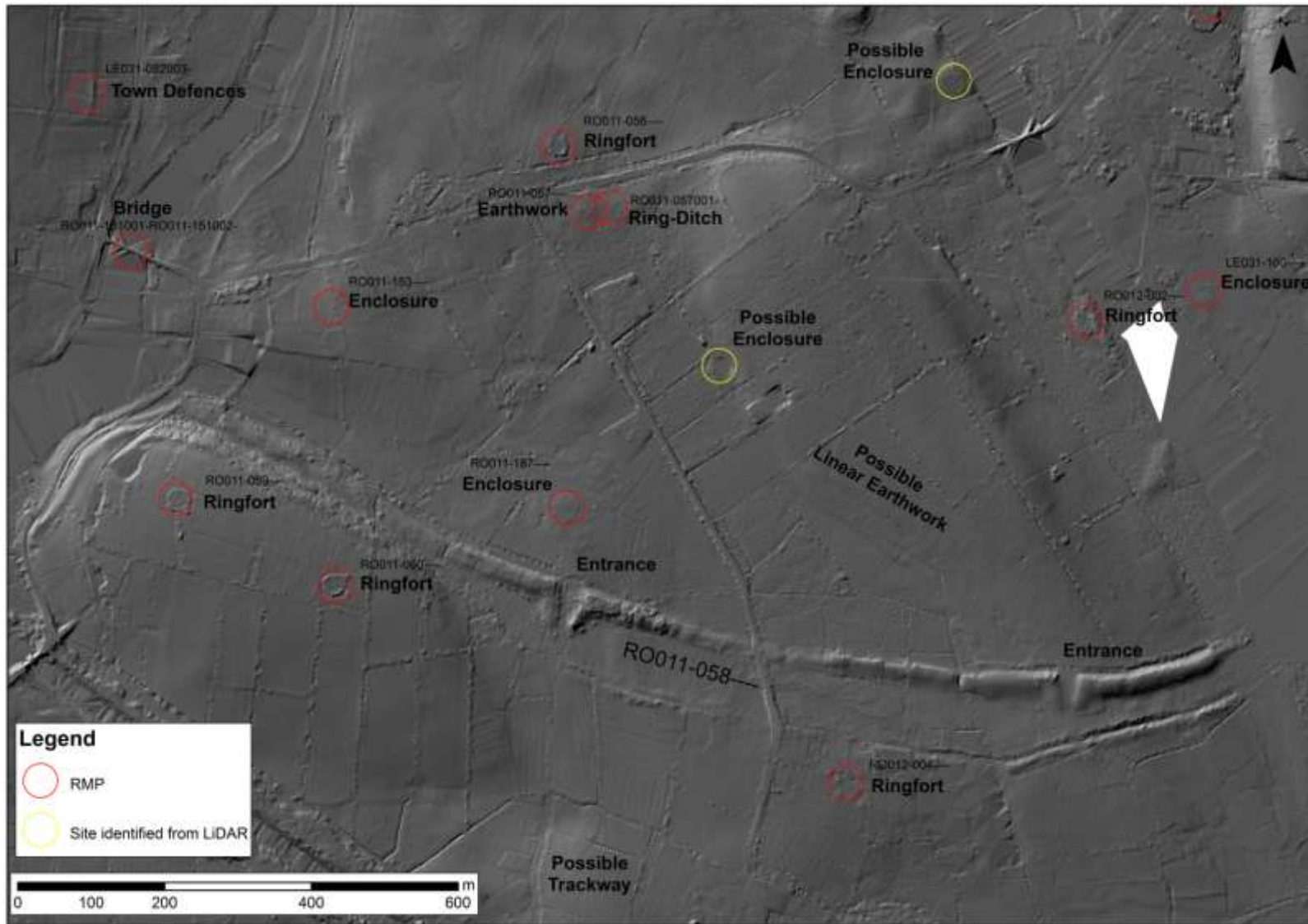


Figure 34: LiDAR 1m (hillshade) model of the cross-spur ramparts of the Doon of Drumsna

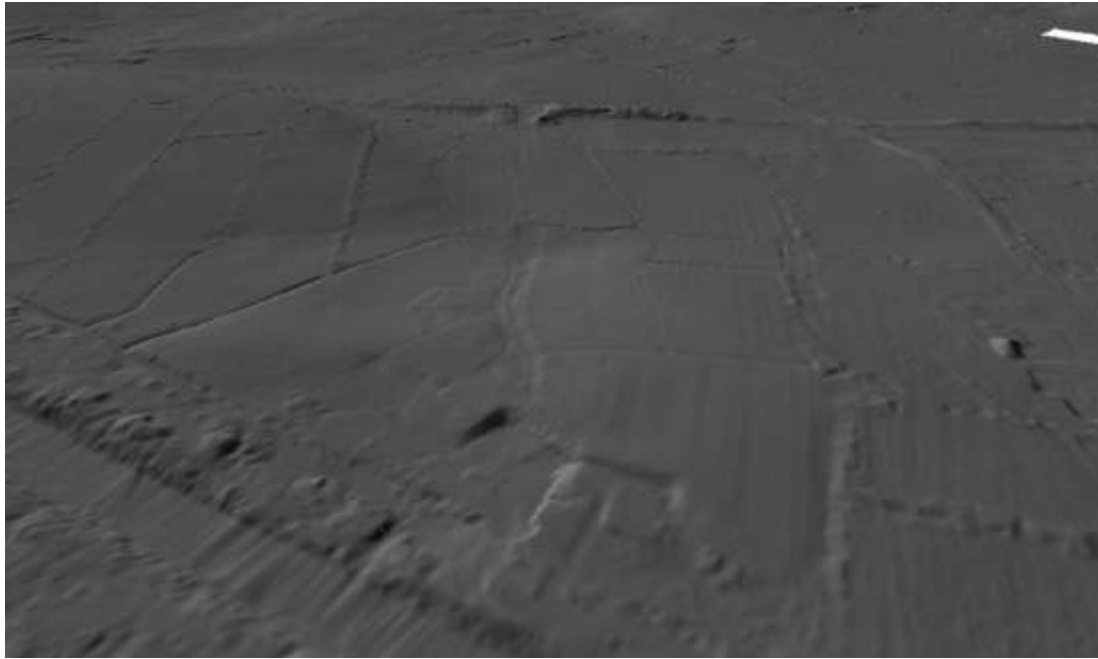


Figure 35: LiDAR image of possible roadway with house platforms leading up to the western entrance of the Doon of Drumsna.

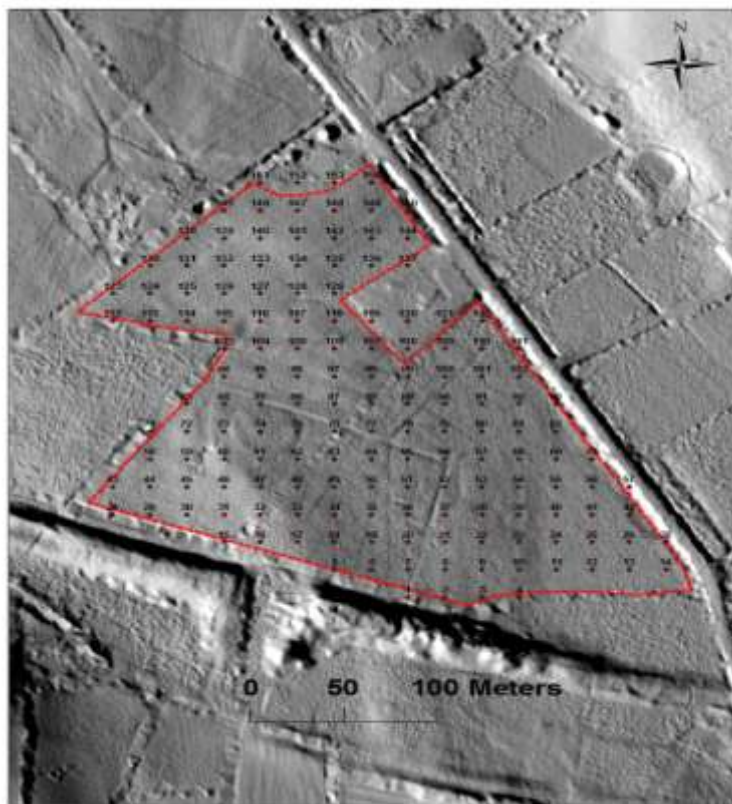


Figure 36: Geophysical survey area at the Doon of Drumsna

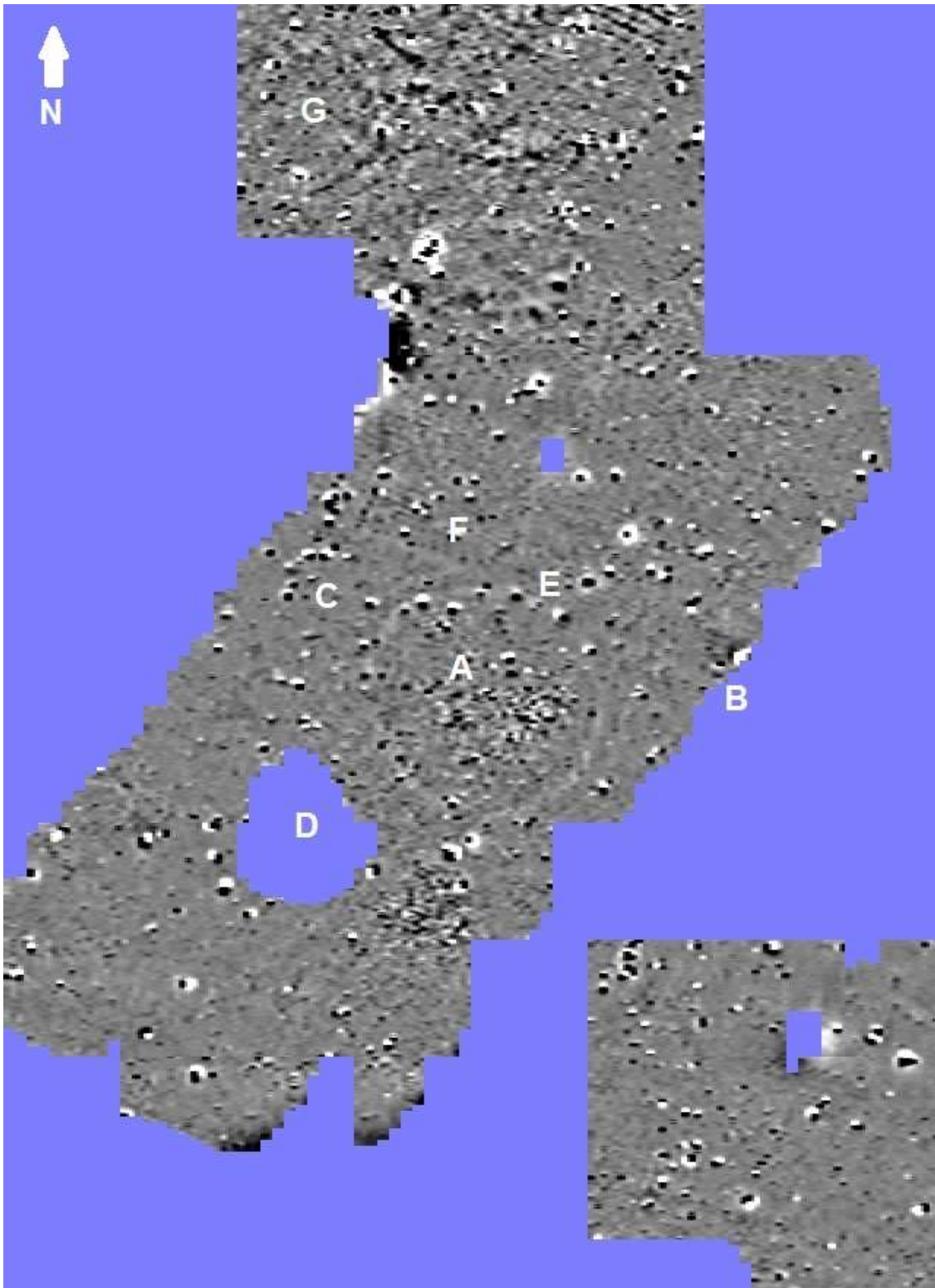


Figure 37: Preliminary greyscale plot of geophysical survey results from the Doon of Drumsna (courtesy: Susan Curran)

The line of the large, northernmost, bank of the cross-spur earthworks is largely extant as it runs through Lislackagh townland. Here, the eastern entrance, which is at right angles to the main bank, is formed by a 25m wide gap. A roadway, which appears on the first edition Ordnance Survey (1838) extends north-south through the centre. The western entrance to the promontory is also visible turning out 40m to the south of the main rampart at right angles. The earthworks continue as a double bank and ditch in a westerly direction through the townland of Ardnaffrin until they reach the foreshore of the river Shannon. It subsequently turns to the southwest and it can be seen to follow the south-east bank of the river. South of the Jamestown Canal only trace remains of the line of the monument can be seen on the LiDAR to survive as a double-bank. This also appears to show sections of bank and ditch linking the fragments of the monument as represented on the second edition Ordnance Survey. In Corry townland the small section of the monument recorded by the Ordnance Survey can be seen to survive on the Bing Aerial Photography (2012) as a tree covered line.

There have been a number of archaeological investigations in and around the Doon. Kane records his excavations, which documented metallurgy at the entrance and the 'ends of wooden stakes with iron points' excavated on the north-west side of the eastern entrance (Kane 1915, 327). Condit and Buckley (1998, 3) speculated that these may have been part of a 'cheveaux de frise', erected to protect the eastern flank of the defences. A trench which was dug through the ramparts by a local farmer in 1990 presented a timber in the 'base of the bank', the bark of which was radiocarbon dated to 342-42 cal BC (GrN-18564- 2105 +/- 35; Buckley and Condit 1991; Lanting et.al 1991). A small panel of geophysical survey was also carried out at the eastern entrance, and may have identified a large central posthole (Buckley et.al. 1990; Condit and Buckley 1998, 4). In 2005 archaeological test excavations in advance of a single house development inside the Doon and some 500m north of the ramparts uncovered evidence for a 20m diameter ring-ditch (RO011-057001-) which contained cremated bone (Read 2007b).

A geophysical survey immediately to the north of the west entrance into the Doon of Drumsna was conducted in November 2014 by Susan Curran (School of Archaeology, University College Dublin) for this project (Figures 36-7). 20m x 20m survey grids were laid out using 'Trimble VRS Now' survey grade GPS which provides centimetre-level accuracy. Data were collected using a Bartington Grad 01 DL601 dual gradiometer. Data were recorded at a traverse interval of 1m and a sample interval of 0.25m (4 points per metre along each traverse). The survey was undertaken walking parallel lines, south to north, starting in the southwest corner of each grid.

Overall the weather conditions were dry throughout the survey, although the ground underfoot was very wet and in parts too wet for data collection. Some areas of the fields were very churned up (by farm machinery / animals) and were also unsuitable for survey. Unfortunately some of these areas were those located closest to the 'Doon of Drumsna' itself and the probable entrance which runs along the line of the field boundary. In particular, the smaller field to the south/southeast of the survey area was very disturbed and marshy so only nine grids were surveyed in this area. A total of 55 20m x 20m grids were surveyed over the course of the three days. The data was downloaded from the instrument at the end of each day using Bartington Grad601 software and processed using Geoscan Research Geoplot version 3 software. Geoplot Data Treatment: Clip, de-spike, zero mean traverse, interpolate.

The magnetic gradiometer survey showed quite clearly the enclosure (A) which was discovered by lidar survey in 2012 (RO011-187) (Figure 37). This lies approximately 80m north of the Doon itself. It is probably the most definite feature revealed by the geophysical survey. This enclosure measures approximately 40m in diameter and is located adjacent to a water feature (figure 1 & 2). This water feature (D) appears as a rectangular feature on the 6inch and 25inch historic maps. There is a suggestion of a second enclosing feature to the east of RO011-187 and to a lesser extent, to the north/northwest. This second enclosing feature was possibly eradicated on other sides by the cutting of the drain and the construction of the water feature.

A modern field drain (B) which is visible on the ground appears as a linear feature running approximately NW-SE crossing the northern part of RO011-187.

There is a probable smaller circular feature to the west of RO011-187, possibly adjoining it and creating a figure-8 shape (C), this measures approximately 30m in diameter. Two further circular features (E & F) (possibly conjoined) are located to the north of RO011-187, with one of them appearing to be cut by the recorded monument and the drain which runs across the field.

The northern portion of the field shows a number of anomalies, however at this stage, it is not possible to tell whether they are a result of the construction of the two houses lying on either side, or whether they are archaeological in origin. The feature to the northeast appears approximately circular in shape and is approximately 30m in diameter (G). This lies more than 200m north of the Doon.

5.5 BPD-005 LONGFORD: 'DUNCLÁ OR BLACK PIG'S RACE'

**ABBEYLARA, BALLINRUD WEST, DALYSTOWN, DRING, SPRINGTOWN,
TOBERFELIM, TONYMORE NORTH, TONYMORE SOUTH, TROMRA,
BALLINULTY LOWER, CARRAGH, AGHNAGARRON, BALLINRUD EAST,
CARRICKDUFF, BALLINRUD GLEBE, CARTRONBORE, CLOGH**

LF010-018

Vol. 2: Map 35-49

The Longford section of the Black Pig's Dyke runs through the undulating lowlands to the north of Granard for a distance of 10.3km, between Lough Gowna and Lough Kinale. It varies in height from 62m-127m, with its highest point being 2.7km from the south-east terminus (Figure 38). The earthworks appear on the first edition Ordnance Survey map (1836-37) as a near-continuous hachured feature labelled 'Dunclá', and is shown as a series of faint lines representing a single bank and ditch for 6.2km and a large double-banked earthwork with an intervening fosse for 3.32km. The depiction on the second (1879-81) and 25" (1911) maps is broadly similar, although the hachures used are clearer, with gaps in the monument being more obvious. It is relabelled 'Dunclá or the Black Pig's Race' on these editions. One minor archaeological investigation of the dyke recorded the 0.12m deep truncated base of the ditch beneath a road surface (Delany 2010).⁷ Kane records that a section dug through the Dunclá at Dalystown showed the fosse on the Meath (south) side was deeper than on the north (Kane 1909, 318).

This section of the dyke is located within a dense concentration of ritual and funerary monuments which may originate in the Neolithic, to judge by two megalithic tombs situated to the north-east of the earthworks. The late prehistoric landscape is characterised by standing stones and ring-barrows: 22 standing stones lie within 2.4km of the monument (13 to the northeast, 8 to the southwest) and 10 barrows are located within 6km (3 to the northeast, 7 to the southwest). There is also a hilltop enclosure, perhaps a hill-fort, 2.2km away at Granard motte. In the Early Medieval period dense settlement occurs around the Dunclá: there are six ringforts in the immediate vicinity of the earthwork on its northeast side and seven to its southwest. There is also an enclosure built adjacent to the monument on its southwest side.

⁷ The exact location of the excavation is not recorded in the excavations bulletin.

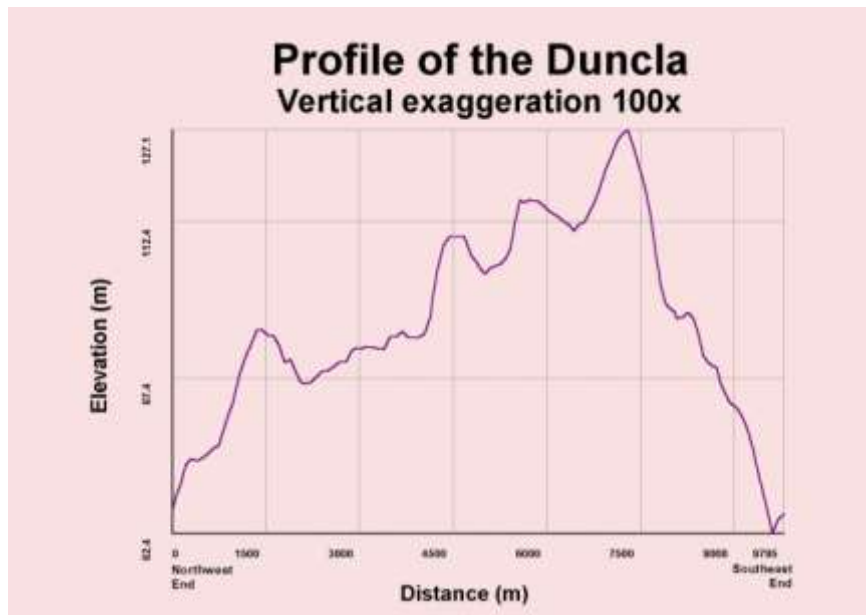


Figure 38: Profile of BPD-005 Dunclá (Wise 2005, 141)

Kane describes the Longford linear earthwork as being made up of broken lengths of earthworks linking Lough Kinale and Lough Gowna and describes well-preserved sections, including one at Dalystown that measures 30m in width and incorporates a central bank 3m high x 6m wide (Kane 1909, 318). He also noted that in places where the ramparts had been levelled 'the deep excavation of the trench still persists' (Kane 1909, 318). This suggests the original configuration of the Dunclá was a medial bank flanked by ditches.

Kane places this section of the Dyke along his No. 2 Frontier, between the Shannon and Meath, a suggestion that was subsequently dismissed by Davies (Kane 1916, 563; Davies 1955, 32). The most recent work on this stretch was carried out by Mark Keegan on behalf of the Discovery Programme, who discovered an additional 1km of earthworks extending south along the west flank of Lough Kinale (Keegan 2010).

The total maximum length as depicted on the second edition OS map is 9.3km, commencing at the south east bank of Lough Gowna and travelling in a general southeast direction until it reaches marshy land on the banks of Lough Kinale. Here it can be seen on the aerial photography to turn south for a further distance of 977m, giving the total length of 10.27km (Keegan 2010, 141). The land here largely consists of flat pasture and is respected by the existing townland boundaries.

The following description is derived from the archaeological survey of Ireland:

This monument is in pasture and marked on all editions of the OS 6-inch map running in a northwest to southeast direction between Lough Gowna and Lough Kinale, a distance of c. 10.6km. Where best preserved, in the northwest of Cartronbore townland, it comprises two substantial banks of earth and stone (width c. 8m; height c. 1.2m), similar in morphology, with a wide, steep-sided, flat-bottomed, intermediate fosse (width 7m; depth c. 1m). Almost all other sections of it have been levelled to a greater or lesser extent. Its circuit is preserved in field boundaries and drains. The precise function of this linear earthwork is unknown though according to local tradition, it was seen as the territorial boundary between the provinces of Ulster and Leinster and between the Gaelic regions of Annaly and Breifne. It seems more likely that it functioned as a territorial boundary marker rather than a defensive frontier line.



Figure 39: The Dunclá at Carrickduff, Co. Longford on an aerial photograph published by E.R. Norman and J.K.S. St. Joseph (1969, 39). The ringfort in the foreground is LF 06-065.



Figure 40: Dunclá at Aghnagarron, county Longford (courtesy: National Monuments Service)



Figure 41: Section of the 'Dunclá' at Carragh townland, county Longford on the first edition Ordnance Survey map.



Figure 42: Iron Age finds in the environs of the Duncá (Fredengren et.al. 2010, 109)



Figure 43: Bronze Age sites and finds in the environs of the Duncá (Fredengren et.al. 2010, 99)



Figure 44: The main central embankment of the Dunclá, north of Granard (courtesy Steve Warrilow)

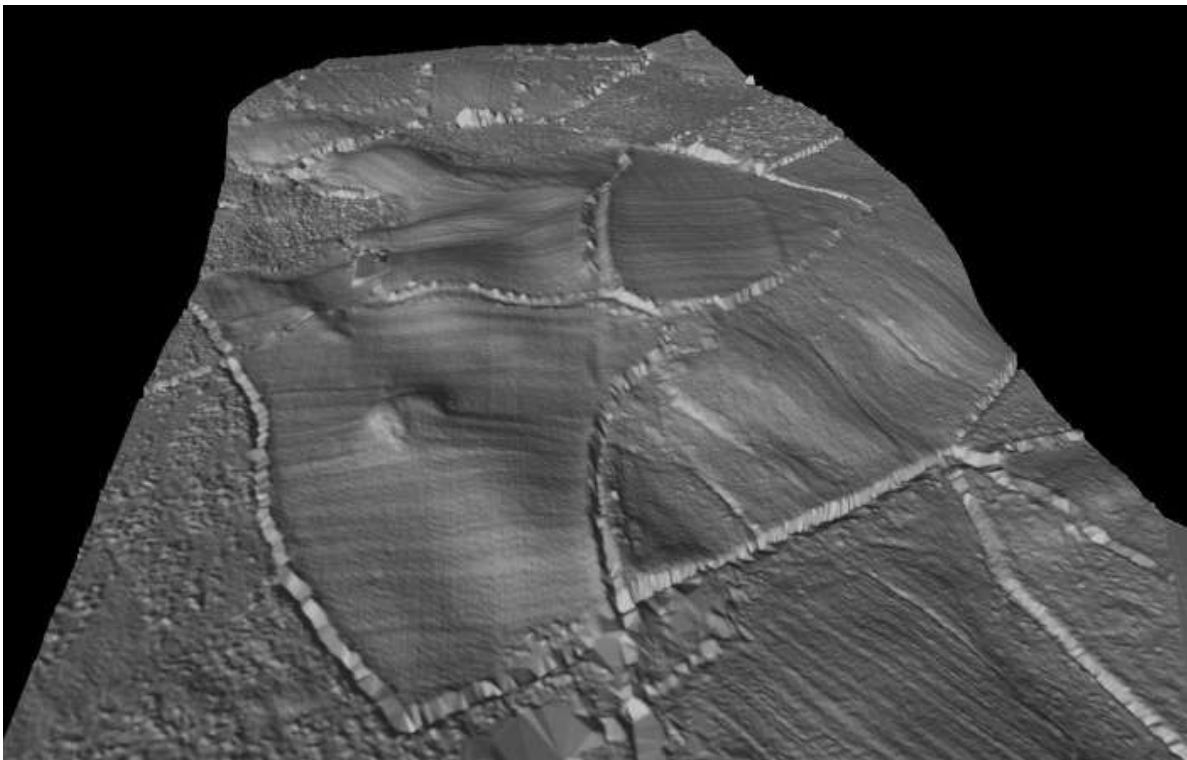


Figure 45: LiDAR 0.5m model (hillshade) of the Dunclá to the west of Lough Kinale

During fieldwork for the Archaeological Survey of Ireland at Ballinulty Lower a 217m stretch of the earthwork as depicted on the OS map was inspected and it was found that only 61m of the bank was still intact. The surviving bank was made up of earth and stone and was between c.4m and c.7m wide and c.1m high. In the townland of Clogh the earthwork consisted of a double ditch with a central low bank. The southern ditch was c.4m wide while the north ditch was c.1m wide. The bank was 7m wide and quite low but appeared to rise higher than the surrounding ground to the north and south of the section. At Carrickduff the linear earthwork was well preserved and consisted of a wide, low, rounded earthen bank c.6m wide with a ditch on each side. The fosse to the southwest was c.6-7m wide and the fosse on the northeast side was slightly narrower. Much of the line of the original monument is visible on the Bing aerial photography, through various field boundaries, drains and trace remains of heavily denuded earthwork.

5.6 BPD-006 CAVAN: 'WORM DITCH'

ARDKILL MORE, LARGAN AND DRUMBARRY

CV0031-004

Vol. 2: Map 50-54

The linear earthwork is situated 6km south of Cavan town in the drumlin belt between Lough Oughter and Lough Sheelin. The earthwork curves around the south side of a drumlin for a distance of 2.15km. On the first edition Ordnance Survey map (1835-36) it is referred to as 'Worm Ditch' and is represented by hachures as a single-banked earthwork. A small portion of the monument is shown as a dashed line. On the second edition Ordnance Survey (1876-80) the dyke is labelled as 'Worm Ditch or the Black Pig's Race' and it is also represented by hachures as a single-banked earthwork, apart from at its south-western end where it is shown as double-banked for a distance of 260m. The monument remains largely unchanged from the second edition to the 25" Map (1908-11).

Kane identified this section in his second paper on the subject and attributes it to the alignment of a 'second frontier' across the country (Kane 1916/17, 549). No other sections of this second frontier were upstanding at the time of Kane's writing and his theory was discounted by Oliver Davies (1955, 32) who suggested its purpose instead was to enclose mountain pasture. Kane (1916/1917, 549) also refers to local traditions of linear ditches having existed in the townlands

of Ardlinney and Ballinamoney but no trace of these could be identified from the Bing aerial photography. Kane also refers to fragments at Bellanagh and these appear to have been photographed by the CUCAP (Figures 48-9) (Kane 1916/1917, 549). No obvious remains of the monument can be seen at Ardlinney, Ballinamoney or Bellanagh today.

There is some evidence for late prehistoric settlement in the area. 1.2km to the northeast on an adjacent drumlin is a barrow (CV026-013) and within 3km a cist and a standing stone are recorded. Seven barrows lie within 5km, five of which are part of a possible barrow cemetery referred to as 'Cromwell's Camp' on the second edition OS map. A 35-40m diameter hilltop enclosure (CV031-060) lies c.200m to the north-east of the linear earthwork. Whilst nothing is known of its age the site commands extensive views over the dyke, perhaps suggesting an association. The Early Medieval period is represented by a scattered distribution of ringforts in the vicinity. One of these ringforts, CV031-047, is built against the south face of the dyke, in Largan townland. There are also two crannogs within 3km.



Figure 46: 'Worm Ditch' marked on first edition OS map at Ardkill More, County Cavan.

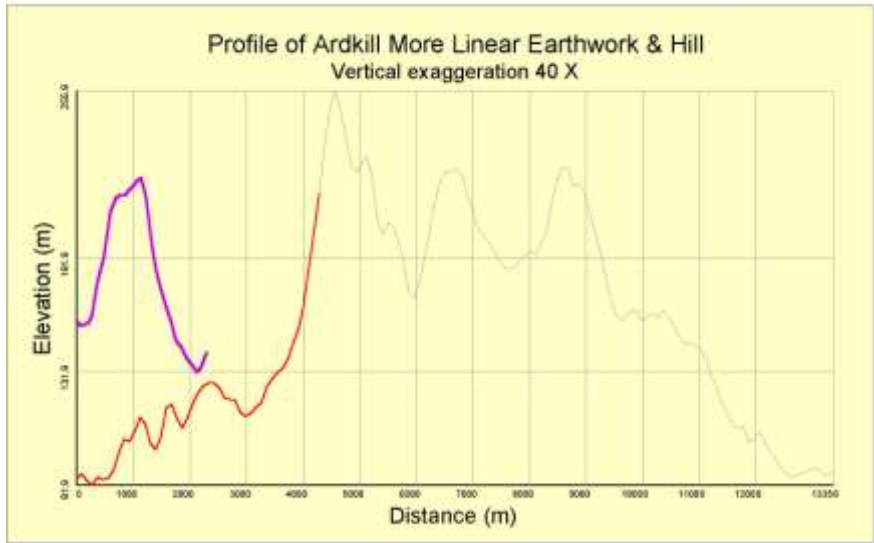


Figure 47: Profile of BPD-006 Ardkill More (purple) and hill (Wise 2005, 120)



Figure 48: Ardkill More linear earthwork (CUCAP ALJ 078)



Figure 49: Ardkill More linear earthwork (CUCAP AYS030)



Figure 50: Section of ditch in the north face of Ardkill More quarry (Campbell 1997, photograph 2) (courtesy: Kieran Campbell).

The Record of Monuments and Places described the remains of the earthworks as follows:

No definite surface remains of the site was identifiable in Ardkill townland N of an active quarry, but the rock-cut ditch (width c. 3.5m; depth c. 1.3m) has been recorded in the north face of the quarry (Campbell 1997, 3). The ditch is also visible (width c. 4m; D c. 1.5m) in the south face of the quarry, while the bank (width 5-7m; height at west c. 2m) with a ditch (width c. 4m; depth c. 1.3m) on the uphill or east side continues south of the quarry (length c. 700m), veering eastwards to the boundary with Largan. In Largan townland the site is marked by stretches of a much-denuded earthen rampart (max. width 7m; max. height 0.9m) with remains of a fosse at its north-northeast foot. The rampart and fosse are much disturbed by modern field drains. A rath is built against the south face of the rampart in Largan townland (CV031-047----). For the final c. 75m the site is marked by a narrow, modern tarred road.

The surviving earthworks measure 1.36km in length (out of a total of 2.15km) and commence at a stream at the south-west base of a high, steep-sided drumlin in the Ardkill More townland. From here it runs approximately northwest-southeast along the west and south of the hillside. The land here is uncultivated and patches of bedrock are exposed in places. A stretch c.150m long has been removed by a modern quarry at Ardkill More. On the aerial photography the line of an upstanding bank which runs into field boundaries to the south of the quarry is visible. An archaeological investigation at the quarry by Kieran Campbell in 1997 represents the only archaeological excavations to have occurred on this section of the dyke (Campbell 1997). Cross sections of the ditch of the monument were exposed in the section faces of the quarry in the northern and southern boundaries of the site. Clear denuded earthworks that are visible in a pasture field in the southern portion of the monument make up an additional 265m of its length. Directly to the north of the Ardkill More quarry 330m of the bank was levelled during land reclamation in the early 1980s (Campbell 1997, 4). It has subsequently become overgrown with furze and bracken and no trace of the earthwork is visible from the aerial photographs. At the base of the hill in Largan townland the dyke changes direction and runs approximately east-west for 750m across relatively flat pastureland, before terminating at the east side of a north-south orientated stream on the border between Largan and Drumbarry townlands. An additional section stretches to the north for a further 190m; this was not shown on the first edition map.

5.7 BPD-007 MONAGHAN: 'WORM DITCH OR BLACK PIG'S RACE'

AGHAREAGH WEST, AGHNASKEW, ANNAGHEANE, CORNAPASTE, CORRACKAN, CORRINARY, CORRINSHIGO, DRUMAVAN, DRUMGRONE, FASTRY OR RACREEGHAN, KILLARK, LATTACROSSAN, SKERRICK WEST, MAGHERASHAGHRY

MO021-011, MO022-023

Vol. 2: Map 55-67

This, the longest linear earthwork in Monaghan, runs discontinuously east-west across the drumlin belt to the south of Scothouse for a projected distance of 9.85km. The terrain it crosses is predominantly undulating pasture land and its course tends to follow the valleys between drumlins. It runs from the Finn River and incorporates two lakes, Laurel Lough and Drumcor Lough, before terminating after crossing the Bunnoe River. At its west end it is 46m above sea level, rising to 131m above sea level in the east.



Figure 51: Section of the BPD between Laurel Lough to Drumcor Lough at Killark townland on first edition OS map

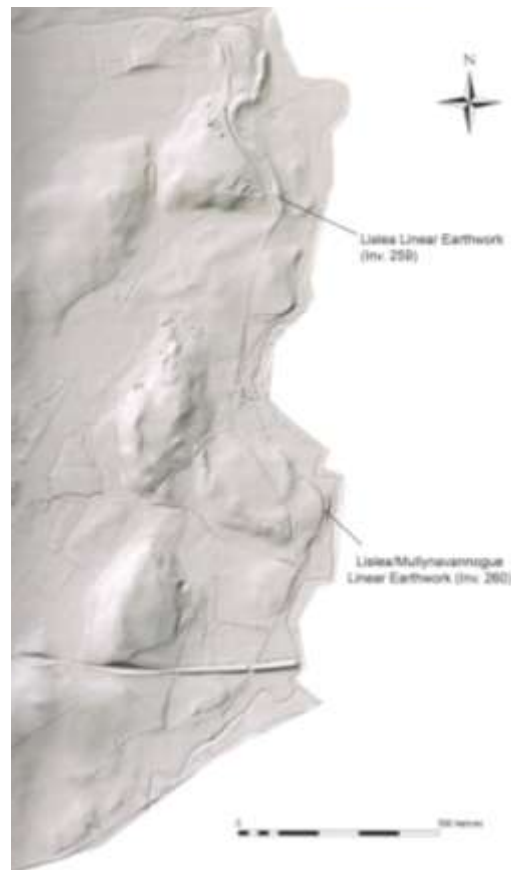


Figure 52: LiDAR model of the Lislea and Mullynavannogue linear earthworks, Co. Fermanagh (Foley and McHugh 2014 i, 137). These may represent the continuation of the Monaghan section of the dyke into county Fermanagh.

There are three megalithic structures in close proximity, a court tomb and an unclassified megalithic structure, 600m and 1.2km to the south respectively. An unclassified megalithic tomb is also positioned 2km to the north. The later prehistoric period is strongly represented to the south of the monument by two cairns, a barrow and two hilltop enclosures (of uncertain date) within 1.5km, and a similar distance to the north a cairn and a standing stone are situated. There is an uneven distribution of Early Medieval sites in the surrounding landscape. None are built into the earthwork itself but there are several in very close proximity: six ringforts, an enclosure and an ecclesiastical enclosure are within 200m of the monument.



Figure 53: 'Worm Ditch' Monaghan (CUCAP AVR033)

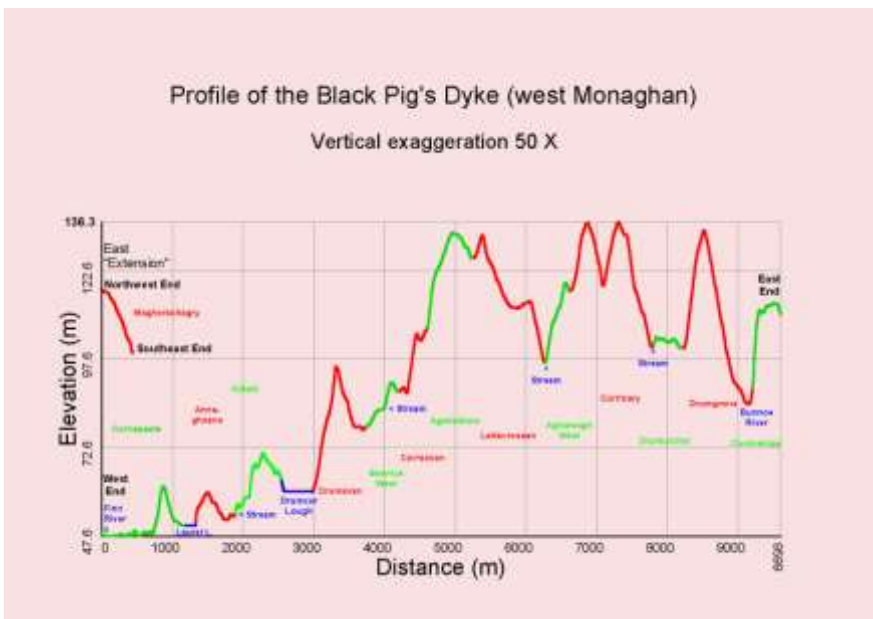


Figure 54: BPD-007 Monaghan West profile (Wise 2005, 179)



Figure 55: Black Pig's Dyke at Aghareagh West, from west (photo: C. O Drisceoil)



Figure 56: Excavations underway at Aghareagh West (courtesy: Aidan Walsh)



Figure 57: A drawing by W.F. Kane from the Shane Leslie notebook showing timbers lining a cross section of the ditch of the BPD at Lattacrossan, county Monaghan (NLI MS 23 385).

The stretch appears on the first edition (1838) Ordnance Survey map as a continuous (only broken where the monument is crossed by roads, lakes and rivers) double-ditched earthwork with a central bank. The southern bank appears to be the more substantial of the two. The monument is labelled as the "Worm Ditch" on this edition. The total distance of the monument as shown on the first edition (1838) map is 8.7km. The second edition (1857-59) map shows a more disjointed monument with broken lines representing the conjectural extent of the monument; these are presumably lengths that were levelled when this revised map had been drawn. The map also depicts the earthwork as both double-banked and single-banked and labels it as 'Worm Ditch or Black Pig's Race. In areas where the monument is represented as a conjectural line '(site of)' is added to the label. The total extent on the second edition map is 7.7km. The 25" map (1910) is broadly similar, however the level of detail is higher and more details can be made out regarding the proportion and structure of the monument in places.

Kane described this length as being part of his northernmost frontier and presented a detailed description of its course (Kane 1909, 302; Kane 1919, 564; *see* Davies 1955, 33). Accounts of this section have also been published by Brandon Barringer (1954, 10-13) and Aidan Walsh (1987, 1991). Hand-written field descriptions of its extent from east-west as far as Lattacrossan were compiled by Oliver Davies in the 1950s, and a similar account of its full extent as depicted on

the OS maps from west-east was written by G. McCabe in October 1968. Both are contained in the RMP file in the Archaeological Survey of Ireland.

There have been four separate sites along the course of this section investigated archaeologically, and a further two produced material that was recorded by Kane. Aidan Walsh in 1982 excavated a 32m x 1-2m trench through an upstanding section of double bank and ditch at Aghareagh West (Walsh 1987; 1991; 2002). The two banks were of dumped boulder clay construction (north bank 7m wide, south bank 4.8m wide high) and a charcoal (species not stated) sample from a possible plank in the base of the northern bank was dated by radiocarbon to 536-46 cal. BC (GrN-12616) (Walsh 1987, 9). Within the southern bank a possible hearth was identified. The two ditches were U-profiled (north ditch 4m wide x 2m deep, south ditch 2.7m wide x 1m deep) and filled with a sticky gley clay. Neither ditch produced any finds. A 0.5-0.6m wide (narrowing to 0.3m at the base) x 0.9m deep U-profiled palisade slot was uncovered 1m north of the north ditch. It was traced running approximately parallel for a distance of 10m. The sides of the slot were fire-scorched to a depth of 70mm and filled with charcoal, burnt clay and stones. A bulk sample of *Quercus* charcoal from the slot was radiocarbon dated to 370-56 cal. BC (UB-2600).

During Aidan Walsh's 1982 excavations an additional section of what was interpreted as the palisade slot was discovered 1.6km west at Aghnaskew. Bulk charcoal (species not stated) from the slot was dated to 388-105 cal. BC (UB-2601). At Lattacrossan Roseanne Meenan uncovered a line of 'burnt clay' parallel and to the north of the earthworks, which she interpreted as the same palisade trench as that excavated 180m to the east by Aidan Walsh (Meenan 2006). Also in Lattacrossan townland, although where exactly is not known, excavations of the northern fosse in the late nineteenth-early twentieth century led to the discovery of a wooden bowl at the base of the ditch and 'at regular intervals along the side, battens or barks of round timber resting against the original slopes as though they were stays' (Kane 1909, 304). One end was pointed and charred, and driven into the ground. Also horizontal sleepers were found lying transversely across the bottom for about 2 to 2.5 feet in length, and roughly mortised at each end to the sloping side timbers'. In 'Kettle's farm', in the south-west of Corrinny townland, Kane records that two separate 'wooden lean-to sheds' were discovered in the northern fosse when sections of

the BPD were being demolished c.1820 and again c.1860 (Kane 1909, 303).⁸ The central bank was recorded as having been 9m wide x 3.6m high and the two fosses on either side 4.2m deep x 4.2m wide.

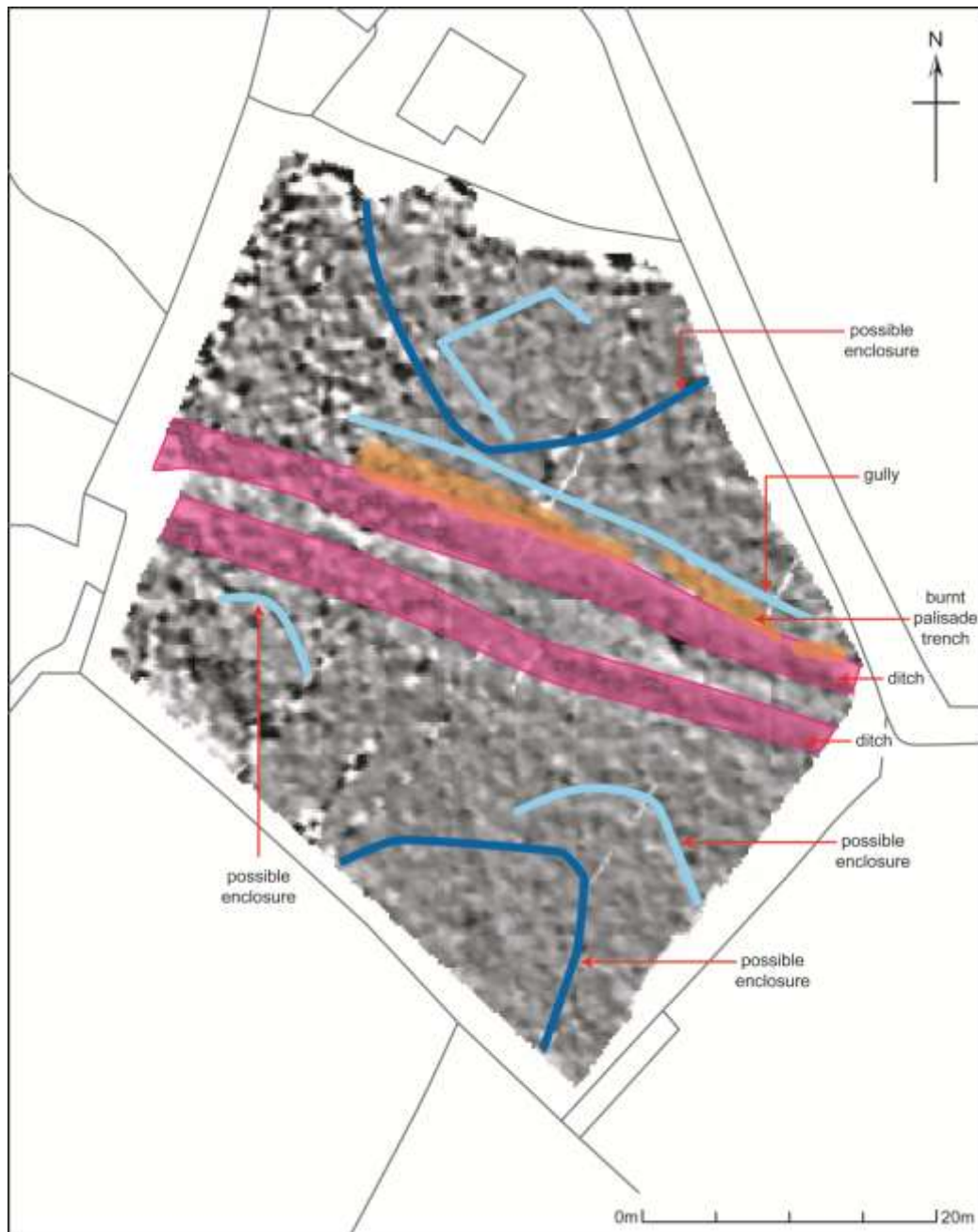


Figure 58: Interpretation of the results of the conductivity and in-phase surveys at Corrinary by Earthsound Geophysics.

⁸ It is possible that 'Kettle's farm' is that marked as being occupied by John Kettle (marked no.1) on the Griffith's Valuation map of Corrinary. (<http://www.askaboutireland.ie/griffith-valuation/index.xml?action=doNameSearch&Submit.x=44&Submit.y=11&Submit=Submit&familyname=Kettle&firstname=First+Name&baronyname=&countyname=MONAGHAN&unionname=&parishname=>)

An electromagnetic survey that was conducted for this project across a levelled section of the dyke at Corrinary identified two parallel ditches (northern ditch 6-8m wide; south ditch 5-7m wide) and a 0.5m wide band of intense burning outside the northern ditch (Appendix 1). The burning extended east-west for a distance of 73m, at which point it terminated. It is likely to have continued to the west but was not detected in the survey, probably because it was unburnt. This is probably the same burnt palisade slot that was recorded at Aghnaskew, Lattacrossan and Aghareagh West, giving it a total distance of 2.6km. It is not known however if the palisade was continuous and there was certainly a gap measuring at least 22.5m in width (only its east side was identified) but this may have been a result of the absence of burning, which would have made its identification difficult in the magnetic results. A ditch or gully that runs along the outside (northern) edge of the burning terminates at the same point and is probably associated. A second ditch runs parallel and at a distance of 11m from the northern ditch. Possible enclosures were also noted and what are probably agricultural drains that post-date the backfilling of the southern ditch.

The first and second edition OS map show the commencement of the earthworks in the townland of Cornapaste on the east bank of the River Fane. They run parallel to a stream within a marshy valley in the townland of Cornapaste. From here they continue in a general south-easterly direction for a distance of 1.17km to join Laurel Lough. An industrial building has been built over a section of the dyke on the east side of Laurel Lough crossroads. It is unclear from the Bing aerial photography how much of this section of the black Pig's Dyke survives but the line of the monument can be seen in the existing field boundaries to the east of the river Fane for a distance of 1.08km. Slight traces of the earthworks are also visible on the Bing aerial photography between the factory and the lake. Oliver Davies recorded that 150m of its length could be traced to the north-west of 'Laurel Hill school' (this is marked on the 25 inch map to the west of the lake) and here the fosse was 10m wide, the north edge was marked by a field bank c.1m high and a 7m wide bank was present on the south side of the fosse. Along the slope there was no indication of the earthwork.

On the south east bank of Laurel Lough, in the townland of Annagheane, a farmyard that is shown on the first edition but not subsequent OS editions occupied the area between the recommencement of the dyke and the lake. The monument continues in a south easterly direction along the north bank of a small stream towards Drumcor Lough in the townland of Killark. According to Davies the fosse on this section was 2.8m wide and 3.5m-5m high on the

north side where it was cut out of a steep slope without the artificial raising of the bank. He also noted a 1.2m high bank to the south and that halfway along this stretch the ditch was crossed by a lane which he regarded as 'an original crossing as the interruption of the ditch appears to be much wider than the needs of the lane'. This is probably the lane running north toward Mount Pleasant. This section is much overgrown with trees on the Bing aerial photography and it is difficult to make out how much is extant. McCabe records that most of this section had been bulldozed.



Figure 59: The linear earthwork at Drumavan stripped of topsoil revealing its stone and clay rampart (photo courtesy Peter Wise; Wise 2005, 236)

From Lough Drumcor the first edition OS shows the earthworks running to the north-east in Drumavan to meet an area of reclaimed bogland, from where it turns east into the townlands of Skerrick West and Corracken. The second edition map marks this full line as 'site of' and Oliver Davies also noted that the dyke could not be traced in these townlands. However, the Bing aerial photography depicts a 250m long narrow field boundary that correlates with the first edition depiction of the dyke at Drumavan and it may be incorporated into short lengths of similar field boundaries in the north-east of the townland. Peter Wise photographed a section of ramparts that had been stripped of topsoil, apparently for agricultural purposes, revealing it to be of clay and stone construction (Figure 59). In Skerrick West and Corracken townlands Davies recorded

that the monument was not traceable and had been levelled but there was a slight depression in the ground where the Ordnance Survey showed a dotted line. No trace is visible on the Bing aerial photography.

The first edition OS shows the earthworks extending in a south easterly direction into Aghanskew, where it is incorporated in a laneway leading to a farmyard for a distance of 300m and it continues as an earthwork for 175m, which can be seen on the Bing aerial photography, as far as the townland boundary with Lattacrossan. Oliver Davies noted the presence of a 2.9m wide fosse and a low south bank along this stretch. At the west end of this segment archaeological investigations by Aidan Walsh uncovered a section of a palisade trench to the north of the line of the dyke (see above).

On the first and second edition OS the Lattacrossan section of the dyke crosses the townland largely intact in a north-east direction until it reaches the final 250m, which is incorporated into a laneway. Oliver Davies noted that the double fosse was seen to vanish in the western most field of this townland but it reappeared to the east, where the north fosse was 5.3m wide at its base, the central bank had a flat top and was 5m wide. The south fosse was 6m wide and 1.75m high to the north. The south bank was partly destroyed. To the east of this length the ditch was less well preserved but slight depressions marked both fosses. The south bank was levelled for the remaining length but the central bank was up to 2m high and used as a field boundary. On the Bing aerial photography the earthworks can be traced upstanding for 500m and as cropmarks for a further 75m until they reach a farmyard and laneway. To the north of the lane construction of a new house led to the discovery, noted above, of a section of burnt palisade by Roseanne Meenan (2006).

In Aghareagh West the first edition shows the earthworks extending across the south of the townland for a distance of 240m and it is also depicted as being largely intact on the second edition. The 110m stretch shown on the Bing aerial photography is in local authority ownership and was the subject of partial archaeological excavations by Aidan Walsh (see above). The remainder of the length has been largely removed but may survive in a field boundary.

On entering Corrinny townland the earthworks are shown on the first and second edition OS maps as extending for 120m and then incorporating a laneway. The dyke then takes a sharp turn northwards for 220m before returning to a general east-west alignment for the remaining 500m

within the townland. There is no obvious topographical reason for such a dramatic turn and McCabe has suggested there was an additional, unmapped, section of dyke to the south that formed a large enclosure 'like the Dorsey' with the northern section that terminates in Corrinshigo. The Bing aerial photography shows most of the western section at Corrinshigo intact as far as the north south road and a narrow field boundary appears to perpetuate its line as far as a farmyard. The driveway for a new house has cut through the line of the dyke. Local information noted that archaeological monitoring of construction through this section by Eoghan Moore found nothing of significance.⁹ To the east of the farmyard the earthworks can be seen as low banks in a sloping field; this was the subject of the geophysical survey noted above. Little or no trace of the rest of the monument in the townland appears to survive.

At the townland boundary between Corrinshigo and Drumurcher the earthworks cross a stream and continue eastwards for a short distance to an area of marshy ground, a former lake. The segment marked on the first edition is not visible on the Bing aerial photography. The monument continues for 1.1km from the former lake in a south easterly direction through the townland of Drumgrone. After 140m from the western townland boundary the line takes a noticeable kink to the south, perhaps to meet the 'fort' MO 22-002 that is marked on the first edition OS. A road subsequently runs along the course of the monument for a distance of 134m and the earthworks survive for 110m to the east of the road, and perhaps continue in a narrow field boundary. McCabe describes well-preserved earthworks and a flat-bottomed fosse along this stretch of the monument. The monument continues south-eastwards on its path on the first and second edition OS maps over the Bunnoe River and into the townland of Corrinshigo before terminating in the middle of fields. A possible small extension to the east was noted by the Archaeological Survey of Ireland in Magherashaghry townland (RMP MO022-023). No trace of this section is visible on the Bing aerial photography.

⁹ There is no report on this work on excavations.ie

5.8 BPD-008 MONAGHAN: MAGHERNAKILL 'SITE OF ANCIENT ENTRENCHMENT'

MAGHERNAKILL

MO 025-044

Vol. 2: 68-70

A linear earthwork runs northwest to southeast across a level pasture field in the townland of Maghernakill. It is not represented on the first edition Ordnance Survey Map (1834-35) and first appears on the second edition (1857-59), labelled 'Site of Ancient Entrenchment'. On both maps it is represented with a dashed line running northwest to southeast and running for 150m and perhaps continuing in a field boundary.

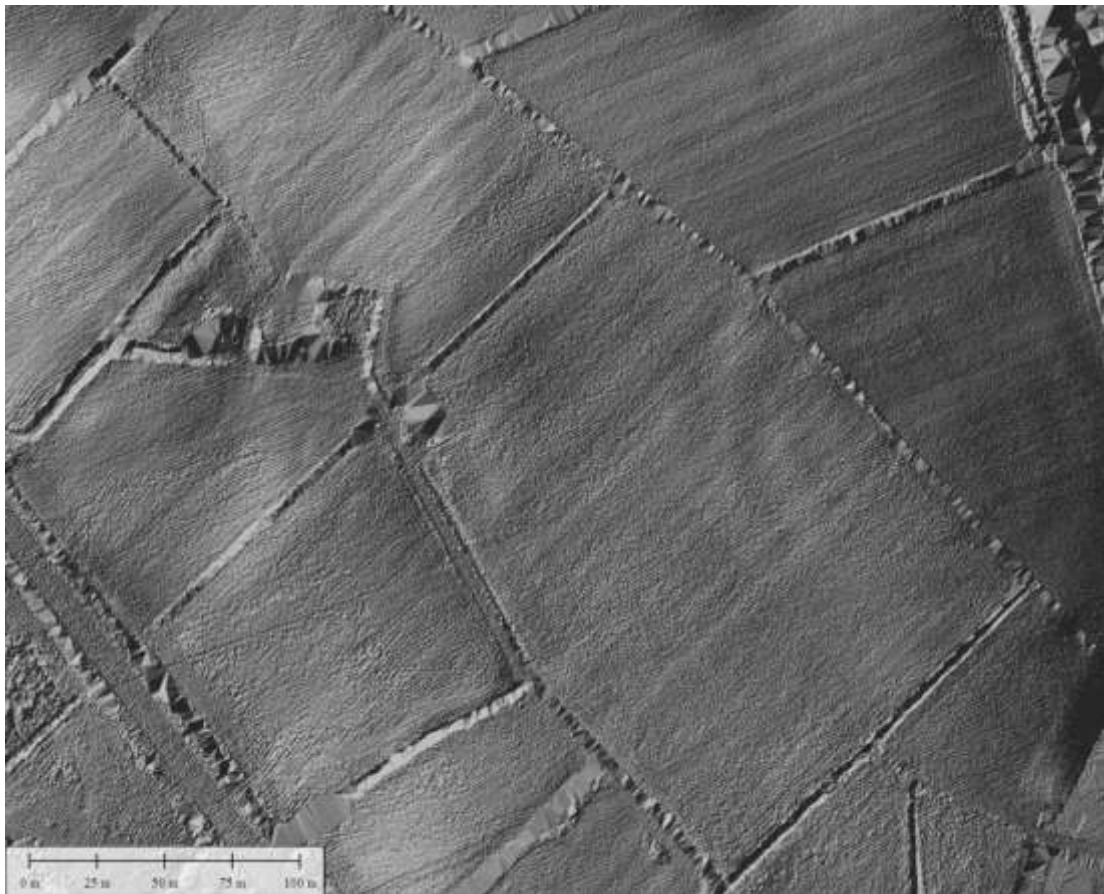


Figure 60: LiDAR model of site of Maghernakill linear earthwork, of which no trace is evident. However, the newly identified (by Dr. Steve Davis) large enclosure MO 025-052 can be clearly seen in the east.

It is similarly represented on the 25" Ordnance Survey Map (1909-1910). 230m to the south-east of the earthwork a large, c.150m diameter enclosure was identified in a LiDAR model (MO 025-

052) and the Drumgristin Lower section of linear earthwork (BPD-009) lies 850m to the east (Figure 60). This section was not included in Kane's research and Davies noted there were no visible remains of the ditch (Davies 1955, 33). No trace of the Maghernakill site can be seen on the Bing Aerial Photography 2012.

5.9 BPD-009 MONAGHAN: DRUMGRISTIN LOWER 'SITE OF ANCIENT ENTRENCHMENT'

DRUMGRISTIN LOWER

MO 025-046

Vol. 2: Map 71-73

This short, 82m, section of linear earthwork runs along the bottom of a ridge in pasture on the north bank of the Fane river to the south of Lough Ross. 850m to the west at Maghernakill is another short section of linear earthwork (BPD-008) and a megalithic tomb (MO 025-021) and large enclosure (MO025-052) are situated a kilometre to the west. The earthwork may have extended further to the east to cut off a loop in the river and Davies traced further sections on the ground for 'up to half a mile' and noted it crossed the Fane river where it may have defended a fording point known as 'Bronegan's Ford', from whence a routeway headed for either Emain Macha or Clogher (Davies 1955, 33).

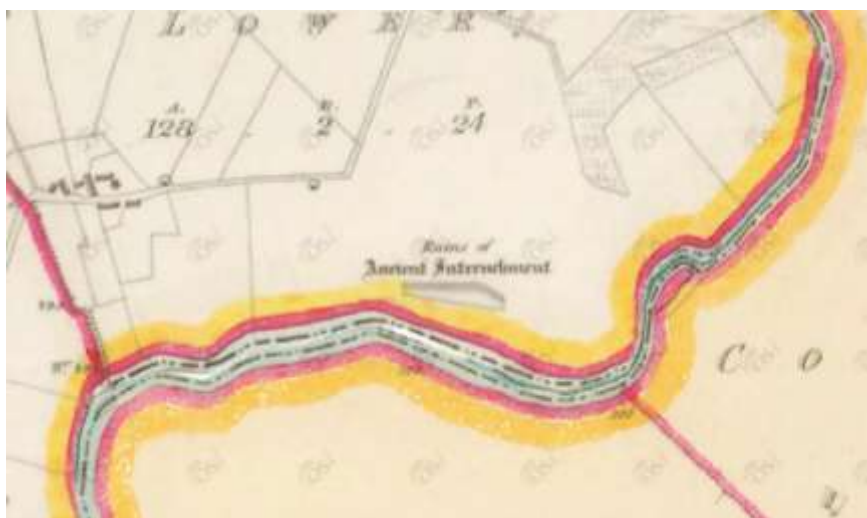


Figure 61: 'Site of Ancient Entrenchment' at Drumgristin, county Monaghan, marked on first edition Ordnance Survey map



Figure 62: LiDAR 0.5m model (hillshade) of site of Drumgristin Lower linear earthwork, of which faint traces can be seen running east-west on the north side of the Fane river.

It is marked 'Ruins of ancient entrenchment' on the first edition OS map and as 'Site of Ancient Entrenchment' on the second edition OS map (1857-59). On both maps it is depicted with hachures. John O'Donovan referred to it as the 'Worm Ditch' and Kane records that it linked with sections of dyke to the south of Carrickmacross and continued north-east into county Armagh to meet the Dorsey (Kane 1909, 305).

No trace of the Drumgristin Lower section can be seen on the Bing Aerial Photography 2012 and only a faint outline is visible on the LiDAR model. The Archaeological Survey of Ireland, however, state the earthworks are of bank and ditch construction and they noted the presence of a large U-shaped fosse 84.5m long x 10.7m wide at top x c.4m wide at base x c. 4.1m deep. Traces of a bank were also recorded, orientated east-west and c.11.4m wide x c.4.5m high on the south side. Faint traces were noted 27m to the east.

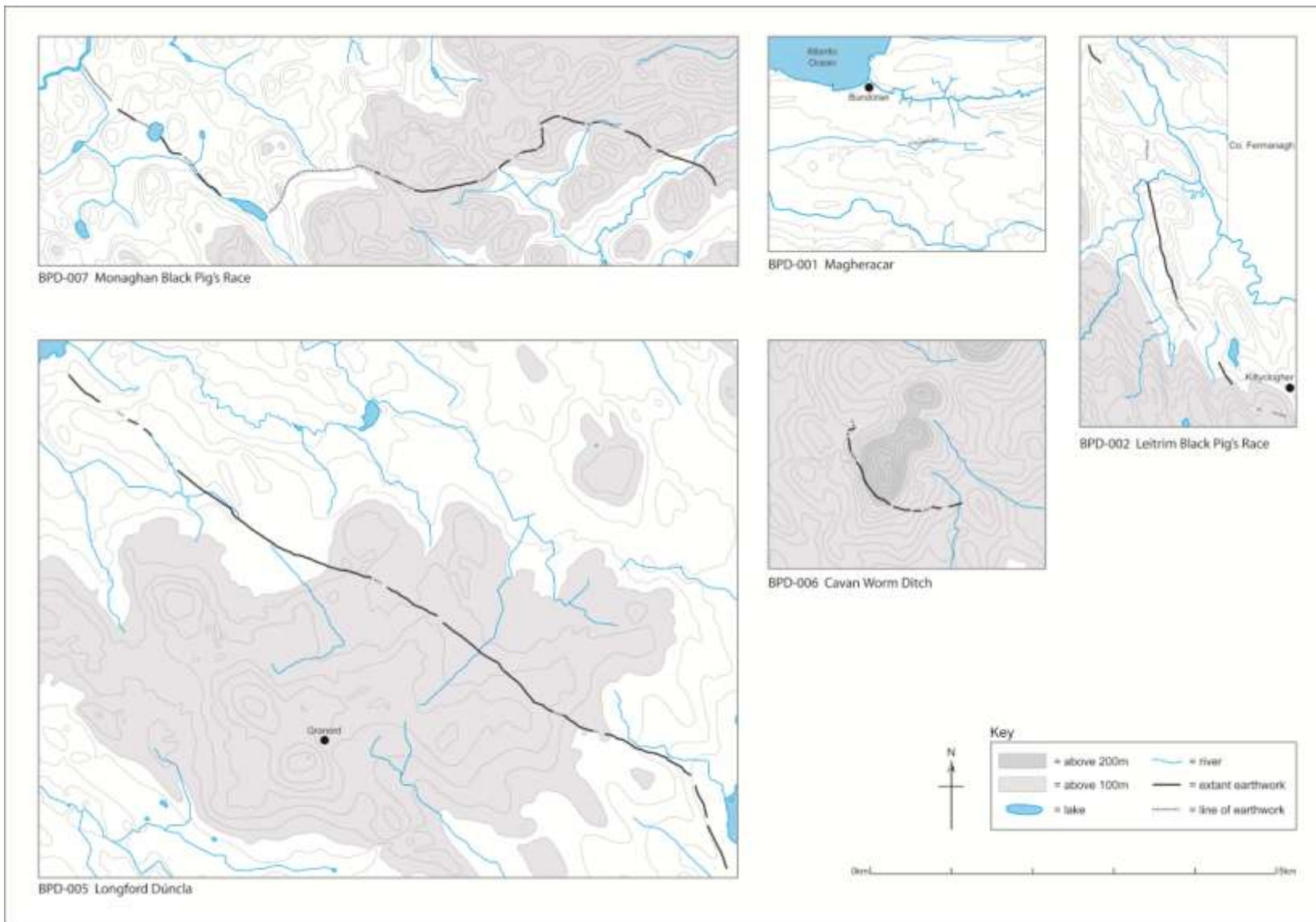
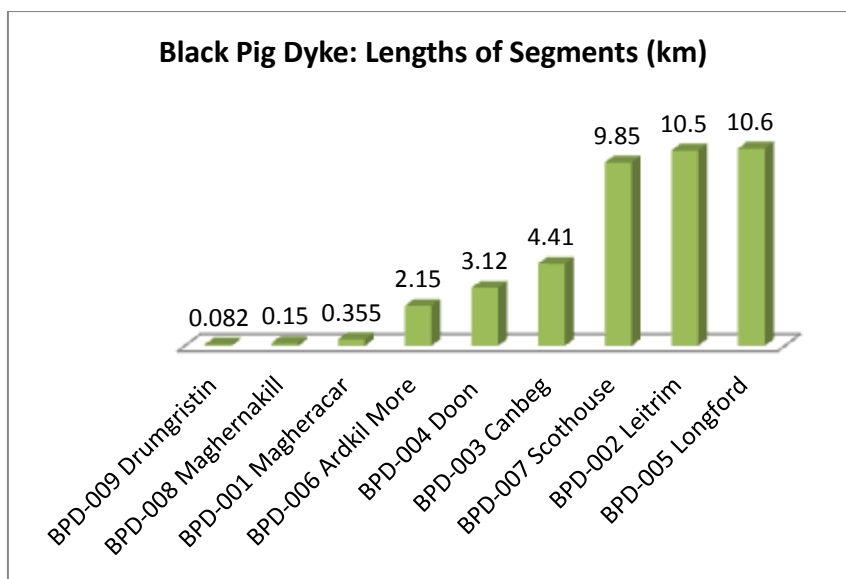


Figure 63: Selected linear earthworks of the study area, general plans in relation to topography

6.0 EXTENT AND TOPOGRAPHIC SETTING

6.1 EXTENT

The linear boundaries exhibit considerable variability in their lengths, from a mere 82m at Drumgristin, county Monaghan (BPD-009) to 10.6km at the Dunclá, county Longford (BPD-005). They fall within three distinct groups: short segments of 82m-355m, segments of medium length between 2.15km-4.4km, and longer segments of between 9.85km and 10.6km. The 22km *Cladh Dubh*, county Cork is considerably longer and may be Ireland’s longest linear earthwork, but the lengths of the study area do compare well with the most extensive sections of dyke on Salisbury Plain such as the Old Nursery Ditch (11km) and Old Ditch West (16km) (McOmish et.al. 2002, 61).



None of the earthworks form continuous lines. For example, the Leitrim 'Worm Ditch' (BPD-002) is split into six discrete segments measuring 3.63km in total length, but they have been considered as a single 10.36km entity. In measuring its extent, however, lost sections, and the use of rivers, lakes, bogs and forests to plug gaps may need to be taken into account. Thus, in considering the extent of the linear earthworks the interpolated distance is probably closer to reality than what survives on the ground today. On this basis the total length of linear earthworks

in the study area is 41.07km. As a result of the absence of LiDAR availability for most of the study area (see above) very few ‘new’ stretches of dyke were identified in this study. This is also probably testament to the thoroughness of the nineteenth century Ordnance Survey cartographers and the Archaeological Survey of Ireland. However, it is almost certain that there are many linear earthworks that await discovery. Many will have been lost to agricultural extensification and many others may be masked within relatively modern field boundaries. Figure 64 below highlights the townlands in county Monaghan where folklore associated with the BPD has been recorded. Particular concentrations can be seen in areas where no linear earthworks have been noted by the Ordnance Survey or the Archaeological Survey of Ireland, most notably to the south of Carrickmacross (Figure 64). These may give an indication of locations where additional stretches formerly existed.

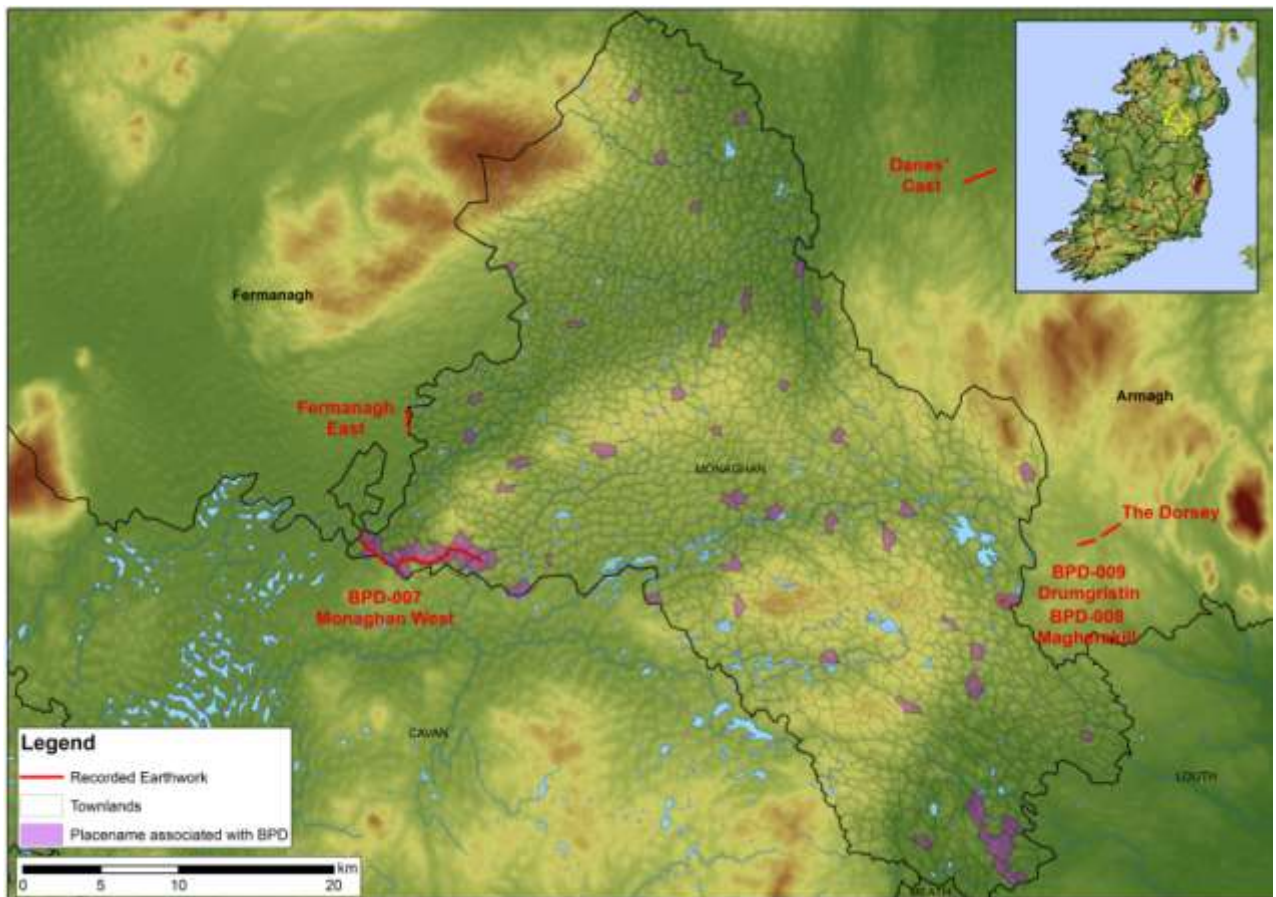


Figure 64: Map of Monaghan highlighting the townlands in which toponyms/folk traditions relating to the BPD have been recorded

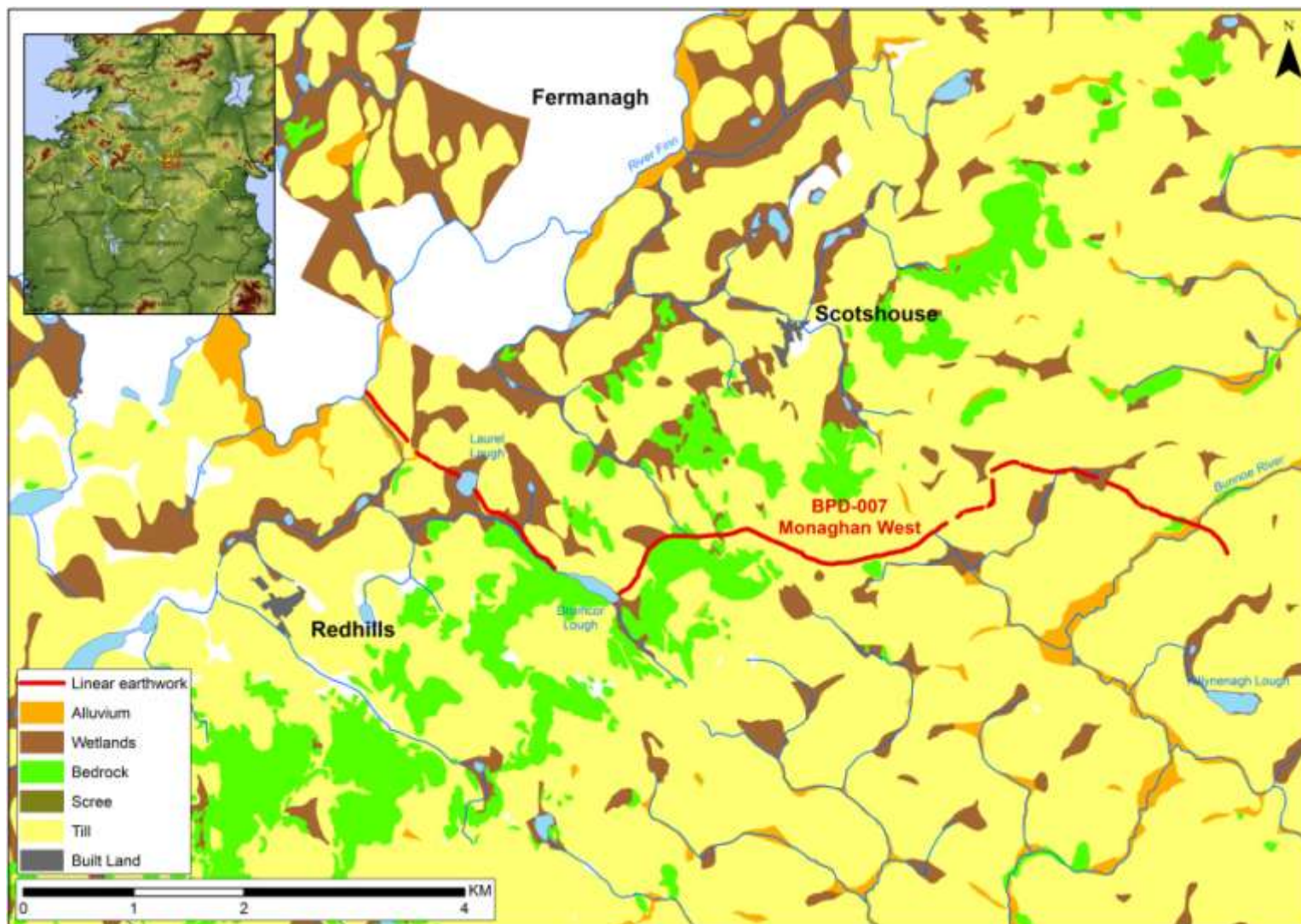


Figure 65: BPD-007 Monaghan West linear earthworks overlain on map of Quaternary geology

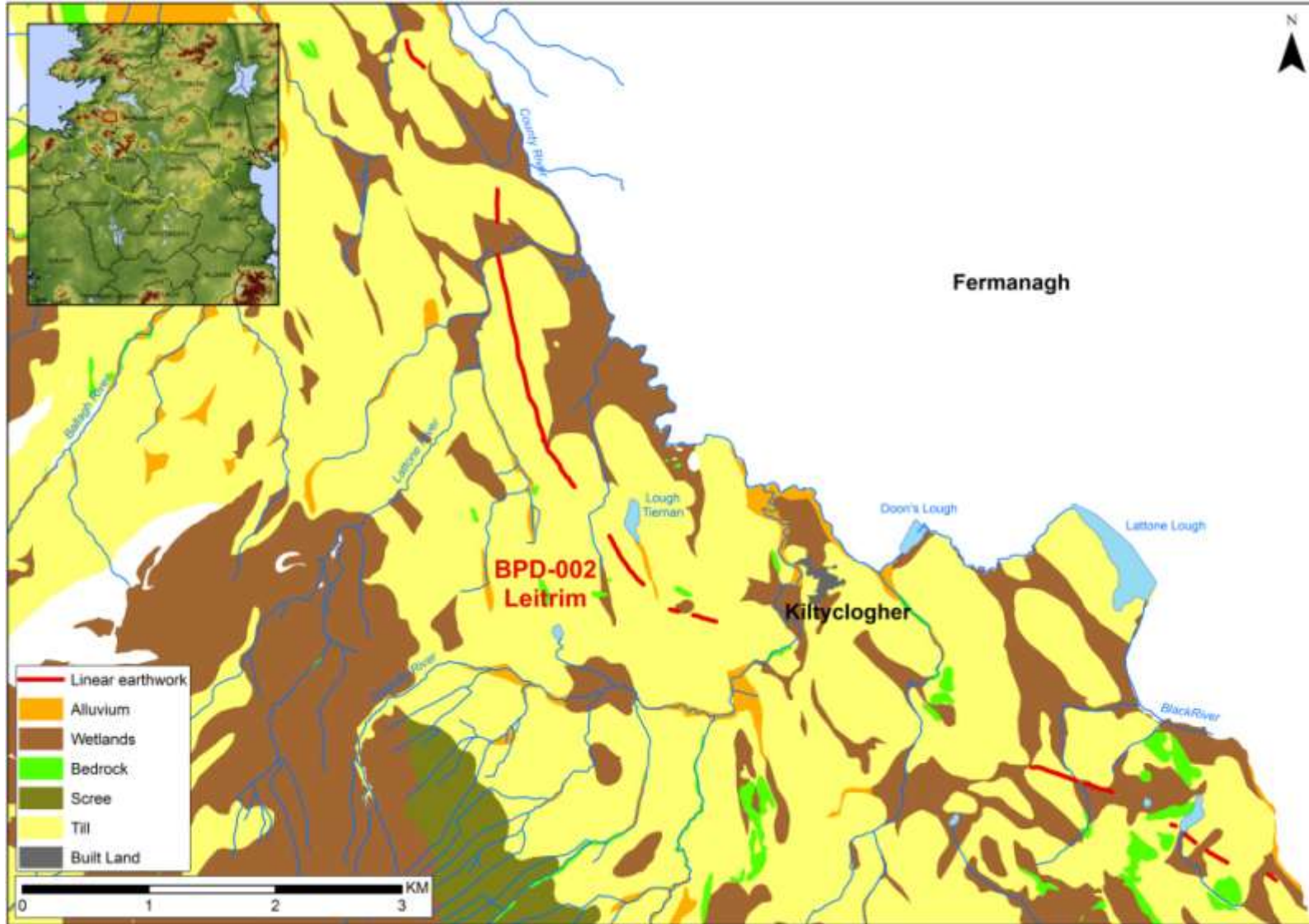


Figure 66: BPD-002 Leitrim linear earthworks overlaid on map of Quaternary geology

5.2 TOPOGRAPHIC SETTING

As is the case with other land boundaries in Ireland and Britain there is a close relationship between the siting of the linear earthworks of the study area and topography. All of the linear earthworks are positioned in the lowlands, below the 150m contour. They differ markedly from the Wessex dykes however, in that they do not tend to follow the natural contours or watersheds. The choice of location for all nine linear earthworks was a river valley and there is a very definite association with rivers and lakes. In all but two instances (BPD-008 Maghernakill and BPD-006 Cavan) rivers and lakes are incorporated into the course of the earthworks. The Leitrim (BPD-002) section forms a D-shaped enclosure with the County River (the modern border with county Fermanagh) and probably originally extended between two lakes, Lough Melvin to the north and Lough Macnean Upper to the south. It also crossed the Lattone river. Likewise the Longford section (BPD-005) runs from Lough Gowna to Lough Kinale, and it also incorporates and crosses a section of a tributary of Lough Gowna at Abbeylara. The Monaghan (west) (BPD-007) section extends from the Finn river in the west as far as Laurel Lough and it then follows the east bank of a tributary of the Finn river as far as Drumcor Lough, before terminating after crossing the Bunnoe river. Its sinuous course finds a close analogy in the Cleave Dyke, which winds through the Hambleton hills, north Yorkshire (Spratt 1989). Three of the earthworks are situated on spurs formed by meanders in rivers: Magheracar (BPD-001) on the Sruhannafulla river, Drumgristin (BPD-009) on the Fane river and most spectacularly the Doon of Drumsna (BPD-004) on the Shannon. Embankments along the river banks are to be found to the south of the Doon and also on the Cavan section (BPD-003), where they also follow the Shannon. It has been suggested by the Archaeological Survey of Ireland however that the latter are natural features.

The importance of wetlands in the routing of the earthworks is further emphasised by the occasions where the line of the earthwork appears to have been deliberately altered in order to arrive at a lake. Unfortunately our knowledge of the extent of lakelands at the time the earthworks were built is extremely deficient (see below) but a certain amount can be construed by overlaying the lines on maps of the quaternary subsoils. These give an indication of the location of drained/reclaimed wetlands. For instance, at Corrinary the dyke takes can be shown to turn abruptly northwards towards Aghareagh West/Corrinary bog and it then turns eastwards again to meet Drumurcher lake (Figure 65). Similarly, at Drumavan the earthwork turns suddenly to the south towards Drumcor Lough. On the Leitrim section (BPD-002) Lough Tiernan was

evidently a chosen destination along its alignment (Figure 66) and outside the study area in county Down, the Danes Cast appears to have been aligned to arrive at Lough Cam.

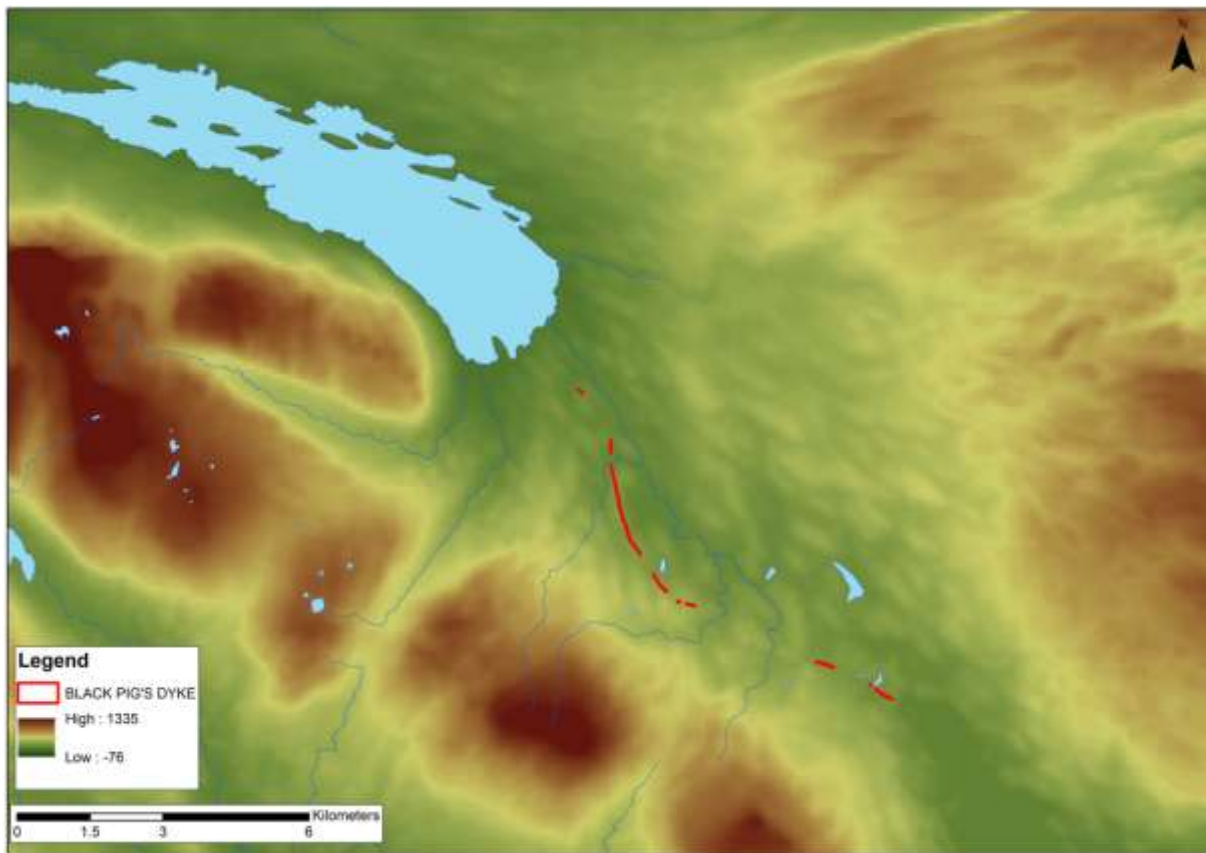


Figure 67: Map showing the relationship between BPD-002 Leitrim and physical topography

Aspect analysis - study of the compass direction that a slope faces - was undertaken by Peter Wise for the linear earthworks of the study area (Wise 2005, 90-1). His analysis showed that the slopes on which the earthworks are sited trended strongly towards the west and south: BPD-003 Cavan and BPD-005 Longford to the west, BPD-002 Leitrim to the south west and BPD-007 Monaghan West to the south. In reality, the provision of a ditch on either side of a medial bank, or a bank on both sides of a central ditch, would have presented in reality an equal barrier when approached from either side.

7.0 THE ANATOMY OF THE EARTHWORKS

The linear earthworks represent the most extensive civil engineering tasks of their day and involved earthmoving on a vast scale. Understanding the methods and materials used in their construction is vital when considering their purpose and chronology, but is seriously hampered by the erosion of the monuments over time and by a lack of excavation. Almost from the moment they were first constructed the earthworks were subject to degradation, their ditches would have begun silting-up and any associated timberwork would have begun to decay. Over time sections were completely and incompletely erased and cut back and modified into field boundaries and laneways. As a result the degraded surface appearance of the earthworks today can give little away regarding their original form in prehistory. This is epitomised by the small amount of excavation and geophysical survey that has been undertaken on the Monaghan West (BPD-007) earthworks, which demonstrates a much more complex picture than the bare earthworks might suggest. However, the small amount of excavation and survey work that has been carried out does allow for some observations to be made regarding the earthworks' architecture, albeit within the context of a very incomplete picture.

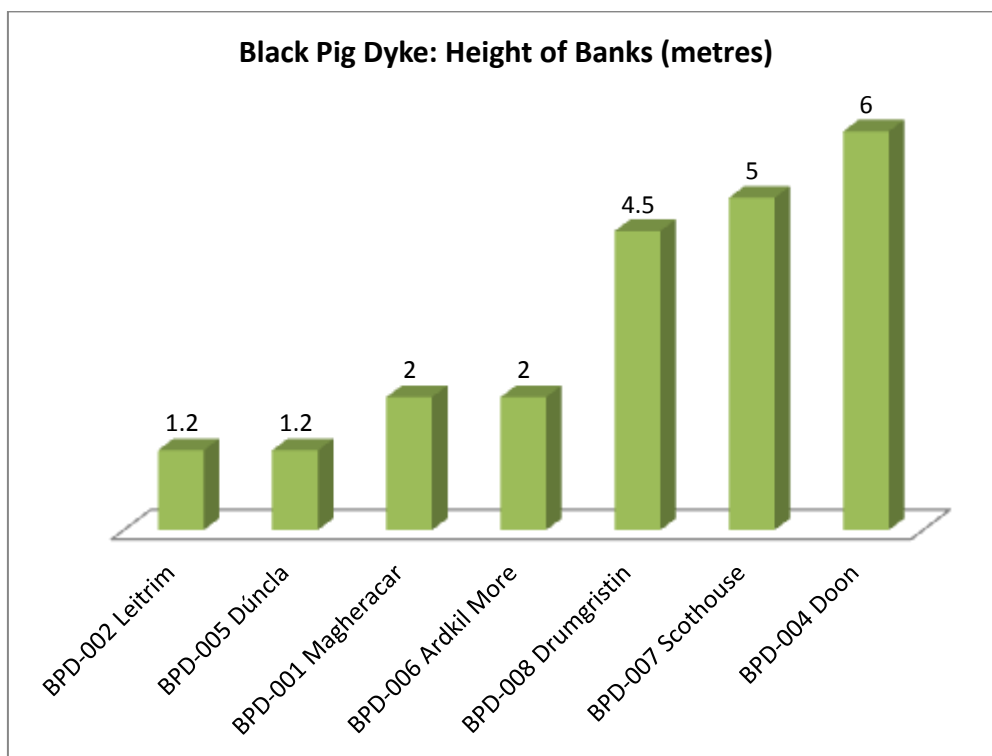
7.2 MORPHOLOGY

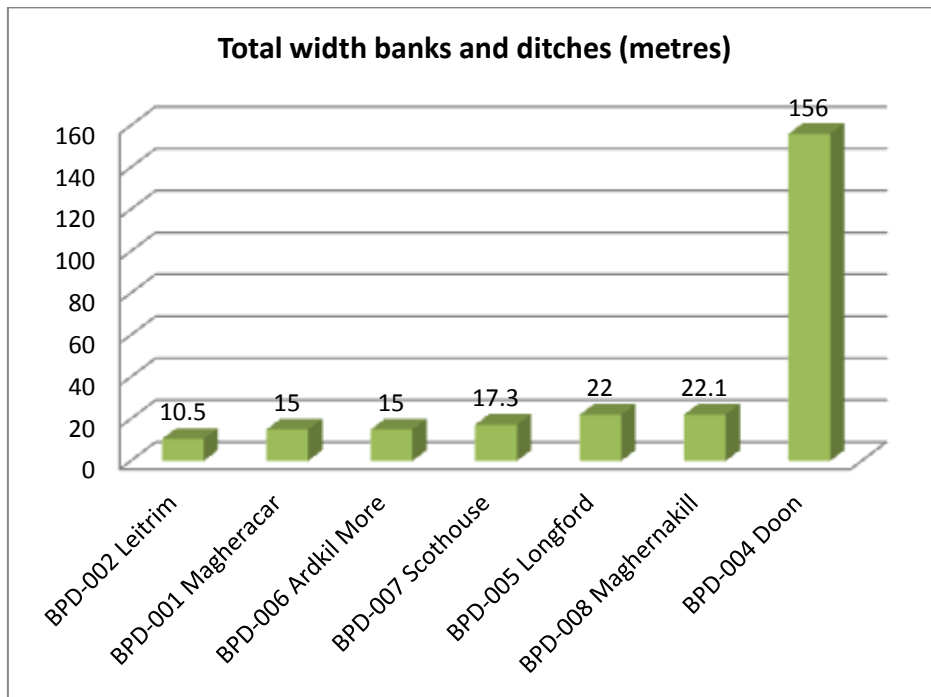
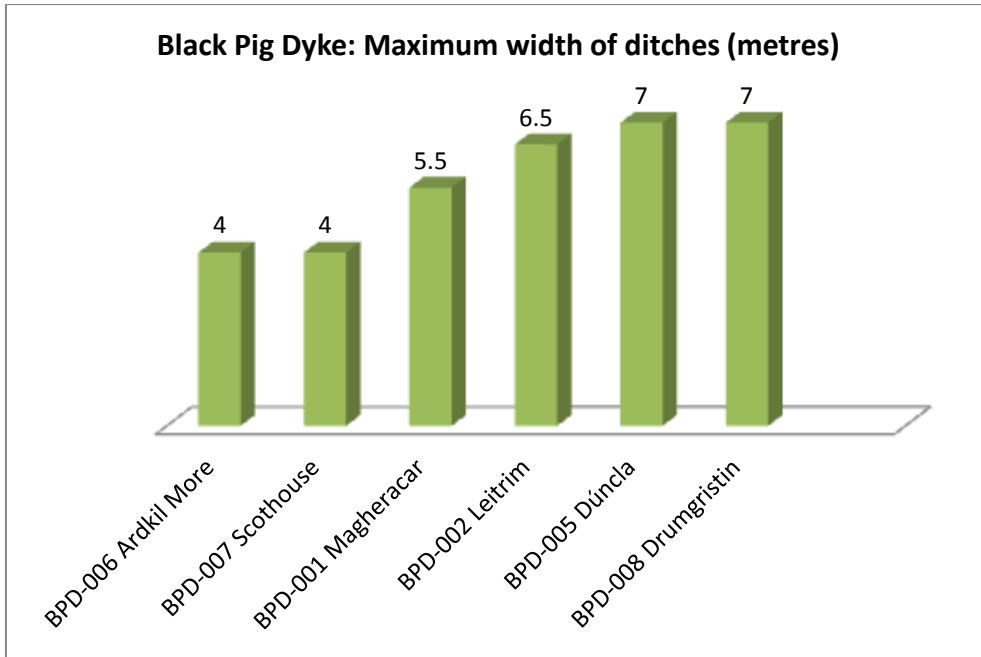
The linear earthworks can be divided into five different categories (on the basis of the evidence available) (Table 1):

- Univallate with double ditch (BPD-001 Magheracar, BPD-005 Dunclá and BPD-007 Monaghan West)
- Univallate with single ditch (BPD-006 Ardkill More and BPD-009 Drumgristin)
- Bivallate with medial ditch (BPD-002 Leitrim)
- Univallate along a river bank (BPD-004 Doon of Drumsna, BPD-003 Cavan)
- Trivallate (BPD-004 Doon of Drumsna)

The widths of the defensive 'zone', *ie.* the cumulative width of the banks and ditches, is broadly similar, ranging from 15m-22m across, but with the Doon of Drumsna being on a completely different scale at 156m.

The material used to construct the banks derived chiefly from the ditch(es) and because the bulk of the earthworks cross glacial tills this clay was most commonly used. In areas where the bedrock was close to the surface, such as Ardkill More (PBD-006), the bank was mainly of stone derived from a rock-cut ditch (Campbell 1997). Recent exposures of the dyke at Drumavan, county Monaghan and a section of the western entrance of the Doon of Drumsna indicated it was of mixed stone and earth construction. Simple dump construction seems to have been the norm but the hearth-pit in the centre of the rampart excavated at Aghareagh West, county Monaghan provides an indication that the banks may have been built in stages, perhaps to allow for settlement of the earthworks (Walsh 1991, 17). A variety of kinks and junctions, as well as apparent changes in alignment of the boundaries, may suggest the use of different work gangs in their construction.





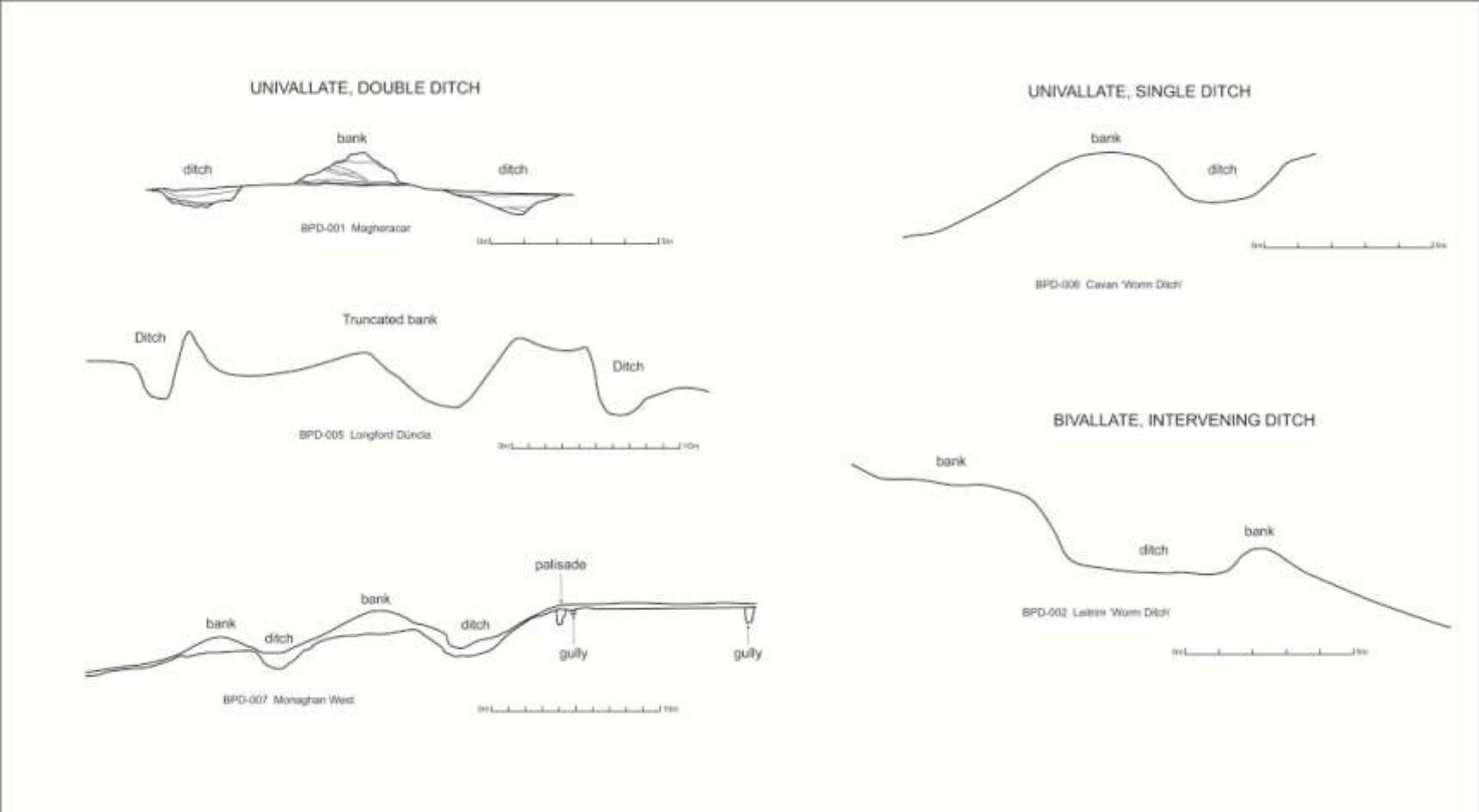


Figure 68: Selected profiles across linear earthworks in the study area

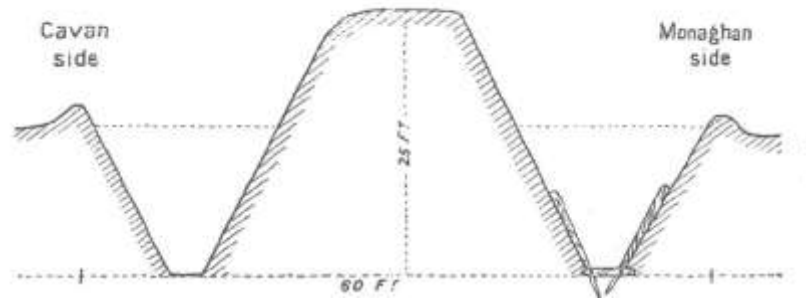


Figure 69: Kane's somewhat fanciful reconstruction of a cross section through the Scothouse (BPD-007) linear earthwork

The heights of the banks divide into two groups, those between 1-2m and those between 4.5m-6m. The tops of the banks, where they appear to be well-preserved, tend to be flat, and counterscarp banks in front of the ditches are documented, for example at the south side of the Aghareagh West south ditch and along the Leitrim dyke. The counterscarp banks augmented the ditches and gave them the appearance of being deeper than they actually were. Berms, flat ground between the inside edge of the fosse and the rampart, are not known from any of the earthworks apart from Maghereacar, where a substantial berm was present on both sides of the bank. This may have been deliberately constructed to arrest erosion of the rampart. It is not known how the monuments were built across wetlands, but they may have been of timber, as was shown to be the case at the Dorsey.

The largest ditches were between 4m-7m in width (at the top). U-profiled ditches, such as those excavated at Aghareagh West, are more common than those that are V-shaped (eg. BPD-002 Leitrim and BPD-001 Magheracar north side); the latter are a characteristic of Iron Age linear ditches in Wessex (Bradley et.al. 1994, 143). Where the earthworks were sited along the side of a drumlin they often cut into the side of the hill to form a ditch, such as at Corrinny. The use of V-profiled ditches with steep sides excavated at Magheracar had a specialised 'ankle-breaker' at its base and could be construed as defensive in form. Streams were also used as 'natural' fosses on the Monaghan section (Kane 1909, plate XVI).

The extent to which timber was used to augment the earth/stone banks is little understood and no evidence for palisades on top of the banks such as was found at the Claidh Dubh, has been

recorded (Doody 1995). Palisading, which had evidently been burnt, was however raised along at least 2.6km of the north side of the Monaghan Scothouse (BPD-007) section (see above). It may also be the case that the many timbers recorded by Kane from the Scothouse ditches was also palisading or lacing that had ended up in the ditch, rather than the guard houses and linings in the fosse, as stated by Kane (1909, 303-4). It is also possible that the palisade trench at Monaghan West may have held a barrier of wooden stakes to impede attack, similar to those recorded at Callow Hill, Model farm, Ditchley and Blenheim park, England (Harding 1974, 75). Timbers, perhaps part of a 'chevaux de frise', have also been recorded at the eastern entrance of /the Doon of Drumsna (Kane Condit and Buckley 1998, 4).

8.0 CHRONOLOGY

When did the linear ditches first emerge and for how long did they continue to be significant? Dating earthwork structures and linear earthworks in particular is notoriously difficult. This is because they are composed wholly of earth and stone and they tend to have very little associated dateable cultural material that can be directly associated with key phases in their history, *ie.* their construction, use, modification, abandonment or destruction. Abandonment, erosion and refurbishment of the monuments since they were first constructed compounds the problem.

Their scale, extent and perceived similarities with Roman military defences (*eg.* the Antonine wall) had led most early writers on the subject to date the earthworks to the first centuries AD. Aidan Walsh's excavations at Aghareagh West however produced older dates and the common consensus is that construction of the Irish linear earthworks occurred in the Iron Age and preceded the Roman boundary defences. Whilst this is probably correct, nevertheless there are very few Irish linear earthworks with secure dates and as a result it is not known when they first originated and other aspects of their chronology are also very poorly understood. In Britain, the date at which linear earthworks emerge is also unclear but the Late Bronze Age sees a dramatic rise in the extent and number of the earthworks.

The most common means of dating linear earthworks has been the radiocarbon method, but to achieve accuracy this requires samples to be short-life (or known-life), single-entities (*eg.* cereal grains, animal bone etc.) that have a demonstrable association with the archaeological event for which a date is sought (Warner 1990; Ashmore 1999; 2004; Lanting and van der Plicht 1993-4). Obtaining such 'gold standard' samples from linear earthworks is not easily achieved for the reasons outlined above. For example peat overlying a track beside the east bank of the Claidhbh Dubh, county Cork was radiocarbon dated to 126-336 cal. AD (1801 +/- 39 BP; UB-3721) (Doody 1995, 22). This however, as acknowledged by Martin Doody, did not date the earthworks but instead provided a *terminus ante quem* for the trackway. The radiocarbon method also suffers from problems in correcting - 'calibrating' - radiocarbon dates for the early Iron Age - the so-called 'Hallstatt plateau' between 700-400 cal. BC - with dates that fall within this period having wide ranges when calibrated.

Dendrochronology provides an effective means of dating the linear earthworks, although it still needs to be used with caution as it can only be used to date the timber (oak) elements and not the earthwork construction, which may not necessarily be of the same age. The Dorsey has produced four dendrochronological dates, along with 12 radiocarbon determinations, that place it firmly in the Middle-Late Iron Age (Table 2) (Baillie and Brown 1989). The dendrochronological dates demonstrated that oak timbers dumped in the north ditch were felled in the 140s BC and a gap of some 40 years elapsed between these and timbers associated with the southern line of the monument (Lynn 2003, 61).

There are no reliable artefact associations or dendrochronological dates available for the linear earthworks of the study area. Seven radiocarbon dates are available from three of the earthworks: three dates from Monaghan (west) (BPD-007), two from the Doon of Drumsna (BPD-004) and two from Magheracar (BPD-001) (Table 2). The dates from each of the three sections will be examined in turn.

BPD-007 Monaghan (west)

Aghareagh West date UB-2600 was obtained from a bulk sample of oak charcoal from the fill of the palisade slot. The Aghnaskew date UB-2601 was taken on a bulk sample of unidentified charcoal from the assumed continuation of this palisade slot. The second Aghareagh West date GrN-121616 was determined from a bulk sample of unidentified charcoal 'apparently the remains of a plank' embedded in the base of the northern bank (Walsh 1987, 9). The exact vertical position of the sample within the bank is not recorded in the published reports; it may be the charcoal lines indicated on the published section (Walsh 1987, figure 4). This sample could well be residual and the association of the date with the period of construction cannot be demonstrated. In addition, because all three dates are from bulk samples and are thus 'likely to contain sub-samples of any date within the span of the context of any organic age' the reported dates are therefore a mean age of the combined sub-samples (Warner 1997, 177).

It is not possible to amend the dates to reflect the fact they were obtained on bulk samples but they can be adjusted to take into account the 'old wood effect', which takes into account the probability that the sample does not derive from the final growth ring of the tree (Warner 1990; Warner 1997, table 24). Table 2 sets out the adjusted date ranges, which may be summarised as follows:

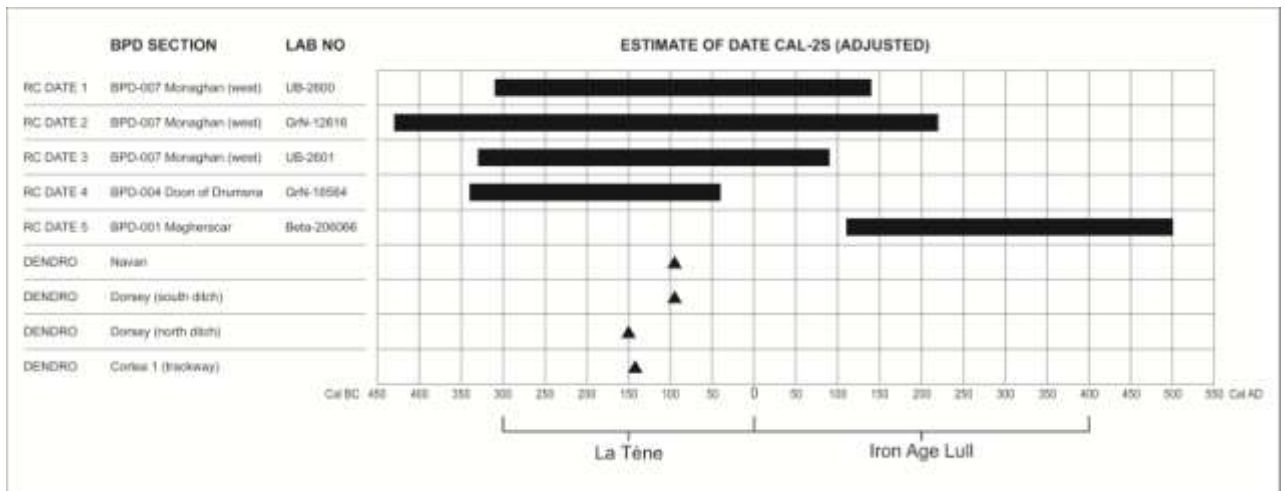
- The possible plank sample provides a *terminus post quem* in the range 430 cal. BC - AD cal. 220 for construction of the north bank at Aghareagh West.
- At Aghareagh West the oak in the palisade slot was cut at some point between 310 cal. BC and cal. AD 140.
- At Aghnaskew the unidentified charcoal in the palisade slot is from timbers that were cut at some point between 330 cal. BC and 90 cal. AD.

BPD-004 Doon of Drumsna

The two samples used for radiocarbon dating from the Doon of Drumsna were recovered below and in the body of the main (northern) rampart, 100m to the west of the eastern entrance. Both samples had minimal own-life ages. A peat sample GrN-18563 on which the rampart rested was dated to the Neolithic period. The second date GrN-18564 was taken on a piece of bark from a 'piece of wood' which was identified as alder. Whilst the sample does not require the 'old wood effect' adjustment, being on bark, it is possible the timber is residual and since there were no indications it was worked in any way this possibility is increased. Likewise the presence of boggy ground could mean the timber was preserved for some time before it was subsumed into the rampart. The sample therefore strictly provides a *terminus post quem* for the construction of the main rampart at some point in the range 340-40 cal. BC.

BPD-001 Magheracar

No dates were obtained from material in the earthwork bank; two were taken from samples in the fills of the northern Ditch A. One gram of charcoal of ash and willow from the primary silting was dated. Although it is somewhat unlikely, it is possible the two species in the charcoal samples were of different ages and therefore the mean date of both has been determined. The two Magheracar dates have been adjusted to take into account the 'old-wood effect' and this has made only a marginal difference to their ranges. The date that was produced infers the ditch had begun to silt up after cal. AD 110-500 (Beta-206066) and before cal. AD 1060-1240 (Beta-205186).



Line graph of Iron Age radiocarbon dates for linear earthworks in the study area and key related chronologies

The radiocarbon dates do not allow for construction phases to be discerned. It is important to note that what may appear as a unitary construction of multiple lines of banks and ditches may in fact be the outcome of several separate building episodes, as has been demonstrated at the Dorsey (Lynn 2003, 61). This was also hinted at in the Magheracar (BPD-001) excavations, which recorded that the northern ditch was V-shaped whilst the southern ditch was U-shaped in profile. The northern ditch was dated but the southern ditch was not. The broad spans of the overlapping radiocarbon dates from the Monaghan West investigations makes it impossible to use them to infer different construction phases. The probable complexity of the monuments is also hinted at by the Doon of Drumsna investigations which showed that the main embankment had been enlarged substantially following its initial phase of construction, but the timing of this is unknown (Lanting et.al. 1991). The earlier phase could represent a marking out bank. Likewise, whether the palisade on the Monaghan West linear earthwork was built at the same time as the banks and ditches cannot be determined from the available radiocarbon dates. The fact that the palisade trench does not run exactly parallel with the earthworks might imply it predates the earthworks.

In summary, the adjusted radiocarbon dates all fall squarely within the Iron Age and span a maximum period of around eight centuries. The extension of the Monaghan West date ranges into the Late Iron Age is significant because it does not preclude the possibility of influences from the Roman world. However, when taken in conjunction with the dendrochronological

dates from the Dorsey the likelihood is that the first centuries BC are the horizon into which the linear earthworks of the study area should most probably be placed.



Figure 70: CV031-047 ringfort is built into the Ardkill More (BPD-006) section



Figure 71: MO 022-002 ringfort is built into the Monaghan (west) section (BPD-007)

Associations with other monuments can also give clues as to the age of the linear earthworks, but without excavation the nature of the association can be speculative. There are just two monuments that are physically linked with the linear earthworks of the study area, both of which are probably Early Medieval ringforts that utilised the earthworks. The fosse of the ringfort CV031-047 was recorded by the Archaeological Survey of Ireland as having cut through the linear earthwork at Ardkill More and too little of the second enclosure MO 022-002, which was also recorded as a ringfort, had survived to indicate its relationship with the adjoining section of the Monaghan West dyke (Figures 70 and 71). The broader landscape approach also gives little away regarding age. The Longford Dunclá runs through the centre of a rich funerary/ritual landscape of ring-barrows and standing stones but it is not possible to be certain which came first, the linear earthwork or the other monuments. The probability is that the barrows and standing stones predate the boundary earthwork, just as was the case in relation to the Wessex linears, but this is not certain. Many of the English Iron Age dykes developed out of Late Bronze Age systems of land parcelling (Harding 2004, 38; Bradley et.al. 1994, 137). It is interesting in this regard to note that the viewshed analysis from the Dunclá demonstrates visibility from the monument to the standing stones but not to the barrows, which are in the same general area (Figure 77). This may suggest an association with the standing stones, rather than the barrows. At Maghernakill (BPD-008) the linear earthwork appears to have been aligned towards what a (possible) megalithic tomb (MO-025-021), perhaps suggesting a much earlier, Neolithic, date for this section.

| NUMBER | BPD SECTION | SITE | METHOD | LAB NO | CONTEXT | SUBSTANCE DATED | BP_DATE | STANDARD_DEV | CAL_2S ¹⁰ | AGE-LAPSE | ESTIMATE OF CONTEXT DATE CAL-2S (ADJUSTED) ¹¹ | REFERENCE |
|-----------|---------------------------------|----------------|---------------------------------|-------------|--|---|---------|--------------|-------------------------|-----------|---|----------------------------|
| RC DATE 1 | BPD--007 MONAGHAN (WEST) | Aghareagh West | Conventional radiocarbon dating | UB-2600 | Burnt fill of palisade slot. | Mixed charcoal (<i>Quercus</i>) | 2165 | 55 | 376-56 cal. BC | up to 250 | 310 cal. BC - cal. AD 140 | Walsh 1987, 9 |
| RC DATE 2 | BPD--007 MONAGHAN (WEST) | Aghareagh West | Conventional radiocarbon dating | GrN-12616 | North bank | Mixed charcoal, possible plank embedded in bank (species not identified, possibly residual) | 2240 | 90 | 517 cal. BC- cal. AD 45 | up to 250 | 430 cal. BC - 220 cal. AD | Walsh 1987, 9 |
| RC DATE 3 | BPD--007 MONAGHAN (WEST) | Aghnaskew | Conventional radiocarbon dating | UB-2601 | Burnt fill of palisade slot | Mixed charcoal (species not identified) | 2190 | 55 | 389-106 cal. BC | up to 250 | 330 cal. BC - cal. AD 90 | Walsh 1987, 9 |
| RC DATE 4 | BPD-004 DOON OF DRUMSNA | Drumcleavry | AMS radiocarbon dating | GrN-18564 | Lowest level of earthwork bank | Wood from bark (<i>alnus</i>), possibly residual | 2105 | 35 | 343- 42 cal. BC | 0 | 340-40 cal. BC | Lanting et.al. 1991, 66 |
| RC DATE 5 | BPD-004 DOON OF DRUMSNA | Drumcleavry | AMS radiocarbon dating | GrN-18563 | Truncated peat level below bank | Peat | 4445 | 40 | 3336-2930 cal. BC | 0 | 3340-2930 cal. BC | Lanting et. al. 1991, 66 |
| RC DATE 6 | BPD-001 MAGHERACAR | Magheracar | AMS radiocarbon dating | Beta-206066 | Ditch A (charcoal rich deposit in primary silting 1012 basal fill) | 1g charcoal from ash (<i>Fraxinus excelsior</i>) and willow (<i>Salix</i> sp.) | 1790 | 80 | cal. AD 60-420 | up to 150 | cal. AD 110-500 | O Donnchadh and Lynch 2005 |
| RC DATE 7 | BPD-001 MAGHERACAR | Magheracar | AMS radiocarbon dating | Beta-205186 | Ditch A (charcoal rich deposit 1014 upper fill of ditch) | Charcoal (<i>Corylus</i>) from branches | 910 | 50 | cal. AD 1024-1218 | up to 50 | cal. AD 1060-1240 | O Donnchadh and Lynch 2005 |

Table 2: Radiocarbon dates from linear earthworks in the study area

| NAME | TOWNLAND | COUNTY | DATED BY | BP_DATE | STANDARD_DEV | CAL_2S | CONTEXT | SUBSTANCE DATED | LAB NO | REFERENCE |
|--------|-------------------|--------|--------------------|---------|--------------|-------------------------|--|-----------------|---------|--------------------------------------|
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 135+/-9 BC | Timbers from north side. | Wood | Q7584 | Warner, Mallory and Ballie 1990, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 140+/-9BC | Timbers from north side. | Wood | Q7598 | Warner, Mallory and Ballie 1990, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 150+/-9 BC | Timbers from north side. | Wood | Q7604 | Warner, Mallory and Ballie 1990, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 150+/-9 BC | Timbers from north side. | Wood | Q7604 | Warner, Mallory and Ballie 1990, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2015 | 45 | 157 cal. BC- cal. AD 76 | Burnt timbers from beneath northern bank. | Charcoal | UB-2221 | Lynn 1991-92, 66. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2020 | 45 | 161 cal. BC- cal. AD 73 | Burnt timbers from beneath northern bank. | Charcoal | UB-2219 | Lynn 1991-92, 66. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2072 | 36 | 180-10 cal. BC | Charred hazelnut shells from the roasting pit. | Charcoal | UB-6176 | Hurl and McSparron 2004, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2163 | 30 | 360-100 cal. BC | Charcoal from Fill of Palisade I. | Charcoal | UB-4894 | Hurl and McSparron 2004, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2171 | 33 | 360-110 cal. BC | Post-pipe from Palisade II. | Charcoal | UB-6174 | Hurl and McSparron 2004, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2159 | 34 | 360-90 cal. BC | Charred timber from Palisade I. | Charcoal | UB-6327 | Hurl and McSparron 2004, 47. |

¹⁰ Calibrations: OxCal v4.2.4 (Bronk Ramsey 2013); IntCal 2013 atmospheric curve (Reimer et al 2013)

¹¹ Adjustments as per Warner 1990

| | | | | | | | | | | |
|--------------------|------------------------|--------|--------------------|------|----|-------------------|--|----------|-----------|--|
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2159 | 30 | 360-90 cal. BC | Charcoal from Fill of Palisade I. | Charcoal | UB-4895 | Hurl and McSparron 2004, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2240 | 45 | 387-191 cal. BC | Burnt timbers from beneath northern bank. | Charcoal | UB-2220 | Lynn 1991-92, 66. |
| DORSEY | Dorsy/Tullynavall | Armagh | Radiocarbon dating | 2248 | 43 | 400-200 cal. BC | Charcoal from basal fill of gully. | Charcoal | UB6030 | Hurl and McSparron 2004, 47. |
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 90-100 BC | Palisade timbers in SW corner | Wood | Q4629 | Warner, Mallory and Ballie 1990, 47; Baillie, 1988, 37-40. |
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 90-100 BC | Palisade timbers in SW corner | Wood | Q4633 | Warner, Mallory and Ballie 1990, 47; Baillie 1988, 37-40. |
| DORSEY | Dorsy/Tullynavall | Armagh | Dendrochronology | 0 | 0 | 95+/-9 BC | Burnt timber from south side | Wood | Q2888 | Warner, Mallory and Ballie 1990, 47; Baillie 1988, 39. |
| CLAIDH DUBH | Ballydague/Castleblagh | Cork | Radiocarbon dating | 1801 | 39 | cal. AD 126-336 | Peat from directly above stones in trackway to east of bank | Peat | UB-3721 | Doody 1995, 22 |
| CLAIDH DUBH | Ballydague/Castleblagh | Cork | Radiocarbon dating | 4991 | 44 | 3942-3660 cal. BC | Sample from peaty matrix in which trackway to east of bank set | Peat | UB-3722 | Doody 1995, 22 |
| KNOCKANS (TELTOWN) | Oristown | Meath | Radiocarbon dating | 2530 | 60 | 806-431 cal. BC | Hazel from 'black layer' sealing primary phase of southern embankment. | Wood | GrN-15923 | Waddell 2011, 198 |
| KNOCKANS (TELTOWN) | Oristown | Meath | Radiocarbon dating | 1335 | 40 | cal. AD 639-770 | Hazel charcoal from heightening of southern embankment. | Wood | GrN-15649 | Waddell 2011, 198 |
| KNOCKANS (TELTOWN) | Oristown | Meath | Radiocarbon dating | 1140 | 40 | cal. AD 775-985 | Hazel charcoal from heightening of southern embankment. | Wood | GrN-15650 | Waddell 2011, 198 |

Table 3: Table of radiocarbon and dendrochronological dates from Irish linear earthworks outside the study area

9.0 ENVIRONMENTAL SETTING

Placing the linear earthworks in their natural landscape setting is vitally important to allow for an understanding of the purpose of the monuments. Palaeoenvironmental remains such as pollen, seeds, timber, charcoal and molluscs can all provide insights into past environments. Within the study area only pollen sequences are available. Whilst there are eight sites within 10km of the study area's linear earthworks where pollen work has been undertaken (Table 4) the chronological problems outlined above preclude correlation between the origins and use of the linear earthworks and the timing of landscape change as presented in the pollen records. Nevertheless they do provide a generalised picture of an open landscape, apart from at Lough Kinale, in the later prehistoric period. Each pollen site is detailed below.



Figure 72: Location of pollen sites within 10km of the linear earthworks of the study area

A kilometre west of the Worm Ditch (BPD-002) at Raheelin, Co. Leitrim pollen analysis from blanket bog indicated that the amount of woodland in the surrounding landscape was reduced in late prehistory (Jessen 1949, 156-158). It is not possible to be any more definitive on the chronology of landscape change at Raheelin because the samples were not dated, but their close proximity to the dyke implies they can be taken to include its setting. Seven kilometres to the north of the Worm Ditch at Glen West, county Fermanagh woodland clearance, perhaps for stock rearing in the Dowris phase of the Late Bronze Age, coincides with an expansion of land-use throughout Ireland at this time (Plunkett 2009, 283, 289). Woodland regeneration occurs from the 8th century cal. BC but the pollen record does not extend beyond the 6th century cal. BC.

| Site name | Site type | Top Date (calBP) | Base Date (calBP) | Publication |
|--|------------------|------------------|-------------------|--------------------|
| Canbo, Roscommon | Raised bog | 0 | 13000 | Jessen 1949 |
| Corlona, Leitrim | Raised bog | 0 | 7000 | Tohall et.al. 1955 |
| Derragh Bog, Longford | Raised bog | 0 | 6300 | Brown et. al. 2005 |
| Drumurcher, Monaghan | Section | 7000 | 12500 | Coope et. al. 1979 |
| Glen West, Fermanagh | Raised bog | 2600 | 3300 | Plunkett 2009 |
| Lough Kinale (Ballywillin Crannog), Longford | Lake | 0 | 9300 | Brown et.al. 2005 |
| Raheelin, Leitrim | Blanket bog | 1000 | 5500 | Jessen 1949 |
| Aghareagh West, Monaghan | Linear earthwork | - | - | Walsh 1991 |

Table 4: Pollen sites within 10km of linear earthworks within the study area (source: Irish Pollen Site Database, ipol.ie, apart from Walsh 1991)

BPD-005 Longford Dunclá

Comprehensive palaeoenvironmental investigations using a range of techniques were undertaken by the Discovery Programme around Lough Kinale, at the east end of the Dunclá (Fredengren, Kilfeather and Stuijts 2010). The investigations showed that following an episode of early Neolithic farming the landscape remained largely forested until the Early Medieval period: 'the environmental record shows only a gradual opening up of the landscape during the later part of

prehistory with little evidence for pastoral farming' (Fredengren et.al. 2010, 250; Selby et.al. 2010, 70). The later prehistoric woodlands comprised pine, ash, oak and birch trees with alder growing on the lake margins. However, because of the nature of the deposits sampled the picture of landscape evolution was confined to the immediate area (*c.*1km) around Lough Kinale and the same conclusions cannot be extended to encompass the area around the Dunclá (Ingelise Stuijts pers. comm.).

BPD-004 Doon of Drumsna

6.3km to the north of the Doon of Drumsna at Corlona, county Leitrim an oak trackway was radiocarbon dated to the Early Bronze Age (2196-1291 cal. BC) (Tohall et.al. 1955). Peat samples from above and below the trackway were analysed and showed a steep decline in oak shortly after the trackway was constructed. This was followed by the apparent abandonment of the environs of the bog. A second core was taken 9.5km west of the Doon at Canbo, county Roscommon but this produced little of relevance (Jessen 1949, 152-4).

BPD-007 Monaghan

Soil samples from the old ground surface beneath both banks at Aghareagh West, county Monaghan (BPD-007) produced pollen of alder and hazel, with oak being noticeable by its absence (Walsh 1991, 17, 19). At Drumurcher the pollen record extended only as far as the early post-glacial (Coope et.al. 1979).

10.0 THE WRITTEN AND ORAL LANDSCAPE OF THE BLACK PIG'S DYKE, BY DR. MARY LEENANE

Research to date around the written and oral landscape of the linear earthworks associated with the so-called Black Pig's Dyke has mostly concentrated on the folklore tradition, much of which has been comprehensively pieced together by Fionnula Williams (1987), with the earliest attestations being recorded in John O'Donovan's 1835 OS letters. Most frequently, these structures are associated with mythical pigs (The Black Pig's Dyke/Race/Valley), while attribution to foreigners, or perhaps Vikings, are also attested (Danes Cast), so too are terms such as 'Worm Ditch/Cast'.

The written representation of this structure(s) from the Old Irish to the Early Modern Irish period, has not received any significant attention. It was deemed necessary to ascertain, if possible, its treatment therein with specific reference to the earlier records. Though archaeological evidence for the dating of these earthworks derives from small-scale investigation, it, nevertheless, indicates that these significantly predate folklore evidence and even that of our earliest relevant written sources dating roughly from the seventh century onwards. It is important to recognise the somewhat limited contribution that these can make to our appreciation of the original purpose of this monument(s). Nevertheless, it is possible that these records might preserve, in some form, earlier traditions and may also have inspired later ones, while also alluding to their cultural significance throughout generations.

10.1 BOUNDARIES IN EARLY LAW AND LITERATURE

At least in places, though perhaps less so today, a linear earthwork would have been a very imposing feature in the landscape. It seems reasonable to expect that they would figure strongly in the literature in the way that sites such as Tara and Emain Macha do. Written accounts, dating mostly to the nineteenth, and more frequently, twentieth century, offer different beliefs around their origin. This includes assertions that it was constructed as a boundary, with Kane (1908/9, 326) noting that the Worm Ditch section near Clones 'is believed by the farmers through whose

fields it runs to have been raised as a boundary between two great kings'. If these were indeed created, or perceived, as a unified monument, like a major political frontier, we might anticipate, at minimum, early references to it along with an associated name. Such a term could include elements which would allude to its status as a territorial border, like, *clad/clas*, 'ditch, trench, dyke', *coicrích*, 'border', and *blá*, 'a boundary (mark), enclosure', which are attested in early Irish law and literature (*DIL*). A more localised structure might also attract these and similar terms. Old Irish commentary on the legal text, *Bretha Comaithchesa*, outlines twelve types of landmark (*blá*) which can act as a boundary indicator, such as natural features, like rivers, lakes and rocks (*CIH* 64.6-79.12; 191.1-205.21; Bhreatnach 2008, 587). The most applicable in the current context is most likely to be the listing for *cladblá*, 'a ditch mark', 'a district marked by an enclosure (*duae*), a ditch (*urclaide*), a *ráth*, a *fert*'. The implication seems to be that the visibility of boundaries was achieved through readily identifiable natural or artificial landmarks, which could be used together or, perhaps individually to form a border. Other possible terms that might encapsulate an earthwork(s) such as this are *dumba*, 'mound, tumulus, barrow', *druim(m)*, 'ridge, usually of elevated ground, hill', *fert*, 'mound, tumulus, dyke used as a boundary-mark', *búrach*, 'trench, pit, excavation', *lorg*, 'track, trail, path', or perhaps *corr*, 'peak' (*DIL*). Later folklore tradition refers to the 'Valley of the Black Pig, introducing another possibility in the form of *glenn*, 'valley, hollow' (Williams 1987, 13-14).

The wider significance of boundaries has not gone unnoticed by scholars. Bhreathnach (2008, 587) asserts that boundaries have 'been shown to be central to many types of activities in early Ireland, for example as the locations of assemblies, battles, churches and important secular sites'. In this way, border structures form neutral ground and allow for the regulation of contact between communities (MacCulloch 1967, 790; Sjöblom 1994, 159-62; Tarzia 1987, 29). Not only were these centres of commercial and political activity, but also, according to Ó Riain (1972, 14-24), had a ritualistic dimension. Accordingly, these could also act as an interface between the ordinary world and that of an otherworld. Nevertheless, linear earthworks remain very much of an enigma, with many questions around their function and associations remaining unanswered.

10.2 ULSTER CYCLE

An analysis of key sources, particularly those pertaining to the so-called Ulster Cycle, does not appear to point to any explicit, or consistent, representation, or naming of the earthworks in a definitive manner. However, on closer examination, some interesting references come to light.

One of the more seemingly clear-cut early mentions of the Dorsey is found in the Annals of Connacht entry for 1224 (*AC*), referring to the *dorsiu Emma*, ‘the doors or gates of Emain’, implying, according to Bhreatnach (2008, 585), that this was a ‘pass that could be defended from an army moving northwards from Dundalk’. This is central to her argument that the Dorsey and the Danes Cast monuments, acted as political boundaries, or obstacles, in the medieval period. She proposes that the description of Fergna mac Finchonna as *rí Búraig Ulad*, ‘the king of the trench of the Ulaid’, in *Táin Bó Cúailnge* supports this (*TBC II* 1.4525). Of further relevance is Muhr’s (1994, 158) discussion on the placename, *Cuib*, where the bull goes at the end of the tale and paws up the earth, or perhaps digs a trench (*dogní búrach TBC I*, 1.4153), giving rise to the placename, *Gort mBúraig*, ‘the enclosure of the trench’. It is concluded that the bull was in exactly the right area for the Danes Cast. Though not as precise as the above listing in the annals, these latter cases might allude to earlier indications for a dyke structure in the southern aspect of Ulster.

A scene from one of Cú Chulainn’s boyhood deeds is noteworthy. Conchobar and his men, aside from Cú Chulainn, go from Emain Macha to fight Eógan mac Durthacht, but are defeated, leaving Conchobar incapacitated (*TBC I*, ll.481-519). The young Cú Chulainn rescues Conchobar, who is covered with earth in what seems to be a sizeable *clad*, ‘ditch, trench, dyke’ (ll.504-509). Additionally, Chulainn is required to capture a pig (*muc, torc*) to rehabilitate Conchobar. In other texts, Eógan is described as the king of the *Fernmag*, or, Farney, the early district of which was near the town of Monaghan, and not in the same area as the barony of Farney, south of Carrickmacross (Thurneysen 1935, 10, §11; Muhr 1994, 156). Though the location of the battle is not listed, it seems that they at least travel away from Emain Macha, perhaps in the direction of Farney, but this would not seem to bring them into contact with any known sections of the dyke.

The explicit absence of this monument(s) in important Ulster Cycle sagas, such as *Táin Bó Cúailnge*, which centres on the Connacht army’s journey from Cruachain to Ulster to seize the Donn Cúailnge, is quite striking, given the attention that is generally afforded to the landscape and onomastic material. If we look at Recension I of the tale, their initial departure to the south-east of Cruachain draws them away from any potential interaction with these structures (*TBC I* ll.114-340). Furthermore, rather than crossing the Shannon at the known fording point at Athlone, and proceeding on towards Tara to join the *Slige Midlúachra* to go northwards, they take a less obvious route. This sees them traversing the river to the north of Athlone, before going on through Granard, just to the south of the section of the Black Pig’s Dyke, referred to as ‘Dunclá’,

but with no references to it. They move further east, but with no mention of Tara, a major nexus of communication in the early period, though, the army proceed fairly closely to its northerly aspect, or, at least to the *Slige Midlúachra*, the most direct path to Emain Macha from here. The army only join this much further north, above Drogheda (ll.1130-490). One might also anticipate that the crossing of the dyke would be a significant event, but again, this does not seem to be the case.

The reasons for the blatant omission of this monument(s) in this tale, and others, are particularly interesting. Does this indicate a deliberate attempt to avoid it, and if so, why? Were the creators of *Táin Bó Cúailnge* skirting around this where possible? Why do they not take a north-easterly exit from Cruachain? Is there an implication that this would bring them into confrontation with a heavily fortified frontier almost from the outset? Maybe, this route is chosen to accommodate the storyline. Alternatively, the explanations might be of a political nature. Perhaps, this suggests that the Black Pig's Dyke reflects a distant, and no longer relevant, political past, which is very much defined by the shrinking of Ulster territory to the north-easterly aspect of the country, and the rise and dominance of the Uí Néill. Yet, a political reality centring on contention between the provinces of Ulster and Connacht is fairly well developed in the extant Ulster Cycle material. It is also possible that at least some of these were viewed as natural features, and thus did not warrant inclusion in the written lore. Further integrated research is required to allow for a better appreciation of this structure(s), and to enable us to address key questions like these.

10.3 PIGS, PLACENAMES AND THE LITERATURE

Another dimension to this initial stage of research, involved the appraisal of a selection of material concerned with the naming of places, including the *Dindsenchas*. Given the association of this monument(s) with pigs in popular tradition, evidence connecting them to landscape features was a further line of enquiry pursued. At the very least, it was hoped that this might provide some insight into the inspiration, or, perhaps the possible origins, for legends of this type. The existence of wild boar/pig from much earlier than any suggested dates for the Black Pig's Dyke seems clear (Carden 2012, 29-30). Giraldus Cambrensis points to the abundance of wild boar in the twelfth century, but archaeological remains suggest their extinction soon after the Norman invasion (O'Meara 1951, 47, §18; Edwards 1990, 65). Carden (2012, iii) observes that 'distinguishing between true wild boar and domesticated pig bones is difficult since they are very similar due to their evolutionary relationship (domesticated pigs are descendants of wild

boars)’. She adds that pigs were commonly kept in towns in the later Medieval period, noting that the Irish ‘greyhound pig’ breed, or ‘turf pig’ receives specific mention particularly in sources and comments on ‘certain skeletal remains from Neolithic through to recent historical archaeological contexts including numerous mentioned at various Medieval sites’ (Carden 2012, 25-26). The predominant Old Irish words for pigs, in their different varieties, are, *mucc*, ‘pig, sow, of a wild pig, or boar’, *torc*, ‘boar, wild boar, tusked boar’, while wild pigs can also be referred to as *mucc allaid* or *torc allaid* (DIL). *Sus scrofa* and *Sus domesticus* are the Latin forms for wild and domestic pigs respectively. Nonetheless, we do find that both *mucc* and *torc* can be applied to the same animal in close proximity, but, there is a general sense from the literature examined here that these are more commonly wild, sometimes mythical, as opposed to domestic forms (TBC I ll.513-519). Carden (2012, 25) notes that the teeth of pigs were found associated with Bronze Age and Medieval human burials which alludes to ‘some ritualistic association with the next world after death’.



Figure 73: The hunting scene on the ninth century cross at Castledermot, county Kildare includes a boar (photo: C. O Drisceoil).

There is evidence for the hunting of wild pigs with dogs, in sources such as the saints lives, namely, St Kevin’s, and a hunting scene on a ninth century cross at Castledermot, Co Kildare, depicts two huntsmen pursuing a wild boar and there also seems to be a dog in the picture (Plummer 1922, i 128 § xiii (26) trans. ii 124; i 165-166 § xxi (40) trans. ii 160-161; Kelly 1997, 299, fig. 15). They inhabited the woodlands and could be quite vicious when hunted, making this a dangerous activity. The potentially treacherous nature of pigs is underscored in texts, like, *Cáin Adomnáin*, where women are said to be killed by pigs, and a child is eaten by them in *Bethu*

Phátraic (Meyer 1905, 28, §42; Mulchrone 1939, 119-120, ll.2319-333). Their destructive method of grazing, referred to as *claidbit muca co grian*, ‘dig down to the gravel (subsoil)’, is highlighted in the Old Irish legal text, *Bretha Comaithchesa*, and incurs high penalties (*CIH* vi 788.11; Kelly 1997, 142-43). Maybe, at least in the medium term, uprooted sections could have acted as a type of local landmark or reference point. The verb, *claidid*, means to ‘dig, excavate, build, construct’, alluding to the creation of an artificial feature (*DIL*).

Although there are variations, the crux of the later folklore legend involves a human changing into a swine, before usually being chased across the country along a route often called ‘The Valley of the Black Pig’, the location of which varies (Williams 1987, 13-15). It is important to note that a relatively late tradition of this type is not exclusive to the region of south Ulster, and is for instance, attested in the south and south-west of Galway. Pigs are quite prominent, often with mythical traits, in tales down to, and including, the early Modern Irish period. They are identified as the meat of choice at feasts in tales, such as, *Scéla Muicce Meic Da Thó* and *Fled Bricrenn*, and more specifically presented as the food for kings such as Conchobar (*TBC I*, ll.513-519), Cormac meic Airt (Stokes 1891, 214-215, §§37-52) and Conaire Mór (Stokes 1901, 42), aligning them closely with the upper echelons of society.

While not perhaps explicitly connected to the Black Pig’s Dyke structures, there is some indication of a belief concerning the reshaping of the landscape by pigs from an early date. For example, in the late Old Irish or early Middle Irish tale, *Cath Maige Mucrama*, magic pigs (*muca gentliuchta*) emerge from the otherworldly cave at Cruachain, are pursued from territory to territory, stripping the land bare giving rise to the name, *Mag Mucrama*, which is described as being in ‘Crích Óc mBethrae to the North of Aidne, northwards from Áth Clíath’ (O Daly 1975, 48-49, §§33-37). This tradition is broadly upheld in the *Dindsenchas* material where we find black pigs wreaking havoc on the land of Connacht before being found at the ‘bright sands’ at *Mag Fraic* which is presumably near Carnfree at the Cruachain complex (Gwynn 1906, 383-386, §69). These are clearly represented as supernatural creatures here, and this is not the only intimation of this. For instance, the *Dindsenchas* entries for *Loch Neill*, again in the same general region at *Mag nAí*, tell of Niall’s, son of Eanna Aigneach, pursuit of the swine of Derbrenn, with his dogs, along the *lurg do muc* ‘track of the pig’ before drowning in the lake which is subsequently named after him (Stokes 1892, 494-495, §29). Derbrenn’s swine are said to be metamorphosed from humans in related versions of this (Gwynn 1906, 150-153, §25; 387-397, §70). Shape-changing is not an uncommon motif with a series of transformations occurring in the tale, *De Chopur in da Muccado*, where the two swineherds from Munster and Connacht eventually become the two fighting bulls

of *Táin Bó Cúailnge* (Windisch 1891, 230-278). This is an important component of the later folklore material. The swine of later legend is usually said to be black and this is also obviously attested in the name, Black Pig's Dyke/Race/Valley (Williams 1987, 13-15). A Middle Irish *Briátharogam* mentions pigs of different colours including reddish-brown, grey and black ones (Calder 1917, 288, ll.5668-679). Though not always indicated in earlier sources, some of these are black.

The record for *Loch Con*, which seems to be further west in Mayo, also features hounds and a pig capable of causing devastation as far as *Alban*, or Scotland (Stokes 1892, 497, §32). The pig goes to an island at *Loch Con* which bears its name, *Muicc-inis*, but an island of this name does not seem to be listed there, though other early attestations to this survive. Although not featuring hounds or pigs, a tale, possibly dating back to the ninth century, *Cath Maige Tuired*, refers to a large track, big enough for the 'boundary ditch of a province', called 'The Track of the Dagda's Club' (*Gonad dei dogaror Slicht Loirge an Dagdai*; Gray 1982, 46-47, §93). This is created by the Dagda when he drags his club along the ground. This *lorg* might be compared to the track created by pigs, but here it is clearly aligned with the marking of a provincial border, while also indicating that these were expected to be very substantial in size. There is some speculation that this may be a reference to *Mag Lurg*, anglicised as Moylurg, or the 'Plains of Boyle' in Roscommon. This is supported by the entry in the Annals of the Four Masters for 1597, *Mag Luirc an Dagbda*, which Hugh O'Donnell passes through after crossing the River Boyle (*AFM*).

The chasing of pigs carries on into later Fenian tradition with one of the best cases occurring in the early Modern Irish account of *Tornigheacht Dhiarmada ocus Ghráinne*. Here, Diarmait violates his *geis*, 'taboo, prohibition', to hunt a wild boar and ends up being disembowelled by it at *Beann Gulban*, Benbulbin, Co. Sligo (O'Grady 1880/81, 40-53). Of particular interest is another tale from this period, *Oidhe Chloinne Tuireann*, but drawing on material dating perhaps as far back as the eleventh century (O'Duffy 1888, 77-90). Set before the Second Battle of Moytura, it centres on the death of Cian, father of Lug mac Ethnenn, at the hands of the Sons of Tuirenn. Cian is at *Mag Muirthemne*, on the south easterly aspect of Ulster, roughly equating with modern day county Louth, when he hides in a herd of swine by transforming himself into one before rooting up the countryside. Brian, one of the sons of Tuirenn, changes his two brothers into hounds and they chase the pigs with the enchanted one becoming separated. He reverts to human form, is killed, and his body is covered over with stones and earth, at an unnamed location. Kane (1908/9, 323-325) proposes that most of the legends relating to the Black Pig's Valley/Race derive their motif from this tale. He confines this tale to prehistoric pagan times, and its events to, perhaps, the

first century B.C. His argument relies to a large degree on the modern version of this appearing in Nicholas O’Kearney’s book, *The Prophecies of SS. Columbkille*, published in 1856, which he argues ‘still preserves in its modern shape so much of the original pagan myth’. This suggested dating for the events of *Oidhe Chloinne Tuireann* is very problematic, and it seems more likely that the later version in O’Kearney’s book is inspired, with variation, by an earlier source as opposed to independently preserving some ancient tradition. It seems clear that there is an enduring tradition, in various forms, of the hunting of wild, or, mythical swine associated with the creation of features, and possibly placenames, in the landscape. At this stage, the assertion that the later folklore motif derives from *Oidhe Chloinne Tuireann* cannot be substantiated.

It is not always possible to determine the location of the places from the earlier material, because some of these are no longer attested, or, their names might have changed to reflect later traditions. However, material of this nature offers an invaluable insight into the cultural associations of the landscape. The identification of placenames containing some of the components outlined above, along with those connected with swine, or even a worm like creature, requires a more detailed consideration. This would include an extensive examination of the landscape around the known linear earthworks’ sites, the broader region, and related areas, of the Black Pig’s Dyke. It might be possible to identify specific trends with regard to, perhaps, the origins and rise in popularity of such elements, like *mucc*, and also their possible connections with certain landscape features, natural and man-made. An initial survey of the placenames databases, www.logainm.ie and www.placenamesni.org, indicates that *mucc*, and its derivations are popular right across the country, and in places where no linear earthworks are attested, thus alluding to other traditions or associations of pigs, for example, *Gleann na Muclach* (Cork), *Cnoc na Mucláí* (Armagh), *Corr na Mucklagh* (Longford, Roscommon, Kildare, Leitrim, Galway, Armagh, Louth, Derry, Tyrone, Fermanagh), *An Mbuch* (Sligo), *(An) Mucklagh* (Offaly, Monaghan, Louth, Wicklow, Mayo), and *Sliabh Mhucsnámba* (Kerry). *Druim(m)*, ‘ridge’, is also very prevalent, perhaps a little more so in our general area, but the hilly terrain likely accounts for a significant portion of these. ‘Ridge of the pigs’ (*Droim Muc*), is also attested, with two cases occurring in Monaghan and another in Cavan. Just less than two kilometres to the west of the townland of *Droim Muc*, in Cavan, is *Drumbirk* ‘ridge of the wild boar’, and about 6km to the southwest again is another townland, called *Drumbirk*, but this one is only about .5km to the south of the section of the dyke at Ardkill More. The earliest confirmations for these seem to date to the nineteenth century, all of which are recorded on the OS maps. There are further instances of *Drumbirk*, in Leitrim, one to the northeast of the Doon of Drumsna, north east of Garvagh, and another to the southeast, southeast of Mohill. According to the entries for these at www.logainm.ie, 1585 is

the earliest testimony to the former, and 1621 to the latter. Further examples, including two townlands in Co. Monaghan are also evident. The twelfth century ‘Martyrology of Gorman’ mentions the ‘Cota of druim tuirc’, which could be an early reference to one of those in our region, and the significantly earlier, ‘Martyrology of Tallaght’, also contains a similar one (Stokes 1895, 246; Kelly 1857, xxxix). The records for *Mucnó*, near Castleblaney, in Monaghan, at www.logainm.ie list the entry for 832 in *Chronicon Scotorum (CS)* as the earliest annalistic evidence for this. While the translation is given therein as *Mucnám*, the form in Irish text is *Mucrima*. However, *Mucnamba* occurs in the entry for 912 in the Annals of the Four Masters. Ultimately, this brief analysis of a selection of material provides an insight into the value of further integrated placename research, while also alluding to the detailed and extensive investigation that is required.

10.4 ALTERNATIVE TRADITIONS

There is a further, though less common and more localised belief, that attributes this structure to a large *oll-phéist*, or serpent, and this has been recorded in the 1930’s by the Folklore Commission in Monaghan and Cavan, in both of which sections of the dyke are called ‘Worm Ditch’ (Williams 1987, 12). This is reflected in the townland name, Cornapaste (*Corr na Péiste*), in Monaghan, where part of the dyke passes through. There is very little, if any, early material which relates to this. In later literature, *piast*, more frequently refers to a creeping reptile, especially worms (*DIL*). Perhaps this is a later import into Irish tradition, but further exploration of the names ascribed to similar earthworks elsewhere, including Britain, is required to verify this. Alternatively, in counties Down and Armagh, the name, Danes Cast associates these with the Danes, who in ‘folklore are not regarded as mere mortals and other monuments, especially mottes and raths (ring-forts), are commonly thought to have been built by them’ (Williams 1987, 1).

A comparative analysis of the specific literary traditions, including later folklore ones, surrounding similar structures in Ireland (e.g. *Claidh Dubh*, *Clad na Leac*, and those at Newgrange, Tara, Cruachain and Loughcrew), Britain (e.g. Offa’s Dye, Wanesdyke, Cleave Dyke system) and beyond (e.g. Danevirke), would help to identify, if possible, common traits, symbolisms, and identities that might point to an underlying unified concept(s) of a much earlier continental origin. For instance, a preliminary search of similar structures in Britain, indicates that they sometimes bear names such as Devil’s Dyke, alluding to the superhuman effort required to build

the largest of these, and Danes Cast is also attested, which is also the case for sections of the Black Pig's Dyke (Oswald 2011, 2). It would also be useful to further tease out the nature of symbolisms connected with wild boar in the broader context of Celtic mythology, with particular emphasis on potential martial links. For instance, the Irish version of *Historia Britonum* of Nennius, a ninth century proposed history of the British, in *Leabhar Breathnach*, refers to *Cladh na muice*, a ditch 'made against the Gales and the Cruithnians' (Todd 1848, 64-65). Williams (1987, 12) equates this with the Antonine Wall, between the Firth of Forth and Firth of Clyde in Scotland, and notes the existence of a village called Swine's Dyke on the line of this. Most importantly for the current research, this represents a relatively early association of pigs with a linear earthwork functioning as a defensive frontier, and perhaps even a boundary. Stuart (1819, 585-587) likens the Danes Cast section to the Antonine wall and notes that the associated popular traditions in both cases are remarkably similar, with a section of the Scottish structure also bearing the name, 'The Swine's Dyke', surviving in the name of a local village. A number of beliefs as to the origin of 'The Glen of the Black Pig', are outlined by him, including one which attributes this to the 'enchantress', Medb at Cruachain, which is particularly interesting given Medb's involvement in a number of narratives concerning the reshaping of the landscape by pigs (O Daly 1975, 48-49, §§33-37; Gwynn 1906, 387-397, §70). Of course, the linear earthworks referred to as the 'Mucklaghs', at Cruachain, to the south of Owenagat, or, the cave at Cruachain mentioned above, upholds a tradition of magical pig(s) reconfiguring the landscape.

While ogham stones are much less prevalent in this part of the country, there are some at Cruachain, but none that refer to the Black Pig's Dyke, though research on this material is ongoing through the 'Ogham in 3D' project (www.ogham.celt.dias.ie/).¹²

10.5 CONCLUSIONS

This initial phase of research was centrally concerned with the collation and appraisal of a broad selection of early written material pertaining to the Black Pig's Dyke. A good insight into the type of information that we might expect to find with regard to linear earthworks in early Irish sources has been provided. These initial findings contribute significantly to a more integrated, and accurate, appreciation of the monument, while also raising some questions around existing theories about its function, including interpretations of this as an ancient fortified boundary of

¹² I am grateful to Dr Nora White for her input in this regard.

Ulster. The possible background and context for much of the later popular traditions, particularly those pertaining to pigs, connected to it has also been presented.

11.0 TOWARDS AN INTERPRETATION OF THE LINEAR EARTHWORKS

At the outset it is important to reiterate that there is no archaeological or literary evidence to support the hypothesis that a unified/co-ordinated territorial boundary, formed by a corpus of linear earthworks known collectively as the ‘Black Pig’s Dyke’ (or variants of the name), ever existed across the north midlands. Likewise there is nothing to suggest that there was a series of separate demarcating boundaries that were conceived in prehistory as a continuous system. The supposition originated with John O’Donovan in the 1830s and was embellished by folk traditions and amplified by antiquarians like Kane, Lett and Fennell. The ‘Great Wall of Ulidia’ captured the public imagination and reinforced political and cultural ideologies that saw Ulster as somehow separate from the rest of Ireland. Applying the same name - e.g. Black Pig's Race etc. - to disparate earthworks does not mean they are part of the same monument and explaining away gaps in the line with natural obstacles (forest, bogs, lakes) is not tenable given the fact that 90% of the circuit has to be plugged in this manner (Figure 74). The gaps in the circuits are far too extensive to have been simply filled with forests, bogs and lakes, as was proposed by Kane.

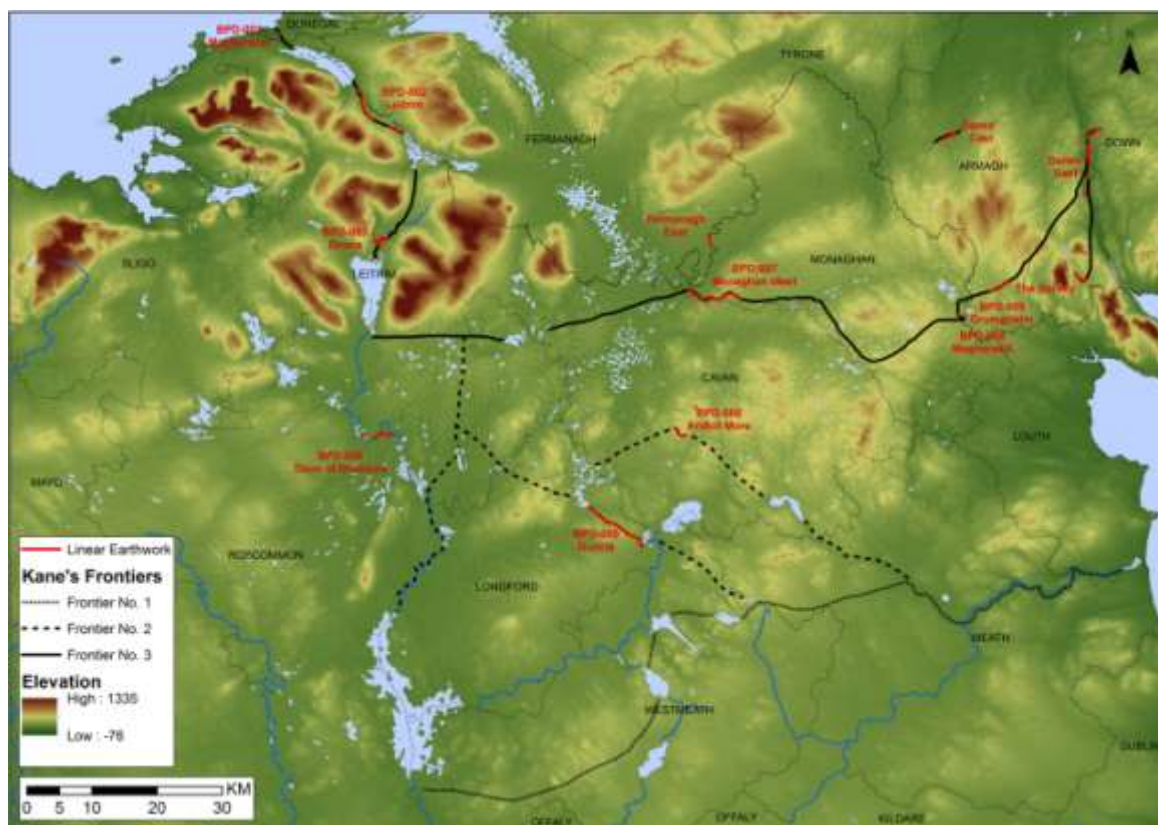


Figure 74: Map of Kane's 'frontiers' and linear earthworks of the region

The linear earthworks within the study area form a disparate corpus that portrays such variability that they each require 'highly specific interpretations' (Tilley 2010, 146). Magheracar and Maghernakill each cut off loops in rivers and may be considered as variants of promontory forts rather than linear earthworks. Very little is known about Maghernakill but its depiction on the first edition map appears to show large ramparts. In amalgamating the rivers enclosures are formed, but nothing is known of the activities that took place inside their ramparts but the radiocarbon dates from Magheracar indicate occupation in the Late Iron Age. Perhaps these were not settlements but attempts to create reserved areas in the landscape. One can only speculate as to why such 'reservations' might be created but it is possible they were created for hunting (of boar?) or for pasture, as at Salisbury Plain (Bradley et.al. 1994, 148).

The Doon of Drumsna also cuts across a river meander and its defensible siting, the massive scale of its ramparts, its unique out-turned entrances, and the dense concentration of settlement, funerary and possibly ritual archaeology inside its embankments all call for an alternative to its interpretation as a linear earthwork that blocked fording points on the river Shannon. It is proposed that the Doon is a unique example of a large-scale British and Continental style promontory fort, perhaps Ireland's only *oppidum*. Its setting within a meander of the river Shannon, the major communication and trade route into a heartland of the Irish La Tène 'province', bears many similarities with the great river promontory forts of Britain and Continental Europe, such as Villeneuve-Saint-Germain on the Aisne river, France, Besancon, France and on an altogether larger scale at Yanville (Figure 76). Its size, 188 hectares, is well above the minimum thresholds proposed for the largest and rarest British (30 ha) hillforts and indeed the Continental (25ha) *oppida* (this was the name given by Julius Caesar to large defended towns he encountered in Britain and the Continent) (Ralston 2006, 15). Sites on this scale need to be considered apart from the general hillfort *milieu*, which in Ireland range on average between 1-3 hectares (Grogan 2005 ii, 113). The Doon is also considerably larger than Spinian's Hill, Co. Wicklow, Ireland's largest hillfort at 130 hectares. The Irish site most commonly compared with the Doon is the Dorsey but this is only half its size, at 84 hectares.

The scale and siting of the ramparts at the Doon are without question highly defensive. The site is augmented by the river on three sides, and the fourth, south, side was also probably defended by marshy terrain (Wise 2005, 191). It was also probably defended by woodland and incorporated both natural and manmade barriers, the extensive system of dykes that run alongside the Shannon, which bear strong similarities with those at the Forest Hill *oppidum* beside

the river Kennet, Wiltshire (Lennon 2010, 127). These cumulatively formed a formidable defensive barrier in the same manner as the English Late Iron Age *oppida* - major tribal capitals like Camulodunum and Bagendon (Harding 1974, 75).

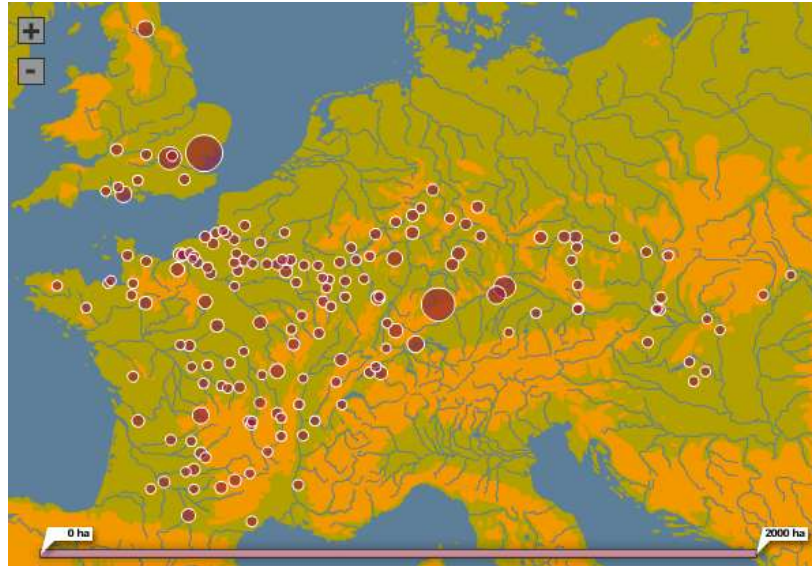


Figure 75: Distribution of Celtic oppida (source <http://www.oppida.org/index-en.html>)

Assuming they are of Iron Age date, the out-turned entrances at the Doon are unique in Ireland and are in marked contrast with the simple gaps found on the vast majority of Irish hillforts (Grogan 2005 ii, 124). Eoin Grogan records just four hillforts with complex entrances - Carn Tigherna, county Cork, Rathcoran, county Wicklow, Dunbeg, county Down and Knocknashee, county Sligo - but none have the type of entrance as those at the Doon (Grogan 2005 ii, 114, 124). Instead they bear close similarities, albeit on a more modest scale, with those found at British hillforts such as Danebury (eastern gate Phase E) and Maiden Castle, Dorset (Cunliffe 1975, 246-7). Here and at other hillforts such as Hambledon hill there were flanking earthworks that ran parallel to the entrance, which may explain the slighter rampart to the south of the Doon. Tom Condit and Victor Buckley compared the form of the entrance with the in-turned/out-turned passageways that are flanked by substantial ramparts known as *Zangentor*-type entrances (Condit and Buckley 1989, 14). The out-turned entrances funnelled attackers into a confined space and allowed defenders to attack would be aggressors from up on the ramparts even before they reached the main gates (Ralston 2006, 67). They are commonly found on the large *oppida*.

Little is known about the interior of the Doon, but the dense concentration of apparent settlement, funerary and possibly ritual sites indicated by the geophysical survey and the probable

ring-ditch 600m north of the main defences at Drumcleavry all point intriguingly towards widespread late prehistoric activity inside the ramparts (Read 2007b). How many, if any, of the nine circular enclosures (some classified as ‘ringforts’ by the Archaeological Survey of Ireland) inside the Doon are of similar age is a fascinating question that only excavation can tackle.

The Doon of Drumsna's siting on a key trade and communications artery into one of the core regions of Celtic Ireland, its many similarities with the large riverine promontory forts, most of which are considered as *oppida*, that are to be found throughout Iron Age Europe (Figure 76) and the potential character of the activities occurring inside its defences, all point towards the need for a reassessment of the previous interpretations as a barrier to protect a fording point on the Shannon. Could the Doon of Drumsna be an Irish version of the largescale riverine promontory forts found in southern England and Europe? Is it unreasonable to suggest therefore the Doon of Drumsna could be an Irish *oppidum*? In this regard, it is important to note that the amount of extensive excavation undertaken on Irish hillforts is tiny in proportion to the amount of known sites - Eoin Grogan records just six excavations at 74 hillforts/134 hilltop enclosures – and major questions regarding their character, chronology and European context remain unanswered (Grogan 2005 ii, 112). To address the questions around the Doon much additional work is needed, in particular in relation to characterising the nature and date of the activities taking place inside the Doon and its role in trade and craft specialisation.

Of the remaining sites Drumgristin, county Monaghan could be the remains of a late prehistoric linear earthwork but its orientation on a megalithic tomb and its small size, 82m long, points instead towards an alternative explanation, perhaps a ritual 'processional avenue' similar to the ‘Friar’s Walk’, Kiltierney, a cursus monument, as proposed by Peter Wise (Wise 2005, 185-6). The Cavan linear earthworks, following the river Shannon to the south of the village Dowra are potentially simply natural embankments, as interpreted by the Archaeological Survey of Ireland, although they do bear some similarities with the earthworks to the south of the Doon of Drumsna. The four remaining stretches - the Dunclá, county Longford, Ardkill More, county Cavan, the Leitrim section and the Monaghan West earthworks – remain as convincing examples of linear earthworks and it these sites to which questions of function(s) should most properly be addressed.

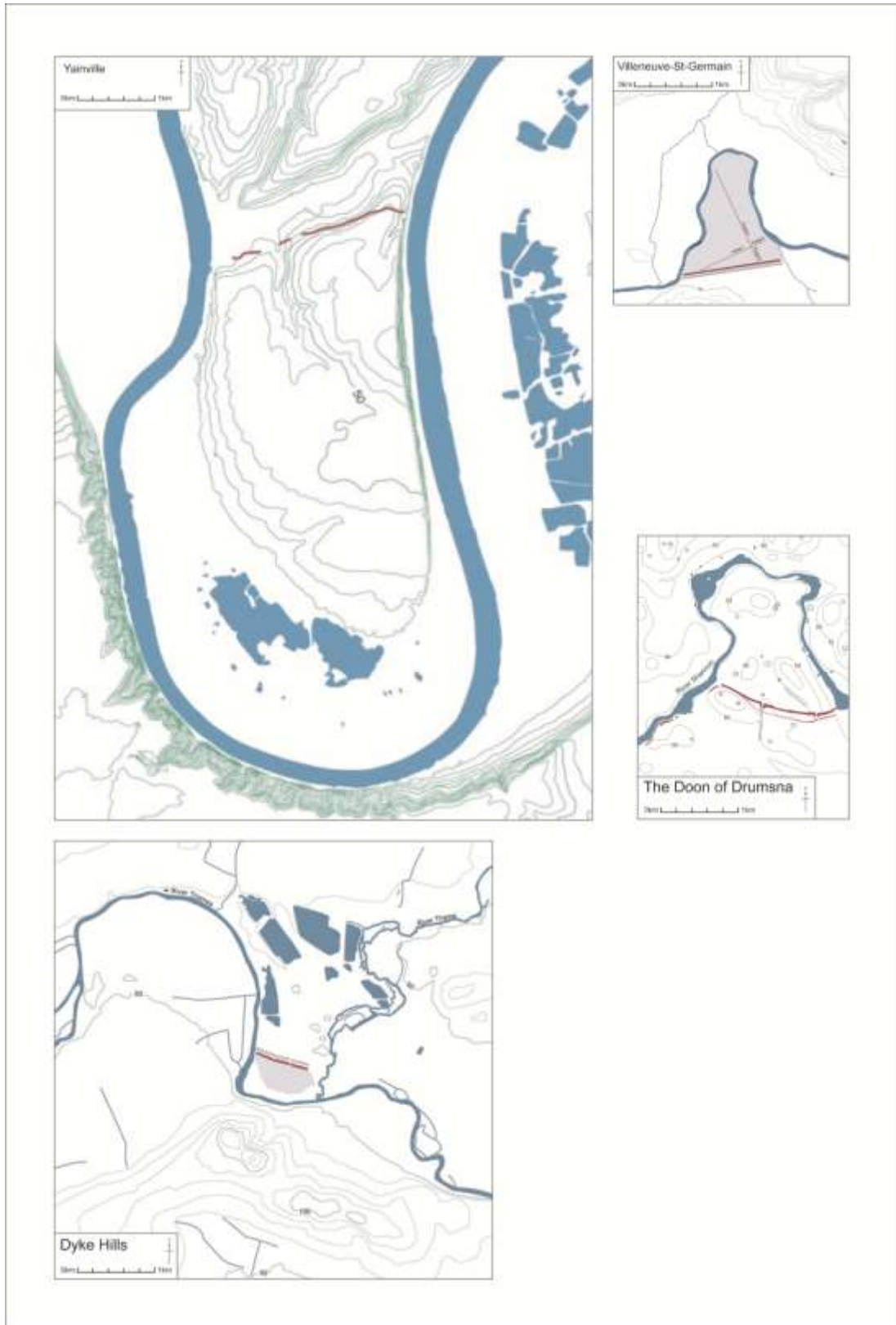


Figure 76: The Doon of Drumsna in the context of meander oppida in Britain and Continental Europe

The motivations that lay behind the construction of linear earthworks in Ireland and Britain has been much discussed since the early twentieth century (some key texts are: Kane 1909; 1916/17; Davies 1955; Bowen 1975, 1978; Fowler 1981; Ford 1981-2, 16-19; Condit and Gibbons 1988; Lynn 1990; Spratt 1991 ; Walsh 1991; Bradley et.al. 1994 151-2; Wise 2005; Bhreathnach 2008; Malim 2008; Tullett 2008; Lennon 2010; Tilley 2010, 99-186). The earliest explanations probably originated in General Pitt Rivers' interpretation of the Bokerley Dyke in Wessex as a defensive, militaristic political boundary (Pitt Rivers 1892), and thus these first interpretations focused on their role as military emplacements for the defence of territory and as boundaries that defined major geo-political territories. Recent study of Offa's and Wat's Dykes highlighted the many gaps in the boundary and concludes they were built to control human traffic: 'in today's terms the crossing points of the Dykes can be seen to have formed immigration, excise and border controls to ensure the safety and continued prosperity of the Mercian state' (Malim 2008, 32). He also suggests that smaller dykes around the 'core' boundaries were local territorial boundaries and blocked important routeways.

More recent economic interpretations see the linear earthworks not as frontier defences but as boundaries that divided agricultural resources within a 'bounded landscape', so-called 'pastoral enclosures' or 'ranch boundaries' for the large-scale enclosure of cattle (Bradley et.al. 1994, i, 137; Bradley 2007, 210; Spratt 1991, 450). Such theories were based on the assumption that cattle and sheep farming grew in importance from the Late Bronze Age. Current interpretations favour the interpretation of the English dyke systems as territorial divisions for 'dividing up the land for agricultural segregation and perhaps for the purposes of indicating community ownership and identity' (Harding 2004, 31, 39). A small cohort of scholars have also sought to downplay the tenurial and defensive aspects of the earthworks, in favour of their role in ritual practices, such as processional routes (Tilley 2010, 180) and as expressions of identity and manifestations of power and authority (Cooney and Grogan 1994, 194; Lennon 2010, 127). Each of these interpretative themes will be examined in relation to the dykes of the study area.

Were the linear earthworks of the study area defensive in intent? Firstly, linear barriers would have been of little practical use in prehistoric warfare, since external attackers could easily mass at a selected spot and make a breach, long before enough reinforcements could be summoned. Early medieval military tacticians estimated that every 1.3m of a fortification required one soldier (Bachrach 2001, 52-4). In the scenario where a linear earthwork like Monaghan West was a military boundary this would mean around 7500 'soldiers' would have been needed at any given

time to adequately defend the full stretch of the line. In the context of the Irish Iron Age this is difficult, if not impossible, to imagine. Similarly, wide gaps in their courses would have allowed enemies easy access into territories and there is no reliable evidence for additional fortifications or redoubts. The propensity for south facing slopes in the Monaghan West section has been seen as one of the key reasons why the earthworks have been interpreted as having had a defensive role. However, as was noted by Peter Wise the bulk of the terrain to the south of the Monaghan West dyke would not have been visible from the earthworks, making any concepts that they were defending the north by looking out over the south redundant (Wise 2005, 164). Furthermore, many of the lines run parallel to rivers and bog which would have offered no place of retreat for defenders. Frontier defences would also surely have been seen as psychologically unacceptable since they implied a definable limit to expansion. In short, a militaristic explanation makes very little sense when placed under scrutiny and there is no evidence that a system of preclusive defence was intended. Indeed this was the view of near-contemporary authorities such as the Byzantine historian Procopius who regarded linear defences as ‘tactically worthless’ and the Venerable Bede who considered long earthworks to have little or no defensive benefit (Squatruti 2002, 27). It is not surprising therefore that as Mary Leenane has demonstrated the Early Medieval Irish and European texts are silent when it comes to describing combat on the dykes. It is also unsurprising that there are no discernible cultural fissures – albeit based on the extremely limited evidence - between the communities on either side of the earthworks. This can be seen most clearly in the distribution of La Tène metalwork and late prehistoric monuments which show no changes that could be equated with the earthwork lines. A similar scenario has been noted in relation to the linear earthworks of Wales and Denmark (Squatruti 2002, 37).

In Wessex the linear earthworks and field systems go together ‘as the component parts of a well-organised agricultural landscape’ (Bardley et.al. 1994, 4). We know nothing about the relationship between Irish linear earthworks and their contemporary field systems, if they in fact existed. In Kilkenny extensive prehistoric field systems, apparently with associated dispersed open settlements, have been documented but their relationship to the linear earthworks is unknown (Gibbons 1990, 17). Within the study area there are no associations between the linear earthworks and field enclosures and it is surely significant that there were no indications for related field systems in the Corrinny (Monaghan West) geophysical survey. As has been previously noted above the four linear earthworks of the study area differ from the Wessex dykes in their siting in the landscape, in their morphologies and in their lack of association with field

systems. This suggests the four linear earthworks of the study area were not primarily expressions of tenure or the structured division of resources in the landscape.

The monumentality of the linear earthworks in terms of their impact on the landscape and the effort required to erect them is out of all proportion to any role they may have had for defence or control or as boundaries that were intended to divide up an agricultural landscape. Their siting was militarily irrational, their circuits had little or no logic, early history fails to record them as having had a role in military encounters, and whilst some sections were constructed in borderlands and may have looked imposing for a brief amount of time, in reality they had little practical application as border-delimitations. It is for this reason that functionalist readings of the earthworks are unlikely to ever bear fruit.

Instead of marking and defending borders the linear earthworks of the study area should perhaps instead be seen as having been encoded with symbols that were meant to be read by the societies that had them built. This, it is suggested, is what was in the minds of their creators, probably over and above any practical purpose(s). What were these symbols? Were they, like the hillforts, designed to give visibility to the power of those who had them built? Were they an 'advertisement of power and status'? (Ralston 2006, 133). Just like the great ditches dug through Early Medieval Europe construction of the linear earthworks may have been a ritual act that symbolised a leader's authority: 'a visible achievement that manifested the capacities and fitness to rule of the mighty men who associated themselves with the projects. Whether for canals or dykes, digging ditches was a demonstrative act, part of the communication through deeds ...' (Squatriti 2002, 16-17). Huge building projects of dubious practical purpose feature throughout the pre-modern world – Hadrian's Wall and the Great Wall of China are the most outrageous examples - and were conceived to send clear messages about power, status and respect for authority. It was not the finished monument that was significant, rather it was 'the event of construction that mattered' (Squatriti 2002, 176).

The linear earthworks were the largest construction projects ever undertaken in prehistoric Ireland. The social consequences of dyke building must have been enormous. The amount of man/womanpower required can be roughly calculated based on the historically-recorded assumption that an excavator will dig around 1.5 cubic metres of earth in a given day (Squatriti 2002, 41). Using this calculation the Monaghan West section would have taken 452,771 person

days or around 2 ½ years with a thousand excavators working 12 hours per day.¹³ The main ramparts of the Doon of Drumsna would have taken 192000 person days or a year to complete, on the same basis.¹⁴ Add to this the vast quantities of timber for palisading and formwork, the food that would have been consumed, the large number of beasts of burden needed, the tools, baskets and carts, and the absence of these people from their households, the strain on society caused by these earthwork projects must have been enormous.

Their monumental scale means they must have been initiatives that were led by those at the apex of society, most probably the same royalty who had the great timber and earth sanctuaries built at places like Tara, Emain Macha, Rathcroghan and the same cohort who had the remarkable timber road at Corlea built in 148 BC. Boundaries were an integral part of the practice of kingship in early Ireland and the maintenance of tribal borders, whether natural or artificial, was a matter of constant concern (O'Riain 1972). Just as was the case with Offa's Dyke, the Danevirke and many other grand linear earthworks throughout Europe the Irish linear earthworks are to be found primarily in borderlands: the north midlands was a contested landscape in prehistoric times, as was the nascent kingdom of Ossory (Kilkenny), hemmed between ancient Leinster and Munster. It is no coincidence that it too has a dense concentration of linear earthworks. In this sense the linear earthworks should perhaps be seen as 'royal works' that inscribed messages about kingly power and supremacy into the topography of the borderlands.

The place of the linear earthworks in the archaeological landscape is very poorly understood but there are some indications that they were deliberately sited amongst complexes of ritual and burial monuments (Waddell 1998, 358). This is most evident at the Dunclá, county Longford, which is set within a dense concentration of barrows and standing stones. As previously noted it is not known how they are associated chronologically but it is striking the manner in which the linear earthwork cuts through the centre of the ritual complex, possibly to open out views towards the monuments. A viewshed from the earthworks shows that it is only the standing stones that are visible from its rampart, and not the barrows. Does this suggest the flat topped

¹³ The central bank of the Monaghan West linear earthwork measured 7m wide x 9.85m high which equals 103425m³ in volume. If 1.5 cubic metres of earth per day are dug this equals 679157 person days.

¹⁴ The main rampart is 1.6km long x 30m wide x 6m high, which equals 288000m³ in volume. On the basis of 1.5 cubic metres of earth per day being dug this calculates at 192000 person days.

ramparts were used for ceremonial processions through ritual landscapes? Perhaps this is an Irish expression of the ‘obsession with genealogy’ that is seen in the layout of monuments in Early Bronze Age Wessex (Bradley 1990, chapter 4). The close association of the linear earthworks of the study area with wet places has been set out above and may provide further evidence for their role in ceremonial activity. Twenty-two Iron Age hoards are known from Ireland, most of which come from river, lakes and bogs (Cooney and Grogan 1994, 196-9). It has been suggested that the Dorsey, which encloses a bog that may have been used for ritual deposition (Aitchison 1993), and at Creeveroe, which is possibly a processional avenue led towards the place of ritual deposition at the King’s Stables, part of the Emain Macha complex.

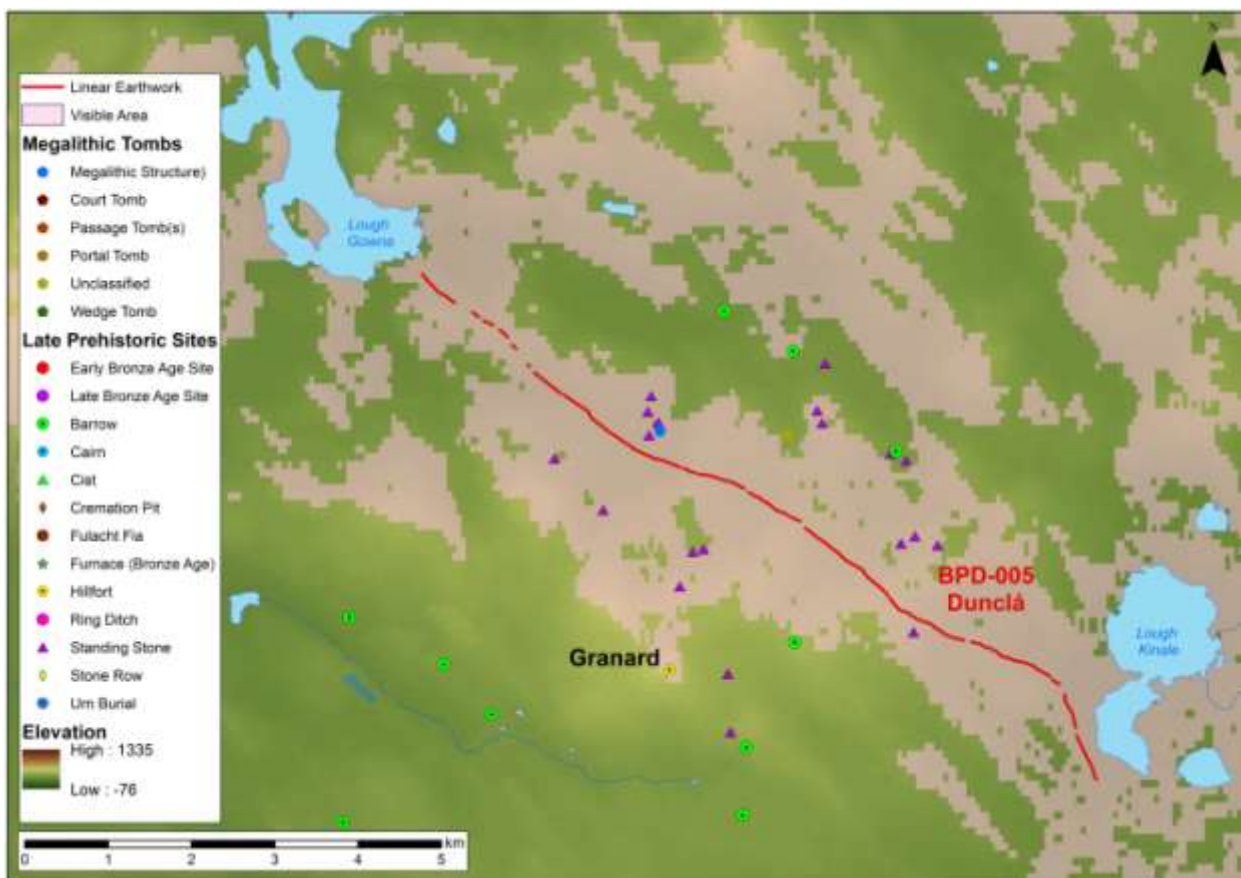


Figure 77: Viewshed between the Dunclá, county Longford and the ritual/funerary complex.



Figure 78: The Dunclá and its relationship with townland boundaries

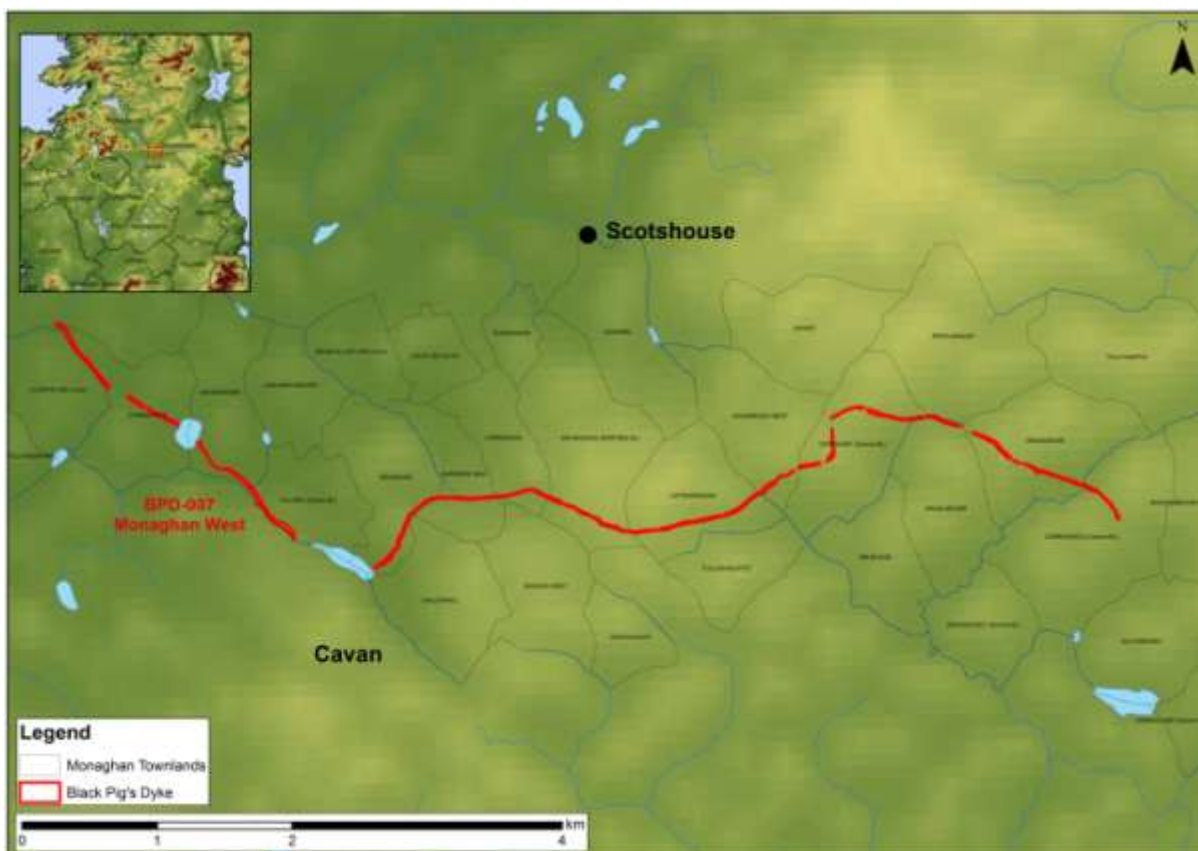


Figure 79: The Monaghan West linear earthwork and its relationship with townland boundaries



Figure 80: The first century BC Gundestrup cauldron, found in a Jutland bog, bears the image of a Celtic warrior with a boar crested helmet. The cauldron also depicts the ritual sacrifice of pigs.

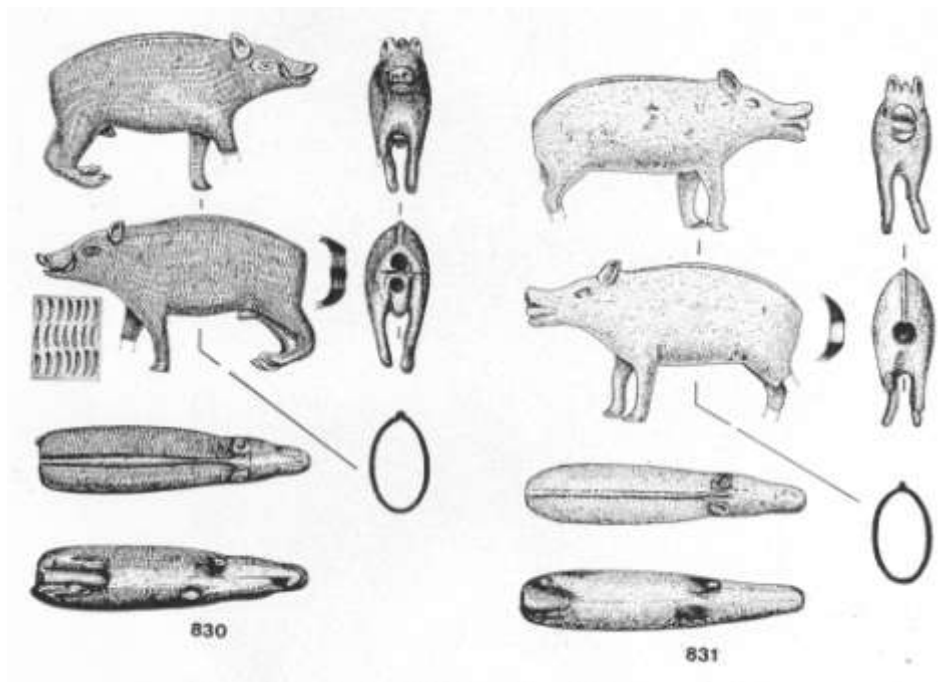


Figure 81: Two unprovenanced bronze pigs, of probable Iron Age date, are known from Ireland (Raftery 1983, fig. 229, 267). These may have been placed on top of Celtic helmets such as the one shown on the Gundestrup cauldron.



Figure 82: The boar hunt depicted on the first century BC vehicle from Mérida, Spain

If the linear earthworks were conceived primarily as potent symbols of royal authority they probably also took on a secondary role in providing communication routes through the landscape. The Monaghan West dyke incorporates laneways in places, for example at Aghnaskew and Lattacrossan, though their antiquity is unknown. The best-preserved sections of the Dunclá and Monaghan West earthworks have flat topped ramparts which could easily have been used as routeways. Excavations at the Cladh Dubh, county Cork brought to light a second-third century cal. BC metal trackway flanking the linear ditch (Doody 1995) and there is a strong connection between linear boundaries and trackways in Wessex (Clay 1927; Hawkes 1939; Tullett 2008, 111, 114). Their sheer scale represented a significant moulding of the landscape and they may have influenced the later parcelling of land; this can be seen in the way the townlands around Granard respect the line of the earthwork, and a similar scenario has been recorded at the Cladh Dubh, county Cork (Bhreathnach 2008). A very different pattern emerges from Monaghan however. Here the line of the linear earthwork is disregarded by the townland boundaries.

The names of those who had the great linear earthworks of the study area built must have endured in memory for many generations but were then lost to history, and replaced instead with a folk story of a mystical Black Pig. The origins of this tradition are difficult to track in time

before the nineteenth century and whether it relates in any way to the Irish Iron Age milieu is a moot point, as shown above by Mary Leenane. It is however worth noting that there was a boar deity in Celtic religion and the special importance of the wild boar in Iron Age European culture and ritual is clear to see in the many depictions of the animal in Celtic art, on coins, figurines, as crests on helmets (as a symbol of fearlessness and protection) and on war trumpets (*carnyxs*) (Ellis Davidson 1989, 49). The hunting of boar also played a very important role in society and may have been bound up with the initiation of warriors and rites of passage. There are literary accounts in the Irish texts ('the Death of Diarmait') of wild boar taking on enormous proportions during the hunt and the Fenian cycle contains many tales of chasing magic boars and boar hunts. This has been used to infer that the hunting of wild boar played an important role in Irish societies (Rowlett 1994) but a recent study by Ruth Carden has questioned whether wild boar, as opposed to domesticated wild boar/pig, was actually present in Ireland in the Bronze Age/Iron Age (Carden 2012, 27). Belief in the mythic qualities of the animal are also probably reflected in the common occurrence of pig bones with later prehistoric burials in Ireland and throughout the Celtic world (Ellis Davidson 1989, 48; Carden 2012, 49-9). Similar beliefs may be seen in the ritual deposition of pig bones, such as the votive deposit of forelegs from at least 28 pigs deposited in a peaty deposit near the river Boyne at Trim, county Meath, and the boar tusks recovered from wetlands (Eogan 1983, 151-2; Beglane 2009). Pig meat was also the food favoured by the Celtic aristocracy in their feasting and a high proportion of pig bones have been found at Navan Fort (McCormick 2009).

12.0 CONCLUDING REMARKS AND PRIORITIES FOR FUTURE RESEARCH

The great linear earthworks of the Irish north midlands may remain elusive to contemporary scholarship but this study has sought to bring some clarity to the many questions that endure about their extent, morphology, chronology and purpose by unravelling historical myths around the Black Pig's Dyke from archaeological facts, and by attempting to present specific interpretations for each individual monument. Bearing in mind there is a severe dearth of empirical evidence at our disposal nevertheless the analysis conducted by this project does allow for interpretative advances to be made. The research has raised intriguing alternative interpretations regarding the character of five of the nine 'linear earthworks', one of which – the Doon of Drumsna – could well be one of Iron Age Ireland's most spectacular monuments. It is also now evident that the linear earthworks can no longer be reduced to just one interpretation. The motivations behind the linear earthworks may remain intangible but past perceptions of the monuments as proto-political boundaries can no longer be entertained. Indeed, whether the linear earthworks of the study area can continue to be regarded as barriers, in the sense of physical or defensive impediments to the movement of people, animals or cultures, is open to question in the light of the research that has been undertaken. It is suggested that none of the functionalist explanations are satisfactory and that instead, perhaps the linear earthworks were 'royal works' that were built in the borderlands as monumental statements of authority, but which had little practical purpose. Ironically, given the enormous societal efforts that would have been required to construct the earthworks, instead of acting to divide early societies the linear earthworks may have been conceived as acts of power that galvanised to unite communities in late prehistoric Ireland.

In contrasting the research that has been undertaken with previous work it can be observed that substantial advances have been made in forming a better understanding of the linear earthworks of the study area. The integrated approach adopted here offers the best opportunity to unravel the enigma that is, The Black Pig's Dyke, with the potential of unleashing many benefits including social, cultural, economic and academic at a local, regional and European level. It is plain to see that any interpretation of their purpose and character, and their meaning to the societies that had them built is severely hampered by the highly fragmentary nature of the information at our disposal. Using analogies with the better-studied English linear earthworks to

interpret the character of the Irish sites is not sufficient, for these sites differ substantially in terms of their siting and physical form, and perhaps their chronology and purpose. The following presents an outline of the avenues to which future research might be directed.

Within the study area the scope of the project should be narrowed somewhat to include the following: BPD-002 Leitrim, BPD-005 Dunclá, BPD-006 Cavan and BPD-007 Monaghan West. The classification of the remaining monuments as linear earthworks is questionable. However, there is justification for including the Doon of Drumsna because of its apparent association with linear earthworks along the river Shannon and also, potentially, its pivotal place within the Iron Age settlement landscape. It is also proposed to take extend the geographical scope of the project to include the known linear earthworks of counties Fermanagh, Down and Armagh: including Lislea and Mullynavannogue, county Fermanagh, the Dorsey, county Armagh, and the Dane's Cast, county Down. These share many of the same characteristics of the earthworks of the study area but require detailed mapping. The availability of LiDAR datasets for these areas is another area that could be explored (Lislea and Mullynavannogue are certainly covered by LiDAR). Further work is also required to assess previous excavations, which may have uncovered linear earthworks. Large-scale stripping prior to road and other infrastructural developments often leads to the discovery of straight lengths of prehistoric ditches, for example at Hill of Rath, county Louth, but these may not have been identified as linear earthworks (Duffy 2001). Two additional regions with linear earthworks may be chosen for comparative purposes, namely counties Kilkenny (30 no. on RMP) and Waterford (10 no. on RMP), and southern Scotland (eg. Cheviot Hills) where there appear to be broad similarities with the linear earthworks of the study area (Barber 1999).

Although the limited radiocarbon evidence is pointing to the last centuries BC as the *floruit* of the linear earthworks, this is far from certain. We do not know when these monuments first emerged in the landscape or how they developed over time. Did their period of currency extend back into the Late Bronze Age like the Wessex ditches? Was Ireland part of the great wave of linear earthwork construction of the British Late Bronze age? There are no dates for the Ardkil More, Dunclá, or Leitrim linear earthworks. Are they contemporary with Monaghan West? Did the linear earthworks subsume, or were they influenced in their siting, by pre-existing monuments such as barrows or cursus-monuments? Were there phases of refurbishment to the monuments? Were the boundaries laid down at the same time or did they evolve incrementally over an extended period of time? A better understood chronology would allow them to be placed in the

landscape history of the region and their relationships with the settlement pattern to be better understood. When did the linear earthworks become obsolete. Did they continue into the Early Medieval period like Offa's Dyke and the Grim's Ditch?

The limitations of radiocarbon dating with regard to providing a chronology for the linear earthworks have been outlined above; alternative methods are required. Dendrochronology, however, requires appropriate timber samples, which may not be easily obtainable and it was notable that there were no timbers in the Aghareagh West ditches when they were excavated (Walsh 1991). Optically stimulated luminescence dating has been used to date construction of the Watt's Dyke, Wales to the late eighth-early ninth century AD and it is probably the most effective means of providing a future chronology for the Irish sites (Malim 2008, 20, table 1). Samples could be taken from exposed sections through the earthworks, of which a number have been identified in the field. Small-scale excavations targeted at obtaining further OSL samples could be undertaken. In terms of methodology, the sample preparation and OSL measurements would follow standard procedures (i.e as in the guidelines published by English Heritage). In summary, measurements would be made on quartz mineral grains extracted from the sediment and OSL measurements made using a single aliquot regenerative dose (SAR) measurement protocol. The palaeodose on 12 repeat small sized (3-4mm) multigrain aliquots will be determined and palaeodose determinations will take into account standard acceptance criteria including recycling ratio, recuperation, thermal transfer, IR/OSL ratio, max palaeodose error, min signal size. For difficult to date samples (as might be the case with partially bleached sediments) more advanced analyses using single grain analysis can be helpful. The general error margin of OSL dates is in the region of 5%.

Consideration could also be given to redating using radiocarbon charcoal samples (assuming they are available) from the Aghareagh West excavations and the Aghnaskew palisade. As already noted the three radiocarbon dates were determined on bulk samples, which may be problematical. AMS dating of single-entities would potentially offer more accurate dates. In particular it would be useful to obtain a more accurate date for the small hearth within the bank at Aghareagh west. A human bone sample from the ring ditch at Drumcleavry, Doon of Drumsna has also been made available to this project and it would be potentially of some significance if this were dated (Read 2007b). Likewise, a small excavation targeted at obtaining archaeomagnetic dates on the heavily burnt edges of the palisade trench at Aghareagh West

could prove useful. Archaeomagnetic dating can give, in the correct circumstances, highly accurate dates. Likewise tephrochronology may be worth exploring.

Our understanding of the physical form of the earthworks is very limited and requires excavation and LiDAR modelling to address. Are palisades, such as that on the Monaghan West earthwork a regional pattern? Are V-shaped ditches, typical of the Iron Age in England and found at Magheracar, indicating a chronological horizon? Can construction phases between the various elements of the earthworks be discerned?

Linear ditches would have been the most prominent monuments in the Irish Iron Age landscape but their place in both the natural and archaeological landscape and in the organisation of later prehistoric land use is poorly understood. Is there a relationship with the hillforts of the region, as has been suggested for the English and Kilkenny linear earthworks (Gibbons 1990; Bradley et.al. 1994, 16; Waddell 1998, 358). Can they be related to the pollen records of the region to place them in the context of vegetational history? How do they relate to agricultural intensification? Is there an association with prehistoric field systems? What is the character of the associated settlements? Large scale geophysical surveys of the terrain adjoining particular sections of linear earthworks could be undertaken to address questions of surrounding land use. What were the natural landscapes into which the linear earthworks were constructed? The ditches of linear earthworks can provide waterlogged palaeoenvironmental remains (pollen, charcoal, seeds, snails) that allow the ancient environment to be reconstructed. Evidence from land snails was a central plank of the Wessex linear ditches project and their examination could provide important information on vegetational history in the immediate environs of the earthworks (Bradley et.al. 1994, 120; *see* Ford 1981-2, 15).

Richard Bradley makes the point that it is systematic field survey, rather than excavation, has brought the most substantial progress in relation to the Wessex earthwork boundaries (Bradley et.al. 1994, 12). Very little field survey was undertaken for the present project and this should be a priority for further phases. Field survey would involve walking and recording the full extents of the earthworks and also detailed topographical mapping on the ground of the extant earthworks. Targets for sample excavation should be identified and carefully chosen to maximise the information gathered. Consideration could also be given to the collection of surface artefacts in arable fields, which could suggest areas for further excavation. Dive-assessments could be undertaken at targeted areas where the lines of the earthworks cross streams/rivers, for example

where the Bunnoe river is crossed. These might provide evidence regarding how the dykes were treated at such crossings. In attempting to find additional sections of linear earthworks augering may be a useful tool, and was used to great effect on Salisbury Plain (Bradley et.al. 1994, 36).

In light of the findings from the historical research assessment it would also be useful to revisit the relevant folklore material. Its more explicit absence, in comparison to other sites, such as Tara, must also be borne in mind when attempting to decipher its relevance and cultural significance. At this stage, it would be useful to widen this analysis to include genealogical, ecclesiastical and more annalistic material along with a more detailed exploration of some of these initial findings. The scope of future research should be extended to include early and later literatures associated with other monuments in Ireland, and abroad, to identify any common themes and motifs, or, even, unifying concepts underpinning these.

Finally, much of the 'raw material', the physical remains of the earthworks, has been lost. Within the study area 30% of what was mapped as extant on the second edition map has been removed or been badly degraded in the intervening 130 years. It is vital that the extent of the surviving linear earthworks should be communicated to landowners and other custodians, that accurate zones of protection around the monument should be established by the National Monuments Service, and that public awareness measures should be undertaken in order to assist in safeguarding what remains of these mysterious earthworks.

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AU – *Annála Uladh: annals of Ulster i-iv* (ed. Hennessy and McCarthy, 1887-1901).
AFM - *Annála ríoghachta Éireann: annals of the kingdom of Ireland by the four masters i-iv* (ed. O'Donovan, 1848-51).
CIH – *Corpus Iuris Hibernici* (ed. Binchy, 1978).
CS - *Cronicon Scotorum* (ed. Mac Niocaill and Hennessy, 2003).
DIL - *Dictionary of the Irish Language* (ed. Quin *et al*, 1913-75).
TBC I - *Táin Bó Cúailnge Recension I* (ed. O'Rahilly, 1976).
TBC II - *Táin Bó Cúailnge Recension II* (ed. O'Rahilly, 1967).

Electronic Resources

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| www.edil.ie | Electronic Dictionary of the Irish Language |
| www.excavations.ie | Summary accounts excavations Ireland |
| www.logainm.ie | Placenames Database of Ireland |
| www.ogham.celt.dias.ie/ | Ogham in 3D |
| www.plcenamesni.org | Placenames Database Northern Ireland |
| www.publish.ucc.ie/doi/locus | Onomasticon Goedelicum |
| www.ucc.ie/celt | Corpus of Electronic Texts |

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APPENDIX 1: GEOPHYSICAL SURVEY AT CORRINARY, COUNTY MONAGHAN (EARTHSOUND GEOPHYSICS)

Summary of Results

On the 14th October 2014, a geophysical survey was conducted over a section of the Black Pig's Dyke in County Monaghan. This section of the dyke was chosen for investigation as it was known to have been flattened in antiquity and provided an opportunity to assess any ditches or archaeology associated with the dyke. The survey was undertaken within the townland of Corrinary, County Monaghan using an electromagnetic instrument enabling the collection of both in-phase and conductivity measurements at a sampling resolution of 0.5×0.25 m.

The survey was conducted upon a bedrock geology consisting of Red Island formation Greywacke, Microconglomerate and Argillite, beneath undifferentiated galeiogenic deposits. The majority of the survey area was covered in short grass with areas of high bog grass present.

The geophysical surveys undertaken for this project have successfully identified the exact location and composition of the Black Pig's Dyke within the survey area. Confirmation has been gained for the presence of two ditches, one on the internal (southern) edge of the dyke and a more extensive one on the external (northern) edge.

Additional features associated with the dyke have also been detected. Along the external edge of the external ditch a linear trend of high magnetism, probably associated with burning was revealed. This is likely to be associated with a palisade, evidence of which was detected in excavations undertaken on the dyke in 1982, confirming its presence and its burnt nature.

External to this palisade a linear ditch or gully was also identified which may be associated with the construction of the palisade. A further ditch was also discovered which runs parallel to this but at a separation of 11m to the north, this feature may be archaeological or agricultural in origin.

Potential archaeological remains were also detected within the land surrounding the dyke. A number of arcing potential ditches as well as linear ditch were revealed. Later agricultural boundaries were also present.

Introduction

Earthsound Archaeological Geophysics were commissioned by Kilkenny Archaeology to execute a geophysical survey over a section of the Black Pig's Dyke within the townland of Corrinary, County Monaghan. The survey is part of ongoing investigations into the Black Pig's Dyke by Kilkenny Archaeology and will target a section of the Dyke which is known to have been flattened in antiquity.

Permissions to undertake the survey were obtained from the Department of the Arts, Heritage and the Gaeltacht (Licence Number 14R0117).

The geophysical survey was requested to determine the location of the ditches and possible palisade associated with the Black Pig's Dyke (MO021-011) as well as any unknown associated archaeological features. The site was assessed using an electromagnetic instrument.

Geography, Topography, Geology & Climate

Located within the townland of Corrinary, the northwest corner of the site (Figure 1) lies at Ordnance Survey of Ireland Irish National Grid (ING) Reference E251317 N318330.

The townland of Corrinary is located approximately 2 km south of the village of Scotthouse, County Monaghan. Upstanding sections of the Dyke are still visible within adjacent fields. While in the survey area the topographic remains of the dyke are still visible forming a central linear expression flanked by two linear depressions

The site is located on the edge of a drumlin with sloping topography to the south. The survey encompassed the entire field which comprised of short grass and areas of bog grass. The presence of the bog grass precluded the survey on some small areas.

The survey was conducted upon a bedrock geology consisting of Red Island formation Greywacke, Microconglomerate and Argillite, beneath undifferentiated galeogenic deposits. This is a relatively magnetically neutral geology and ideal for the use of electromagnetic instruments

In the week preceding the geophysical survey, the climatic conditions were mild and this continued during fieldwork. The weather is unlikely to have affected the survey.

Archaeological Background

Information provided by Kilkenny Archaeology:

The linear banks-and-ditches known as the Black Pig's Dyke are amongst the most celebrated but also the most enigmatic prehistoric sites in Ireland. The earthworks intermittently traverse the Irish countryside of south Ulster and north Connaught. Explanations for their purpose generally centre on their role as barriers for frontier defence, territorial demarcation, and to control the movement of people and livestock. Antiquarians in the nineteenth and early twentieth centuries interpreted the earthworks as having in the early centuries AD formed a continuous unified boundary between Ulster and Connaught, an interpretation which has been questioned in more recent years. In order to arrive at a better understanding of the Black Pig's Dyke an inter-disciplinary study was jointly commissioned by the heritage offices of Monaghan, Longford, Roscommon and Cavan, with the support of the Heritage Council.

as part of this assessment a geophysical survey was commissioned at Corrinary townland, where the first edition Ordnance Survey map shows a section of the dyke ran. This section of the dyke was largely levelled in the late nineteenth century and was chosen to address three key research questions:

1. A limited excavation was undertaken on the dyke within the townland of Aghereagh West near Scotthouse, County Monaghan by Aidan Walsh (Walsh 1991):
2. Excavations revealed a double bank (comprising of boulder clay) and a double ditch with a total width of 24m with evidence of timber revetting present. In addition nearby excavations revealed regularly spaced wooden battens were also found which were charred suggesting the presence of a palisade. Some evidence of archaeological remains such as pits and a hearth were also found surrounding the dyke.
3. The palisade was detected 1m behind the bank and C14 dates taken from the timber indicated an early Iron Age date (390-70 B.C) (Halpin 2006).

Aims & Objectives

The aim of the geophysical survey was to determine the presence and nature of any ditches associated with the dyke as part of ongoing research into the Black Pig's Dyke. Specific objectives were to:

- Determine the presence or absence of ditches associated with the dyke
- Assessment of the spatial extent of any detected ditches
- Assess if any traces of a palisade can be identified
- Assess the remaining field for any associated archaeological features

The use of the electromagnetic instrument allows multiple data sets to be collected. Where possible, the use of multiple geophysical techniques allows a greater confidence to be placed in the interpretation of detected anomalies, which is especially useful on small sites such as this. Their combined application can be used to determine the geometry, compositional material and the extent of an archaeological target.

Methodology

The fieldwork was carried out from 14th October 2014 by H. Gimson and D. Regan of Earthsound Archaeological Geophysics.

An electromagnetic survey was carried out in order to collect apparent resistivity and apparent susceptibility data using a GF Instruments CMD Mini-Explorer.

The survey area covered a total of 0.9 hectares. All survey data points had their position recorded using Trimble R8 GNSS Real Time Kinematic (RTK) VRS Now GNSS equipment. The geophysical survey area is georeferenced relative to the Ordnance Survey Ireland National Grid.

Electromagnetic Survey

The instrument collected both quadrature (later referred to here as apparent conductivity) data and in-phase (apparent magnetic susceptibility) data simultaneously. Apparent conductivity data are the reciprocal of apparent resistivity data, thus a high conductivity anomaly, such as that caused by a ditch, will produce a comparable low resistance anomaly. In-phase data responds to the magnetic content of the underlying soil and is a measure of apparent susceptibility.

The horizontal dipole orientation ('Low', or Vertical Coplanar Coil (VPC) configuration) was chosen for a depth range most applicable to archaeological remains rather than the vertical dipole orientation ('High' or Horizontal Coplanar Coil (HPC) configuration). The depth range for the VPC (recording data from three levels simultaneously), is claimed by the manufacturers to be 0.25m, 0.5m and 0.9m; these depths have yet to be independently assessed for accuracy. They are referred to in this report as Level 1 (shallowest), Level 2 and Level 3 (deepest).

Conductivity data are displayed in mS/m to a resolution of 0.1 mS/m. In-phase data are displayed in ppt to a resolution of 10 ppt.

The survey collected conductivity and in-phase data at a sample interval of 0.5 m between traverses and 0.2 seconds along the traverse. The data were collected in continuous mode by a time based sample trigger connected via blue-tooth to the instrument. The instrument was

located on a CARTEASY^N SparrowHawk-1000 cart system, which located the CMD Mini-Explorer approximately 10cm above the ground. An RTK GPS collected positional data to an accuracy of 5mm at a rate of 10 Hz. The survey was undertaken along lines parallel to the road scheme, in zig-zag formation. The data were stored in an automatic data logger and downloaded to a field computer.

Data Display

Preliminary Data Treatment

The data were downloaded via standard software (GF Instruments' CMD Data Transfer) and were processed using both in-house and commercial software packages. The data were gridded to 1m x 0,25m and were corrected for drift using a rolling mean function (CARTEASY^N).

Further Processing

The data was filtered using a high and low pass filter.

A sine wave interpolation function was applied to provide a smooth, expanding the resolution of the data from 0.5m x 0.25m to 0.25m x 0.25m.

Graphical Display

The data are displayed as both conductivity and in-phase data. All processed data are displayed in greyscale plot format in Figure 3. The most archaeologically appropriate level (Level 3) was selected for display within Figure 4 (conductivity) and Figure 6 (in-phase). Both the conductivity and in-phase data were clipped at ± 1 Standard Deviations.

An interpretation plot of the conductivity data is presented in Figure 5, In-phase data in Figure 7.

Reporting, Mapping & Archiving

The geophysical survey and report follow the recommendations outlined in the English Heritage Guidelines (David et al. 2008) and IFA Paper No. 6 (Gaffney et al. 2002) as a minimum standard. The conditions of the Detection Licence issued by the Licensing Section of the Department of the Arts, Heritage and the Gaeltacht require a copy of this report.

Geophysical data, figures and text are archived following the recommendations of the Archaeology Data Service (Schmidt 2001).

Technical information on the equipment 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.

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 Figures 7 & 9 [C1= Conductivity anomalies, P1=In-phase anomalies] and are described and interpreted within the text.

Electromagnetic Survey: Conductivity

Figure 4 – Conductivity Data

Figure 5 – Conductivity Interpretation

[C1] is a linear trend of conductivity which runs diagonally across the survey area. Measuring between 6m and 8m in width this anomaly appears to represent the northern or outer detective ditch associated with the Black Pig's Dyke. The geophysical signature suggests that the ditch may be deeper or more extensive on the southern edge, while the northern edge may contain a stone or compacted earth element. The detected proportions of the anomaly indicate that it is likely to undulate in formation, appearing to bulge and constrict in places.

[C2] runs parallel to C1 and represents the internal ditch associated with the Black Pig's Dyke. This anomaly measures between 5m and 7m in width and is less defined on the northern edge of the survey area, suggesting that it may be masked by the known flattening of the dyke, later agricultural processes or indeed may be of a slightly different composition within this area.

Both ditches (C1 and C2) were well detected within Level 3 dataset, however only limited detection was gained in Levels 2 and 1. This indicates that C1 and C2 have a depth of at least 1m and that the upper layers may have been masked by the known flattening of the dyke within antiquity.

[C3] is a linear possible ditch which traverses the survey area on a north south alignment, measuring 118m in length. The anomaly appears to cross the ditch C2, indicating that it is a later feature. Indeed the linear extent of the feature and its parallel nature to the adjacent trackway suggests that it is likely to be agricultural in origin.

[C4] comprises a series of interconnecting linear possible ditches which are located on the northeast side of the survey area. These run parallel or perpendicular to C3 and appear to join the anomaly indicating that C4 once comprised of ditches forming sub-divisions within the field.

[C5] is a linear possible ditch which crosses C3 and C4 and does not follow the same alignment. Measuring 75m in length this feature may represent a former field division as its location matches that of a boundary within the adjacent field. However the possible ditch C5 also runs parallel to C1 suggesting that it might be associated with the dyke, if this is the case then C5 and C1 have a separation of 11m.

[C6] is an arcing possible ditch, measuring 37m in length, which may be archaeological in origin.

[C7] is arcing possible ditch which may be of archaeological significance. Located in the flat lower land of the field this anomaly could be archaeological or geological in origin.

Electromagnetic Survey: In-Phase

Figure 6 – In-phase Data

Figure 7 – In-phase Interpretation

[P1] is a curvilinear trend of raised susceptibility values which corresponds to ditch C1 identified in the conductivity data. The curvilinear trend of susceptibility, although not of the same width of C1 is associated with the ditch and indicates that there may be debris or enhanced remains within a section of the ditch.

[P2] is a linear trend of raised susceptibility values which corresponds to ditch C2 identified in the conductivity data. Containing the same characteristics as P1 this anomaly was only detected on the northern edge of C2, suggesting that the contents of the ditch may vary at this location.

Anomalies P1 and P2 represent the location of the Black Pig's Dyke. The central area between the two once containing the dyke, no geophysical signature associated with this anomaly was detected due to the historic flattening of the dyke.

[P3] is a strongly enhanced band of material which was detected on the external edge of the Black Pig's Dyke. The enhancement suggests highly magnetic material or burnt remains. The presence of this anomaly matches evidence of a burnt palisade which was detected in an excavation on the Black Pig's Dyke in 1982.

It is noticeable that the geophysical signature contains breaks and that it does not extend across the whole survey area. This may be associated with the historic flattening of the dyke or be indicative that burning did not take place along the whole of the palisade.

[P4] is linear trend of raised susceptibility values which is located on the northern edge of P3. The extent of the anomaly matches that of P3 suggesting that the two are related, however no archaeological evidence of this feature appears to have been found in the 1982 excavation. The raised susceptibility values suggest that it could be a ditch or gully running along the outside edge of the palisade.

[P5] is an arcing possible ditch which is located on the northern edge of the survey area. Measuring 71m in length this anomaly is of unknown origin, possibly agricultural, archaeological or geological.

[P6] is a right-angled ditch or gully, measuring 39m in length which is located within P5. The origin of this anomaly may be agricultural or archaeological.

[P7] is a small right-angled ditch or gully which is located in the western corner of the survey area. Measuring 19m in length this anomaly could be agricultural or archaeological.

[P8] is an arcing possible ditch which may be agricultural or archaeological and measures 59m in length.

Conclusion

Summary of Results

The geophysical surveys undertaken for this project have successfully identified the exact location and composition of the Black Pig's Dyke within the survey area. Confirmation has been gained for the presence of two ditches, one on the internal (southern) edge of the dyke and a more extensive one on the external (northern) edge.

Additional features associated with the dyke have also been detected. Along the external edge of the external ditch a linear trend of high magnetism, probably associated with burning was revealed. This is likely to be associated with a palisade, evidence of which was detected in excavations undertaken on the dyke in 1982, confirming its presence and its burnt nature.

External to this palisade a linear ditch or gully was also identified which may be associated with the construction of the palisade. A further ditch was also discovered which runs parallel to this but at a separation of 11m to the north, this feature may be archaeological or agricultural in origin.

Potential archaeological remains were also detected within the land surrounding the dyke. A number of arcing potential ditches as well as linear ditch were revealed. Later agricultural boundaries were also present.

Implications

The successful detection of the ditches, palisade and additional components associated with the Black Pig's Dyke have proved that the feature is geophysically prospective and that further work can easily be undertaken to identify these features at other location along the dyke to ensure that the composition remains the same.

The survey area for this project was chosen due to its open and flat nature, the dyke having been flattened in antiquity; however traces of the earthworks still remain on site. This survey can therefore be used as a pilot survey to which any other results can compare the composition and formation.

The composition of the dyke itself was not assessed within this survey area due to it having been flattened in antiquity, however the presence of upstanding remains do not preclude the use of geophysical surveys, but necessitate the deployment of other techniques depending on the survey size, location and composition. And other surveys undertaken over the upstanding dyke would add to our understanding of the monument as a whole.

Recommendations

To enable a full understanding of the Black Pig's Dyke composition further geophysical surveys could be undertaken over the dyke within the survey area. An Electric Resistivity Tomography (ERT) survey would enable the depth and formation of the ditches to be assessed, while a detailed high resolution earth resistance survey would enable the composition of the palisade to be identified, especially in association with the newly detected features on its external edge.

It would be advantageous to undertake a number of comparative geophysical survey along the extent of the dyke. This would allow comparative information to be gained about its composition and formation. These could be undertaken using the same methodology in open areas available for area surveys (minimum 40m width) or using ERT and / or radar within more restricted areas or over standing earthworks.

Dissemination

The results of this survey were submitted to *Kilkenny Archaeology*. *Earthsound* will ensure that copies will be forwarded to the *Department of the Arts, Heritage and the Gaeltacht* and the National Museum of Ireland in compliance with the Licence agreement.

Acknowledgements

Fieldwork: Heather Gimson BA (Hons) MSc MIAI
Darren Regan BSc (Hons) MA

Report and Graphics: Heather Gimson

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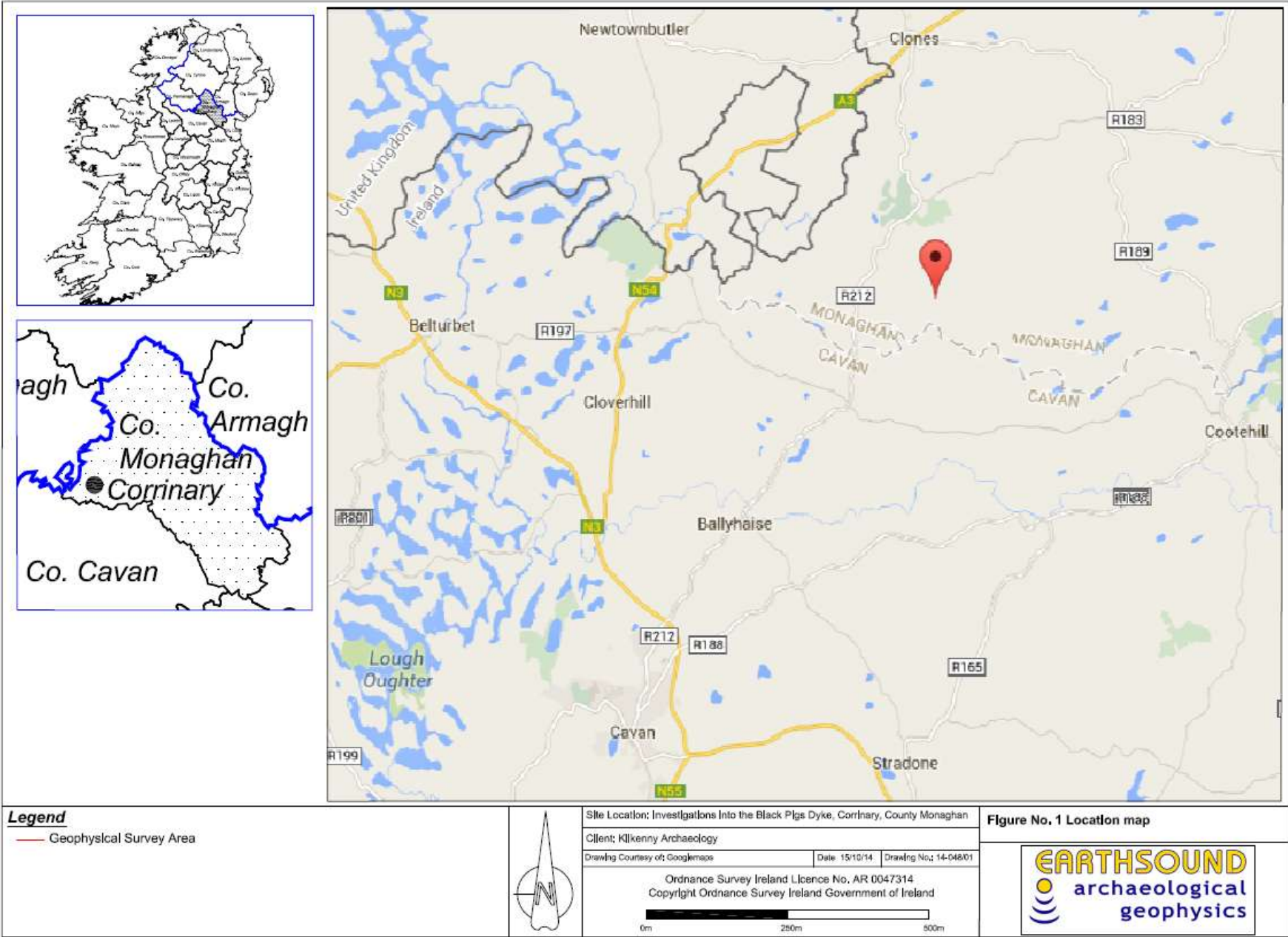
Websites Consulted

<http://www.archaeology.ie/smrmapviewer/mapviewer.aspx>
http://gsigis1.dcmrionline.ie/imf/imf.jsp?site=GSI_Simple

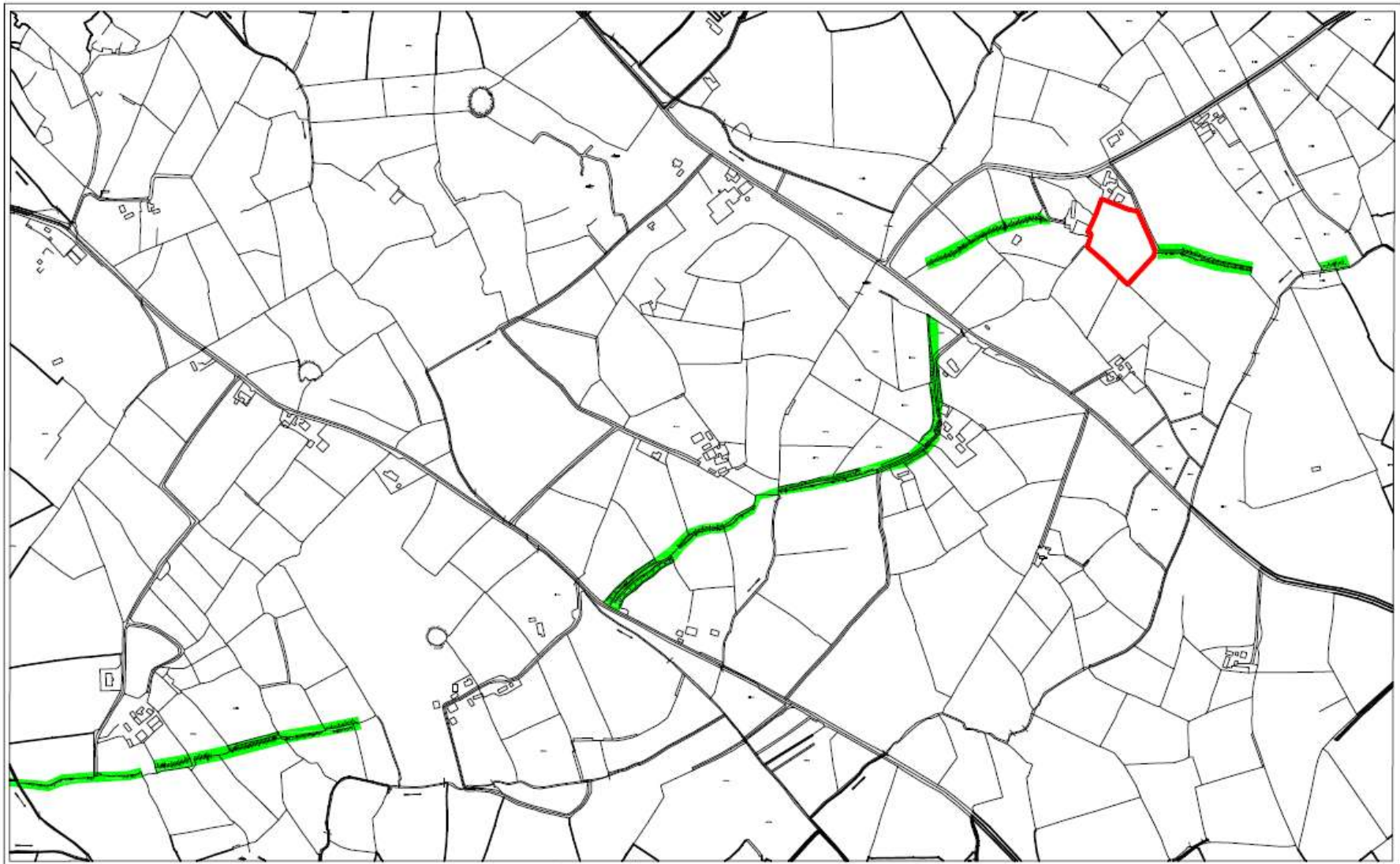
Accessed 17/10/2014
Accessed 17/10/2014

Figures

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- Figure 2: Detailed location map
- Figure 3: Combined electromagnetic data
- Figure 4: Electromagnetic conductivity data
- Figure 5: Electromagnetic conductivity interpretation
- Figure 6: Electromagnetic in-phase data
- Figure 7: Electromagnetic in-phase interpretation



THE BLACK PIG'S DYKE REGIONAL PROJECT REPORT

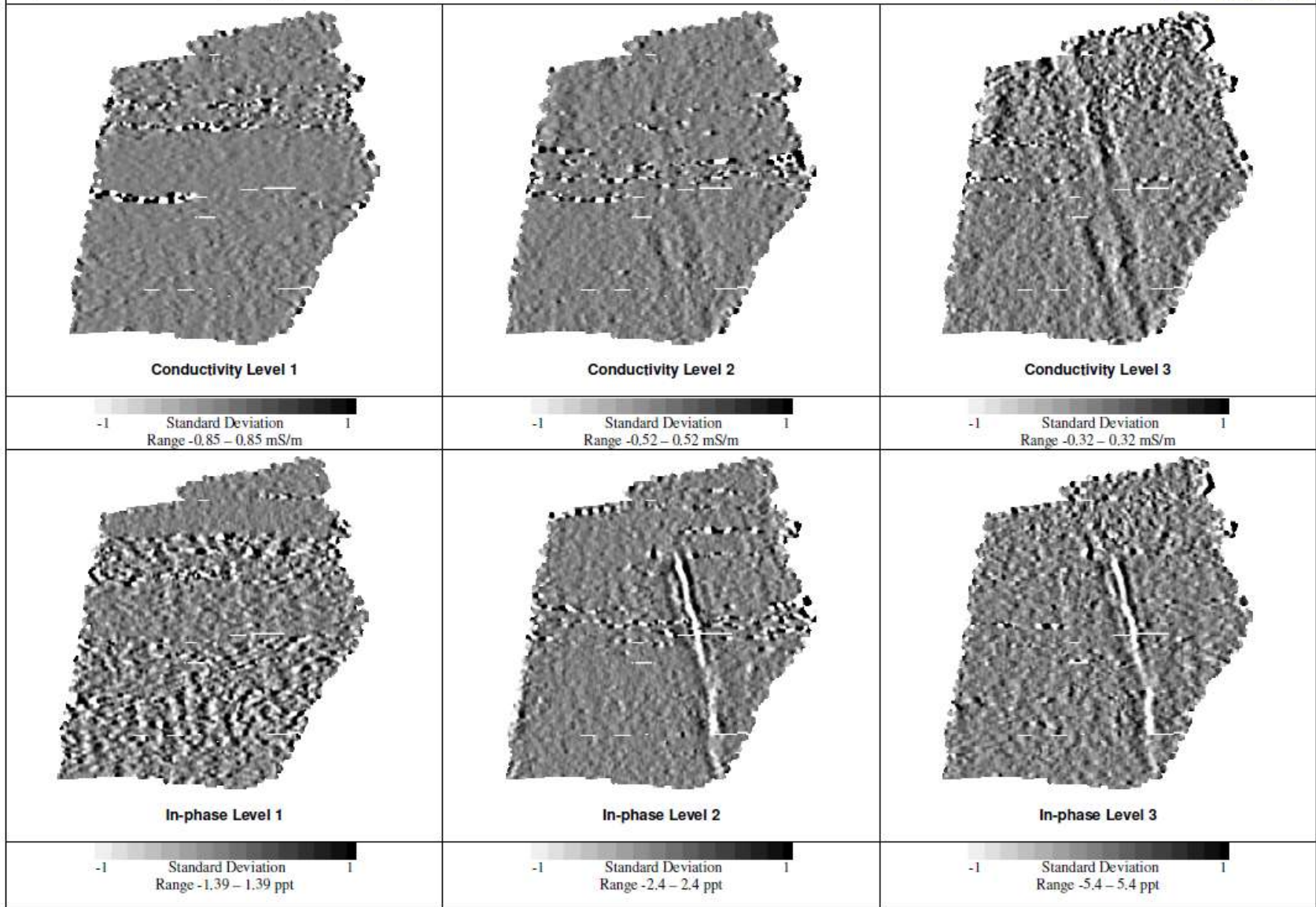


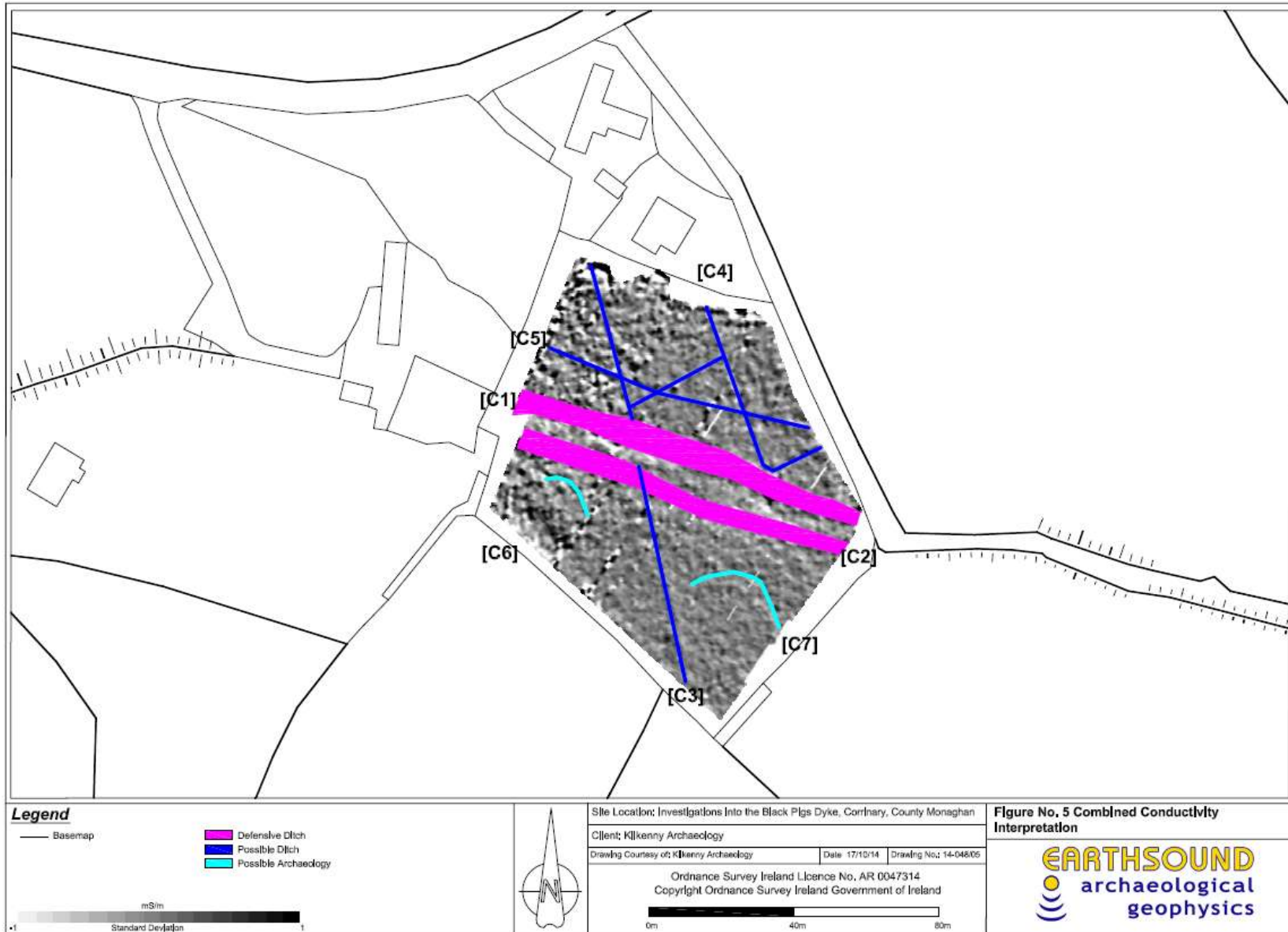
| | | | |
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| <p>Legend</p> <ul style="list-style-type: none"> Basemap Upstanding remains of the Black Pigs Dyke Geophysical Survey Area | | <p>Site Location: Investigations Into the Black Pigs Dyke, Corlinary, County Monaghan</p> <p>Client: Kilkenny Archaeology</p> <p>Drawing Courtesy of: Kilkenny Archaeology Date: 15/10/14 Drawing No.: 14-048/02</p> <p style="text-align: center;">Ordnance Survey Ireland Licence No. AR 0047314 Copyright Ordnance Survey Ireland Government of Ireland</p> <p style="text-align: center;"> 0m 250m 500m </p> | <p>Figure No. 2 Detailed location map</p> <div style="text-align: right;"> </div> |
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THE BLACK PIG'S DYKE REGIONAL PROJECT REPORT

Investigations into the Black Pigs Dyke, Corrinary, County Monaghan

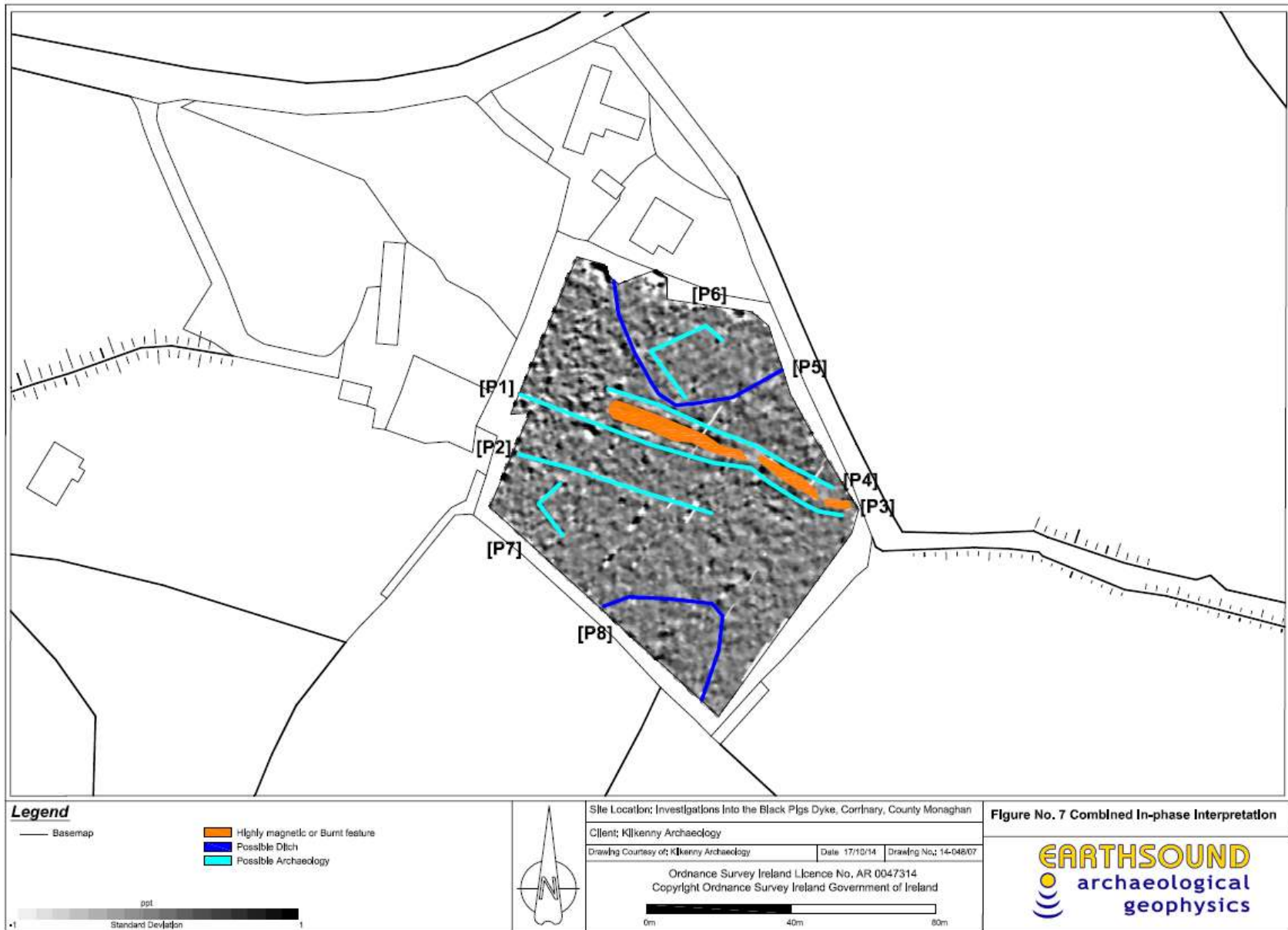
Figure 3: Combined Electromagnetic Data







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|---|--|---|--|
| <p>Legend</p> <p>— Basemap</p> <p>0pt Standard Deviation</p> | | <p>Site Location: Investigations Into the Black Pigs Dyke, Corinary, County Monaghan</p> <p>Client: Kilkenny Archaeology</p> <p>Drawing Courtesy of: Kilkenny Archaeology Date: 17/10/14 Drawing No.: 14-048/06</p> <p>Ordnance Survey Ireland Licence No. AR 0047314 Copyright Ordnance Survey Ireland Government of Ireland</p> <p>0m 40m 80m</p> | <p>Figure No. 6 In-phase Data (Level 3)</p> |
|---|--|---|--|



APPENDIX 2 CULTURAL PROJECT PROPOSAL, BY MARY TEEHAN

Contents:

- 1. Executive Summary**
- 2. Regional Cultural Project – Research**
- 3. Regional Cultural Project – Cultural Resource**
- 4. Management**
- 5. Funding**
- 6. Roadmap**

1. Executive Summary

It was clear from the beginning of research into a Regional Cultural Project that to address all aspects of the Black Pig's Dyke's future, there were two strands to develop:

- the extensive research to be continued
- the cultural resource aspect

Therefore, two cultural projects have been outlined below. For each project, the most appropriate management structures (see Section 4) and funding sources (see Section 5) have also been identified. A 'roadmap' has been outlined to clarify the pertinent steps in work towards these two cultural projects.

In contrast, the research that has been undertaken with previous work it can be observed that substantial advances have been made in forming a better understanding of the linear earthworks of the study area. This project has made considerable inroads in terms of disentangling some of the assertions and beliefs about the dyke, many of which are not based on appropriate research. The integrated approach adopted here offers the best opportunity to unravel the enigma that is, The Black Pig's Dyke, with the potential of unleashing many benefits including social, cultural, economic and academic at a local, regional and European level.

It is plain to see that any interpretation of their purpose and character, and their meaning to the societies that had them built is severely hampered by the highly fragmentary nature of the information at our disposal. Using analogies with the better-studied English linear earthworks to interpret the character of the Irish sites is not sufficient, for these sites differ substantially in terms of their siting and physical form, and perhaps their chronology and purpose. Many significant research gaps have been highlighted by Kilkenny Archaeology in this report and future archaeological research would be of huge import.

However, the findings already create a network of structures and patterns that cross county and country borders. While research offers in-depth understanding, the best way to add value to this research is to connect the linear landscapes through a cultural route, or Timepath. This route will be a platform for walkers, cyclists, connecting landscapes & communities, facilitating community engagement, employment, ownership and economic rewards for a rural region.

To benefit both projects suggested, it is recommended that a government body, such as the Heritage Council, host an advisory board of all local authorities involved and other collaborators, such as academia. A project manager is necessary and for the initial research project, it is suggested that this person be selected from a proven academic and project management background. Both projects should be considered as integral to each other. Community engagement, ownership and management should be a steering consideration for the two projects. Successful examples and recommendations for community involvement have been outlined.

Funding is most likely from EU sources such as Horizon 2020 streams and INTERREG. There are other options. While entire exchequer funding is unlikely, it must not be ruled out. A collaborative partnership between various Departments of A,H,G, Department of Education and the Department of Transport, Tourism & Sport must be investigated. These two resource areas should be concentrated on. Philanthropic and commercial funding is also possible but with more limited possibilities. It is not likely that either of these projects would receive whole funding from these two sources. But a funding officer should follow up on partial funding for tangible aspects needed. For example, recognition of such supporters via marketing of the projects in an exhibition sponsored by a company or individual is favoured.

2. Regional Cultural Project - Research

Research within with report by Kilkenny Archaeology shines a light on the Black Pig's Dyke's spectacular potential as an archaeological landscape. Archaeological landscapes of this typology and supposed time-frame are poorly understood in Ireland and, indeed, further afield. So continued investigation into the Black Pig's Dyke could break new knowledge frontiers, nationally and across the EU. Exciting opportunities for archaeological research lie with the latest remote sensing techniques, geo-radars and electro-magnetic sensors. A strong element of this project is the progression of both archaeological and technological sciences. The strategic emphasis behind many EU funding streams, outlined in Section 3, encourages research and innovation.

2.1 Scope of project

Within study area the scope of the project should be narrowed somewhat to include the following: BPD-002 Leitrim, BPD-005 Dunclá, BPD-006 Cavan and BPD-007 Monaghan West. The classification of the remaining monuments as linear earthworks is questionable. However,

there is scope for including BPD-004 Doon of Drumsna in the revised scope because of its apparent association with linear earthworks along the river Shannon and also, potentially, it's pivotal place within the Iron Age settlement landscape.

It is also proposed to take extend the geographical scope of the project to include the known linear earthworks of counties Fermanagh, Down and Armagh: Lislea and Mullynavannogue, county Fermanagh, the Dorsey, county Armagh, and the Dane's Cast, county Down. These share many of the same characteristics of the earthworks of the study area but require detailed mapping. The availability of LiDAR datasets for these areas is another area that could be explored (Lislea and Mullynavannogue are certainly covered by LiDAR).

Further work is required to assess previous excavations, which may have uncovered linear earthworks. Large-scale stripping prior to road and other infrastructural developments often leads to the discovery of straight lengths of prehistoric ditches, for example at Hill of Rath, county Louth, but these may not have been identified as linear earthworks (Duffy 2001).

Two additional regions with linear earthworks will also be chosen for comparative purposes, namely counties Kilkenny (30 no. on RMP) and Waterford (10 no. on RMP), and southern Scotland (eg. Cheviot Hills) where there appear to be broad similarities with the linear earthworks of the study area (Barber 1999).

2.1.2 Chronology

Although the limited radiocarbon evidence is pointing to the last centuries BC as the floruit of the linear earthworks, this is far from certain. We do not know when these monuments first emerged in the landscape or how they developed over time. Did their period of currency extend back into the Late Bronze Age like the Wessex ditches? Was Ireland part of the great wave of linear earthwork construction of the British Late Bronze age? There are no dates for the Ardkil More, Duncá, or Leitrim linear earthworks. Are they contemporary with Monaghan West? Did the linear earthworks subsume, or were they influenced in their siting, by pre-existing monuments such as barrows or cursus-monuments? Were there phases of refurbishment to the

monuments? Were the boundaries laid down at the same time or did they evolve incrementally over an extended period of time?

A better understood chronology would allow them to be placed in the landscape history of the region and their relationships with the settlement pattern to be better understood. When did the linear earthworks become obsolete. Did they continue into the Early Medieval period like Offa's Dyke and the Grim's Ditch?

The limitations of radiocarbon dating with regard to providing a chronology for the linear earthworks have been outlined above; alternative methods are required. Dendrochronology, however, requires appropriate timber samples, which may not be easily obtainable and it was notable that there were no timbers in the Aghareagh West ditches when they were excavated (Walsh 1991).

Optically stimulated luminescence dating has been used to date construction of the Watt's Dyke, Wales to the late eighth-early ninth century AD and it is probably the most effective means of providing a future chronology for the Irish sites (Malim 2008, 20, table 1). Samples could be taken from exposed sections through the earthworks, of which a number have been identified in the field. Small-scale excavations targeted at obtaining further OSL samples could be undertaken. In terms of methodology, the sample preparation and OSL measurements would follow standard procedures (i.e. as in the guidelines published by English Heritage). In summary, measurements would be made on quartz mineral grains extracted from the sediment and OSL measurements made using a single aliquot regenerative dose (SAR) measurement protocol. The palaeodose on 12 repeat small sized (3-4mm) multigrain aliquots will be determined and palaeodose determinations will take into account standard acceptance criteria including recycling ratio, recuperation, thermal transfer, IR/OSL ratio, max palaeodose error, min signal size. For difficult to date samples (as might be the case with partially bleached sediments) more advanced analyses using single grain analysis can be helpful. The general error margin of OSL dates is in the region of 5%.

Consideration could also be given to re-dating using radiocarbon charcoal samples (assuming they are available) from the Aghareagh West excavations and the Aghnaskew palisade. As already

noted the three radiocarbon dates were determined on bulk samples, which may be problematical. AMS dating of single-entities would potentially offer more accurate dates. In particular it would be useful to obtain a more accurate date for the small hearth within the bank at Aghareagh west. A human bone sample from the ring ditch at Drumcleavry, Doon of Drumsna has also been made available to this project and it would be potentially of some significance if this were dated (Read 2007b).

A small excavation targeted at obtaining archaeo-magnetic dates on the heavily burnt edges of the palisade trench at Aghareagh West could prove useful. Archaeomagnetic dating can give, in the correct circumstances, highly accurate dates. Likewise tephrochronology may be worth exploring.

2.1.3 Morphology

Our understanding of the physical form of the earthworks is very limited and requires excavation and LiDAR modelling to address. Are palisades, such as that on the Monaghan West earthwork a regional pattern? Are V-shaped ditches, typical of the Iron Age in England and found at Magheracar indicating a chronological horizon? Can construction phases between the various elements of the earthworks be discerned?

2.1.4 Archaeological landscape

Linear ditches would have been the most prominent monuments in the Irish Iron Age landscape but their place in both the natural and archaeological landscape and in the organisation of later prehistoric land use is poorly understood. Is there a relationship with the hillforts of the region, as has been suggested for the Kilkenny linear earthworks (Gibbons 1990; Bradley et.al. 1994, 16; Waddell 1998, 358). Can they be related to the pollen records of the region to place them in the context of vegetational history? How do they relate to agricultural intensification? Is there an association with prehistoric field systems? What is the character of the associated settlements? Large-scale geophysical surveys of the terrain adjoining particular sections of linear earthworks could be undertaken to address questions of surrounding land use.

2.1.5 Natural landscape

What were the natural landscapes into which the linear earthworks were constructed? The ditches of linear earthworks can provide waterlogged palaeo-environmental remains (pollen, charcoal, seeds, and snails) that allow the ancient environment to be reconstructed. Evidence from land snails was a central plank of the Wessex linear ditches project and their examination could provide important information on vegetational history in the immediate environs of the earthworks (Bradley et.al. 1994, 120; see Ford 1981-2, 15).

2.1.6 Field work

Richard Bradley makes the point that it is systematic field survey, rather than excavation, has brought the most substantial progress in relation to the Wessex earthwork boundaries (Bradley et.al. 1994, 12). Very little field survey was undertaken for the present project and this should be a priority for further phases. Field survey would involve walking and recording the full extents of the earthworks and also detailed topographical mapping on the ground of the extant earthworks.

Targets for sample excavation should be identified and carefully chosen to maximise the information gathered. Consideration could also be given to the collection of surface artefacts in arable fields, which could suggest areas for further excavation. Dive-assessments could be undertaken at targeted areas where the lines of the earthworks cross streams/rivers, for example where the Bunnoe River is crossed. These might provide evidence regarding how the dykes were treated at such crossings. In attempting to find additional sections of linear earthworks auguring may be a useful tool, and was used to great effect on Salisbury Plain (Bradley et.al. 1994, 36).

2.1.7 Historical research

In light of these findings, it would also be useful to revisit the relevant folklore material. Its more explicit absence, in comparison to other sites, such as Tara, must also be borne in mind when attempting to decipher its relevance and cultural significance. At this stage, it would be useful to widen this analysis to include genealogical, ecclesiastical and more annalistic material along with a more detailed exploration of some of these initial findings. The scope of future research should be extended to include early and later literatures associated with other monuments in Ireland, and abroad, to identify any common themes and motifs, or, even, unifying concepts underpinning these.

2.1.7 Awareness

Much of the ‘raw material’, the physical remains of the earthworks, has been lost. Within the study area 30% of what was mapped as extant on the second edition map has been removed or badly degraded in the intervening 130 years. It is vital that the extent of the surviving linear earthworks should be communicated to landowners and other custodians, and that general public awareness measures be undertaken in order to assist in safe-guarding what remains.

2.2 Research Vision:

It is evident from the findings of Kilkenny Archaeology that a project investigation linear landscape would be fruitful for archaeology on a national and ER scale to explore un-answered questions about the function, chronology, folklore and relationship with the landscape of linear earthen works and their surrounds. To create as full a context to the research as possible, the project is recommended to be inter-disciplinary, creating pan-European partnerships. Initial contact has already been made with organisations in Ireland, Northern Ireland, Wales and Scotland and Germany who have made expressions of interest in such a project. Based on the recent investigations by Kilkenny Archaeology, it is suggested that such a project identify cultural and environmental patterns through investigations into a poorly understood cross-regional typology - linear earthen works. It would generate an evocative knowledge-base to enhance professional and regional community resources. Such archaeological research will also provide a more cohesive European identity.

2.3 Research Project Aims:

- To explore new horizons in one of the least understood eras of archaeology – the Iron Age
- To evoke a full spectrum of understanding for linear earthen-works landscapes via archaeological, environmental, historical and technological investigations
- To provide a research platform for collaborative partnerships in archaeological, environmental, historical and technological disciplines across at least 4 European regions - Ireland, Northern Ireland, Scotland and Wales (and potentially Germany)
- To achieve a comprehensive understanding of these archaeological landscapes and the cultural connections that formed them, through inter-disciplinary research

- To disseminate the research results at identified stages for the benefit of relevant professional and rural regional communities
- To form a knowledge-base for the creation of a ‘timepath’ regional cultural resource in Ireland and Scotland. This will be a cultural route involving west to east landscapes from prehistory into Roman & Early Christian regions.

2.4 Research Project – Key Questions:

Archaeological

1. Function - do they serve as political boundaries, enclose prime agricultural lands, act as boundaries and/ or have defensive uses? Certain structures appear to delineate promontory forts.
2. Landscape – are they using landscapes which are difficult to pass – lakes and bogs – to form extensions of the earthworks?
3. Re-use – were the current structures part of a larger monument and how have the structures been used over time?
4. Extent – do these dots in the landscape connect and what are their associations with surrounding sites, most typically hill forts?
5. Typology – what to the various sizes, lengths, ditch and bank attributes tell us? Are past excavations which indicate palisaded features a regional pattern?
6. Chronology – more established methods of dating may need to be applied to refine the less specific dating methods used in previous excavations to find precise dating patterns. AMS and dendrochronology, where appropriate, may suggest dating patterns.
7. Cultural context – how do the regions differ or resemble each other? Can cultural comparisons be made for the Iron Age?

Environmental

1. Landscape changes – existing pollen records for the Bronze Age show evidence of local clearances matching post-industrial clearances lasting several centuries. In contrast, Iron Age pollen records show a regeneration of native vegetation which has no parallel in other periods. Is this true of the poorly explored midlands region and what can it tell us of Iron Age landscape use?

2. Land use – was this a no-man’s land, a frontier, or was its primary use for agriculture? How long was this persistence of place maintained?
3. Palynological studies - what was the past human impact ? This method can reconstruct land-use to provide a context for understanding when and why the earthworks were constructed
4. Tephrochronology and 14C Dating - how do the existing linear monuments dating results relate to the paleo-environmental record? What imprint have construction of such sites left in the sediment record? What does an increase in soil erosion, and the timeframe in which it took place, indicate?

Historical – written and oral

1. Texts – how do the early, middle and medieval texts refer to these linear monuments? Investigation into the Black Pig’s Dyke linear structures found references to pigs associated with kingship and status. Was it a feature so common in certain eras that it was not historically referenced, similar to a fence in the landscape? What can this tell us about its function
2. Folklore – Pigs were also found to have a mythological presence and affiliations with the Other World in the Irish written tales. Are the Black Pig’s Dyke name origins associated with these linear earthworks? Or were the linear structures known as something else throughout the different archaeological eras?
3. Place names – a preliminary study of Black Pig’s Dyke associated place names in Co. Monaghan highlighted possible references in place names where linear structures are thought to have existed from the archaeological record. A full study of townland and fieldnames could point towards linear structures which no longer exist.

2.5 Potential Collaborations:

All of the potential collaborators below have submitted an official ‘Expression of Interest’ in the Linear Landscapes project, stemming from Kilkenny Archaeology’s investigation into the Black Pig’s Dyke and the research questions thrown up. All are highlighted in the table below as appropriate partnerships for the next stage of the project’s progression – the compilation of a research proposal for EU funding.

Some have had some very recent developments around similar linear structures. For example, Offa's Dyke on the border of Wales and England, is a linear earthen work named after an 8th century King. As with the Black Pig's Dyke (considering its extensions into Northern Ireland) the monuments are under separate Monument legislation, policies and management plans. It is managed between 8 local authorities, English Heritage and CADW. Offa's Dyke also has a national route of c.177km run along its layout, of which 80km is formed by the Dyke itself. Recent demolition of a section of the Dyke in 2013 revealed radiocarbon dating of between 200 and 400AD. The theory of its 8th century construction is in doubt. Research into whether King Offa simply amalgamated older linear structures into a border needs to be investigated. There are also many Iron Age hillforts concentrated along the Dyke route to the North of Wales. A research based archaeological trust, CPAT, are now keen to collaborate on this project.

There is a similar linear defensive earthwork constructed across the neck of the Cimbrian peninsula during Denmark's Viking Age. It is located across the marshes at the neck of the peninsula and is c.30km long. It is attributed to the Danish King Gudfred in 808AD. However, new carbon-14 dating in 2013 revealed that the second stage started around 500 AD, and the oldest associated fortifications are even older than that. The Museum of Danevirke holds Iron Age ramparts from the linear sites.

| | Country | Organisation | Type | Representative | Area of Expertise |
|---|---------|---|-----------------------------|--------------------------|----------------------------------|
| 1 | Ireland | School of Archaeology, University College Dublin | University | Dr. Gabriel Cooney | Archaeological |
| 2 | Ireland | Department of Geography, NUI Maynooth | University | Dr. Bettina Stephanie | Environmental |
| 3 | Ireland | Centre of Irish Cultural Heritage, NUI Maynooth | University | Dr. Mary Leenane | Historical |
| 4 | Ireland | Discovery Programme | Archaeologica l Research | Dr. Edel Breathnach | Archaeological/ Technological |

| | Centre | | | | |
|----|------------------|--|---------------------------------------|-----------------------|---|
| 5 | Ireland | Kilkenny Archaeology Co. | Company | Coilin O'Drisceoil | Archaeological |
| 6 | Northern Ireland | School of Geography, Archaeology and Paleocology, Queen's University | University | Dr. Dirk Brandherm | Archaeological |
| 7 | Northern Ireland | School of Geography, Archaeology and Paleocology, Queen's University | University | Dr. Gill Plunkett | Environmental |
| 8 | Scotland | School of Humanities, University of Glasgow | University | Prof. Steven Driscoll | Archaeological |
| 9 | Scotland | School of Historic, Classics & Archaeology, University of Edinburgh | University | Prof. Ian Ralston | Archaeological/ Historical |
| 10 | Wales | Clwyd-Powys Archaeological Trust | Archaeologica l Trust | Paul Caulfield | Archaeological/ Environmental/ Historical |
| 11 | Germany | LiDAR Research Group, University of Heidelberg | University | Dr. Bernhard Hoefle | Technological |
| 12 | Germany | RGK, German Archaeological Institute (DAI) | Archaeologica l research centre | ? | Technological |

Other Areas:

While there are a diversity of interested partnerships which have expressed interest in research for this project, other relevant disciplines such as geography and geology may also be interested and should be explored.

3. Regional Cultural Project – Cultural Resource

3.1 Introduction

Research is vital to understanding this archaeological landscape. But this project hopes to bring about the incorporation of these monuments into communities through dissemination of information and tourism. A fuller understanding of this archaeological landscape will facilitate a strong economic resource for the BMW region and provide a link to northern Ireland, the UK and other areas of Europe. The research phase of the project hopes to illuminate the value of the archaeological landscape through archaeological research tours, placements and a strong promotional programme to allow access to information as the research is conducted. Appreciation of this archaeological landscape will offer community resources and economic opportunities.

3.2 Cultural Resource Value

The research so far by Kilkenny Archaeology shows that the sites investigated are not part of a single monument, but are individual monuments of similar typology and date. Parallel sites across the EU are being researched for successful governance examples. The most appropriate case is the Antonine Wall in Scotland, although this is a single linear structure across Scotland from Roman times. Yet it is managed by 5 county councils and Historic Scotland, an amalgam of entities which is very similar in structure to the bodies which have collaborated to initiate this research.

They have achieved a lot in areas that are potentially key to the BPD – dissemination of information and public participation. Interestingly, community engagement is vital to its success. The Antonine Wall is used as a walkway for local and foreign visitors. But individual sections have enhanced value. For example, Historic Scotland encourages landowners, farmers and tenants to enter into schemes that benefit the conservation and sustainability of the Antonine Wall. Another example is the Adopt-a-Monument Scheme, run by Historic Scotland, which encourages groups to get involved in hands-on activities to improve the condition, accessibility and interpretation of the chosen site. This helps with the hands-on management of

the site and heightens a sense of ownership and understanding for the community. There are proposals for a similar scheme in Ireland. The BPD project landscapes should consider being a pilot project for such a scheme.

Such expansive archaeological landscapes as the BPD offer huge potential for linked walkways across county boundaries and borders, with multi-disciplinary partnerships, tourism opportunities and job creation. The European Commission's Directorate General for Enterprise and Industry has launched a call for proposals on the themes of "Cooperation projects to support transnational tourism based on European cultural and industrial heritage" and "Fostering accessible tourism entrepreneurship and management". Many other funding initiatives exist such as Horizon 2020 and INTERREG. The BPD has the potential to strengthen the economic and social welfare of the counties involved by creating ownership and interest for local communities in their archaeological assets.

3.3 Cultural Resource – Vision, Objectives, Priorities

To create a travel network along the Black Pig's Dyke landscape using various types of transport, walking, boating, cycling, while travelling in time along a 'timepath'. To use innovative methods of research and interpretation to bring the past layers of the landscape to life. To connect users and communities with their local and European shared landscape.

Short-Term Objectives

- To develop the Timepath
- To develop its community management aspects

Medium – Long-term Objectives

Develop the Timepath to merge with:

- Antonine Wall (see Fig. 1)
- European Walkways Network – E2 & E8 (see Fig. 2)

Project Direction Priorities:

- engaging communities;
- reaching across borders;
- enhancing archaeological and environmental landscape resources;

- investing in communities;
- financing our future

3.4 Development of a Timepath

After research of cultural landscape use in rural communities, it is recommended that a cultural route, or Timepath, be created. This will traverse the archaeological landscape of the counties Roscommon, Donegal, Longford, Leitrim, Cavan and Monaghan in the Borders Midlands West region of Ireland. The route should be established around the archaeological assets of these counties, as a unique selling point. Similar landscapes exist in Northern Ireland, in the counties Fermanagh, Armagh and Down. Positive outcomes could be made and enhanced value if connections are made with Northern Ireland. #

There are many trails established in Ireland, but few concentrate on cultural routes. The Pilgrim Ways is an established network of historic paths. However, the Timepath would walk/ cycle/ boat through historic time periods. The medium to long-term objectives should investigate linking with relevant time periods in other countries. For example, the Iron Age emphasis of the Timepath could link with the Roman era Antonine Wall in Scotland and onto Christian and Viking era landscapes in northern Europe.

Establishing a relationship with the National Trails Office is integral and should be initiated as soon as possible. They offer toolkits, experience, professional advice, a national route register and facilities such as access to irishtrails.ie App.

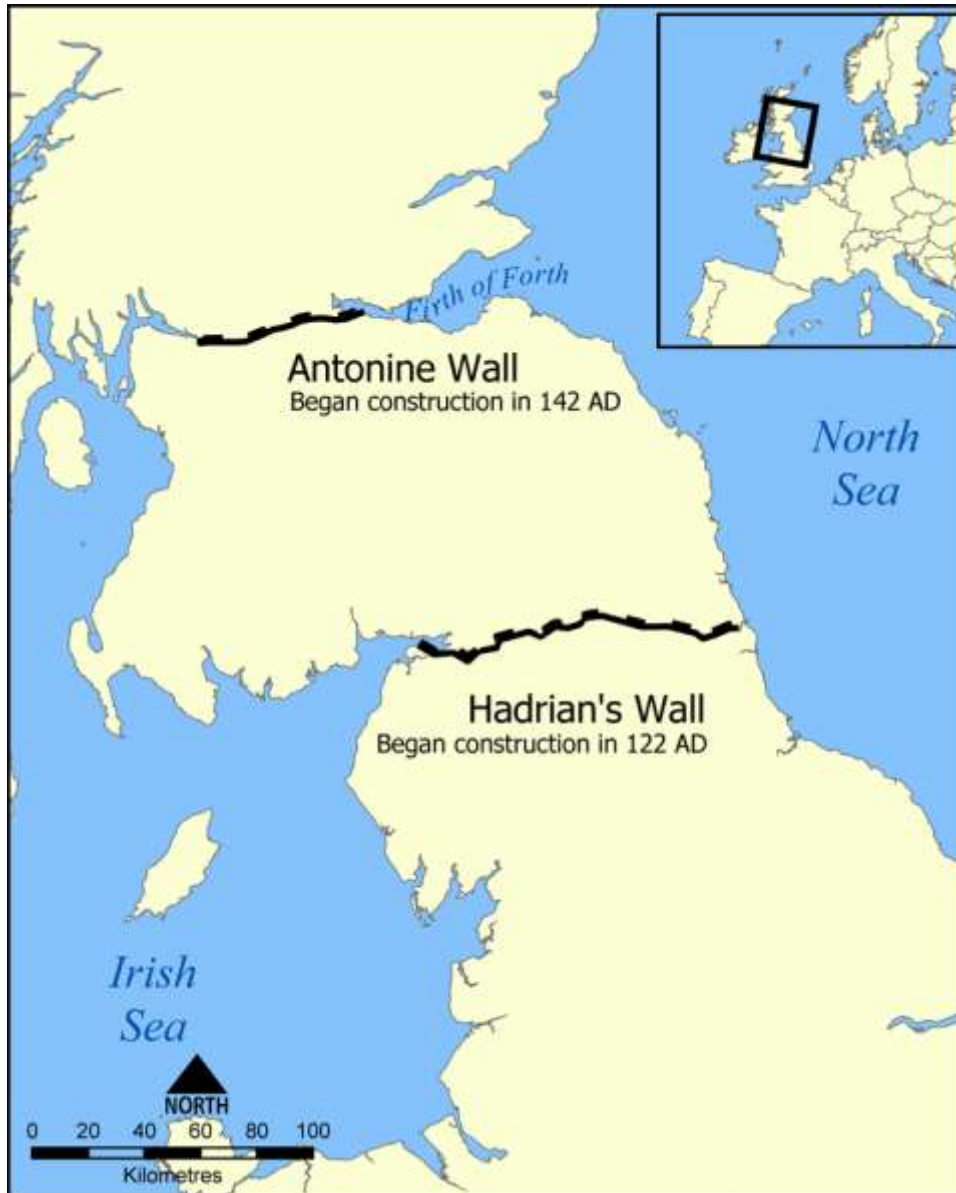


Fig. 1 – Map of Antonine Wall and Hadrian’s Wall in Scotland



Fig. 2 – Map of European Ramblers’ Association of E-Paths – 12 walking routes across EU

3.5 ‘Timepath’ – European Connections

The Cultural Routes programme was launched by the Council of Europe in 1987. Its objective was to demonstrate, by means of a journey through space and time, how the heritage of the different countries and cultures of Europe contributes to a shared cultural heritage. The Cultural Routes put into practice the fundamental principles of the Council of Europe: human rights, cultural democracy, cultural diversity and identity, dialogue, mutual exchange and enrichment across boundaries and centuries. This programme fell by the wayside. But In December 2010, the Committee of Ministers of the Council of Europe adopted Resolution CM/Res(2010)53 establishing an Enlarged Partial Agreement (EPA) to enable closer co-operation between states particularly interested in the development of Cultural Routes. The Enlarged Partial Agreement on Cultural Routes seeks to reinforce the potential of Cultural Routes for cultural co-operation, sustainable territorial development and social cohesion, with a particular focus on themes of symbolic importance for European unity, history, culture and values and the discovery of less

well-known destinations. It helps to strengthen the democratic dimension of cultural exchange and tourism through the involvement of grassroots networks and associations, local and regional authorities, universities and professional organisations. It contributes to the preservation of a diverse heritage through theme-based and alternative tourist itineraries and cultural projects. It is ideally positioned to offer support and EU emphasis to long-term EU connection objectives of the Timepath.

One network of established routes is the European Rambler Association E-Paths (see Fig. 2). There are 12 routes which have been designated by European Ramblers Association (ERA)

For example, path E8 goes from Cork to Istanbul. Path E2 goes from Scotland to Southern France. However, discussions are underway with various individuals and local authorities to extend a route from Scotland into Northern Ireland and onwards to Galway. This may incorporate some of the Timepath route. As the E2 route and the Timepath have yet to be clarified it should be a priority of the BPD board to add to any official discussions on the route. None of the E-Paths are thematic so it highlights the possibility for the Timepath to 'add value' to the extended E2 route. Community management can connect localities to a larger EU network. It is recommended that local and regional communities play a significant role in the development of these routes during their creation and management (see Section 3.6 for community involvement).

3.6 Community Ownership & Management as a Resource

Below are some examples of how to engage, empower and enhance the value of local communities during the progression of the cultural resource project. As they feed into its development, they will be reminded of the rewards to the regional and larger EU identity and the potential economic rewards.

By implementing training in tour guiding of the archaeological and environmental landscapes, opportunities for employment become available.

Ownership - Adopt-a-Monument Scheme

The idea for the Adopt-a-Monument Scheme was first developed in the 1990s. Between 1991 and 1998, the Council for Scottish Archaeology (CSA) ran Adopt-a-Monument in response to the number of archaeological societies who wanted to look after and take responsibility for cultural heritage sites in their areas. A second phase (2006-2009) was funded by Historic Scotland, and was intended as a pilot scheme to assess the popularity of the scheme. Due to the overwhelming response to the pilot project, Adopt-a-Monument is running for another 5 years. The current AaM Scheme builds on this past experience and meets the demands from community groups who wish to engage with their local heritage. This successful model has been assessed by the Heritage Council and is being proposed as a community management scheme for 2015.

It is recommended that the BPD cultural resource project put itself forward as a pilot programme to progress community understanding and ownership of their landscape.

Empowering local knowledge

The Townlands Project was begun in the Spring of 2009, by **Alan Counihan**, collaborating with fellow artist **Gypsy Ray**, as a creative exploration of a north-Kilkenny landscape, specifically the nine townlands of the old civil parish of *Rathcoole*. Its focus is primarily on the “*vernacular*” history of the parish fields, their form and use, and the names and stories by which they are still specifically remembered. It also seeks to engage with farm and family customs. The overall goal of the **Townlands Project** is the representation of local place to and by local people, among others, using creative means for the exploration, distillation, and expression of its folklore, history and contemporary landscape. The project is an ongoing in-depth exploration of a particular landscape as an inhabited and working environment.

An important part of the archaeological investigation and outputs from this research initiative have been related to folklore and tradition. Local knowledge can be underappreciated. Using this project to partake in the Townlands initiative offers many benefits – highlighting oral history patterns for the large research project and empowering communities by recognizing the significance of their knowledge.

Dissemination - 'Heritage Here' Norway

This is an ongoing multi-collaborative project in Norway which allows one to see the 'invisible' in the landscape. Its development has had a high level of community involvement and offers a low-cost, low-impact way of disseminating information to landscape users.

It highlights culture and nature on mobile telephones and tablets. It involves three ministries, five directorates, volunteers, municipalities and counties, museums and archives and other institutions. Three pilot projects in three separate locations were conducted between 2012 & 2013 to gain important heritage interpretation experience. They aim to find out how to provide simple mobile access to relevant facts and narratives and how to adapt the content to various travel situations. Research also looked at how various kinds of dissemination are suitable for various target groups, and how to encourage the public to share their stories and their knowledge.

- Bø-Sauherad focuses mainly on local knowledge and involvement.
- Dovre concentrates on dissemination of information on culture and nature in rural and mountain areas.
- In the Akerselva district, testing of mobile dissemination in an urban area with good access to data was at the heart of the project.

The premise of these projects is that owners of technology have various databases at their disposal, and this is coordinated with regard to open standards. Heritage and environmental information will be mapped out geographically and be based on the user's location. The user will thus be able to adapt the scope, topic and form of the content to his or her needs. Considering the rural expanse of the BPD Timepath, this approach to technology could provide alternatives to costly heritage centres.

4. Project Organization & Management

As the EU's knowledge-based society grows, cultural organisations need to consider their development as an important source for economic advance. Strategic management structures for cultural bodies based on Post-Fordism, and Knowledge-Based Economy models, are particularly interesting for the BPD board as it considers its future direction. With government cuts already heavily implemented, and potential for more in the future, this model strives to replace traditional state subsidies by looking at the four 'P's' – partners, projects, people and place (Volkerlink, 2013). These model bases seek out flexible and innovative projects, and highly favour sponsorship and collaboration to facilitate such a project's operation. The BPD is ripe for the picking, based on these successful management models. The BPD's advised direction on research and cultural resources to offer solutions to regional deficiencies and national archaeological research gaps, and linking various expertise, is also in sync with national and EU cultural shifts in agendas.

Inevitably, to enable this project to thrive, the threads that steer EU policy must be addressed in putting together a new management model. Strategic EU agendas for cultural heritage actions, including EU funding, are underpinned by (European Commission: Culture, 2014) (Resolution on European Agenda for Culture, 2007):

- Strategic partnerships
- Sector skills alliances
- Knowledge alliances
- Capacity building in the field of higher education
- Technological innovations
- Digitisation
- Dissemination of information

Many other streams of funding encourage these strategy themes also. Therefore, models of management must incorporate these considerations. To optimize the outputs from both the research and cultural resource projects suggested in this document, it is recommended that both are overseen by the same body.

4.1 Management Structure Models:

Independent models of project management were reviewed. York Archaeological Trust is an independent charity, founded in 1972, which investigates the past for the benefit of present communities and future generations. It has many innovative methodologies in dissemination of information to professional and public communities. It carries out carefully targeted and cost effective archaeological recording, and excavation and research for a broad range of clients and partners. The results are made available in a number of innovative ways. The charity is independent of exchequer funding and operates on a commercial basis. While driving revenue from the Viking era Jorvik Centre through research and artefacts uncovered in the Coppergate Dig in the 1970's, they successfully perpetuate research, publication and access for the public (York Archaeological Trust website, 2014).

However, on the basis of interviews with York Archaeological Trust (David Jennings interview, 2014), and with people within the heritage sector and the Department of Arts, Heritage and Gaeltacht, an independent trust model to manage the BPD is not recommended. The monies needed to establish and run a programme of works would be hugely difficult to raise for such a body. Financial priorities lie elsewhere. Some are of the opinion that a plethora of heritage bodies has saturated any support that would be out there for an independent archaeological trust.

The most advantageous management structure would involve partnership with an academic institution. They, under the auspices of a Primary Investigator, would be part of the new DEPP board and be a daily manager of the programme. Such a partnership would provide fund management experience, proposal writing familiarity, research interests, extensive professional connections to bring to future outcomes, and additional personnel to relieve the BPD board of daily management needs.

The Antonine Wall is a UNESCO World Heritage Site in Scotland. It was originally constructed as one linear site across the neck of Scotland as a defensive feature for the Roman Empire. It is similar to the Black Pig's Dyke in that what now remains are many segmented pieces to be managed. It also crosses multiple county boundaries. The Site is managed and cared for by East Dunbartonshire Council, Falkirk Council, Glasgow City Council, Historic Scotland, North Lanarkshire Council and West Dunbartonshire Council. The [Site Management Plan 2014-19](#) guides sustainable management to maintain the Outstanding Universal Value. It was produced following a series of [public workshops](#), the preparation of an [Environmental Report](#), and an Interpretation and Access Plan. Its experience in management of such a similar site,

which is also bound by UNESCO standards, is a good comparison in best practice for the Black Pig's Dyke future organisation.

The most advantageous management structure would involve partnership with an academic institution. For example, The German Institute of Archaeology (DAI) is a State body and operates under the Federal Foreign office, while collaborating with the Ministry of Education and Research on its outputs. 20% of its annual €30 million budget is given specifically to research. It's operates numerous successful archaeological collaborations. They act as a project host, and in some instances, co-ordinator to a project. Their management structure for the ArcheoLandscapes Europe (ArcLand) project involves:

- 1 x Project Manager (e.g. representative of the DAI)
- 6. x Coordinating Partners (e.g. state body representatives, representatives from collaborations with academia etc)
- 2 x Associated Partners (e.g. IT and Survey skills).

Their project involves eight themed actions, with specific targets within each theme, ranging from archiving, communication, dissemination to skills exchange etc. An outcome of its communication action plan is a travelling exhibition from this project which is circulating around European museums, including the National Museum of Ireland. Although it is a different area of archaeological research, its management approach could be applicable to the BPD future objectives, regarding how to tackle a working strategy for the areas of archaeological research, dissemination and management.

4.2 Management Recommendations

Considering the issue of cross-border research and cultural routes, the best management structure is for all relevant local authorities to form an advisory board, hosted by the Heritage Council, where collaborators can be represented (see Fig.3). The Heritage Council can steer on a strategic level and bring extensive networks and experience to the BPD board. The HC can also offer impartiality from the local level, yet fuse with the LA's for local engagement.

From extensive research of cultural institutions, research centres and retrospective archaeological project boards, the following structure is advised. Because the Research Project will be the first

Regional Cultural strand most likely to begin first, it is suggested that the Project Manager be from a research background. Once the research project is beginning to wind down, a new project manager with a more cultural management background may be appropriate. The advisory board should include skill sets from:

- Relevant academic areas such as archaeology, folklore, environmental
- Technological
- Dissemination
- Infrastructural - finance, education, marketing, business areas

This board should have statutory status. A new title should be agreed upon, such as LERT (Linear Earthworks Research and Timepaths). It must be broad enough to incorporate all aspects of the BPD's future. The number of the new DEPP board should range between 6 and 10 people to encompass the skillset and collaborative representations adequately. Appropriate board members should be selected considering the above. The new board should be a comprised of members working in a voluntary capacity (Royal Irish Academy, 2013). No remuneration for sitting on the board should be given.

The board should consider existing experience in the organisations. However, appointments should take account of whether the required workload is feasible considering existing responsibilities.

It is suggested that members serve a fixed three year term to provide consistency in project objectives. The possibility of term renewal should be offered, on a consensus basis from the board. Members who cannot attend for twelve months in a row should be asked to step back. Quarterly meetings based in the Heritage Council, or another agreed location, are advised to be held to keep implementation of strategic and annual goals on target. The option of conference calls should be provided, depending on board members' needs. It is recommended that short tours of the BPD landscape and projects' updates be given regularly to the board, before or after meetings, to elucidate issues.

Although there is extensive expertise in local authorities and the Heritage Council, the project objectives cannot be accomplished without collaboration (see Section 1). In the short-term, the Digital Repository of Ireland have offered to conduct a digitisation study on a sample of research

data on a pro bono basis. This is highly recommended as it will enable the achievement of many of the further objectives – largely fundraising and establishment of further collaborations. The most productive partnership may be with academic institutions, as it may be experienced in fundraising, proposal writing and conducting research projects. Such a partnership will co-steer the BPD.

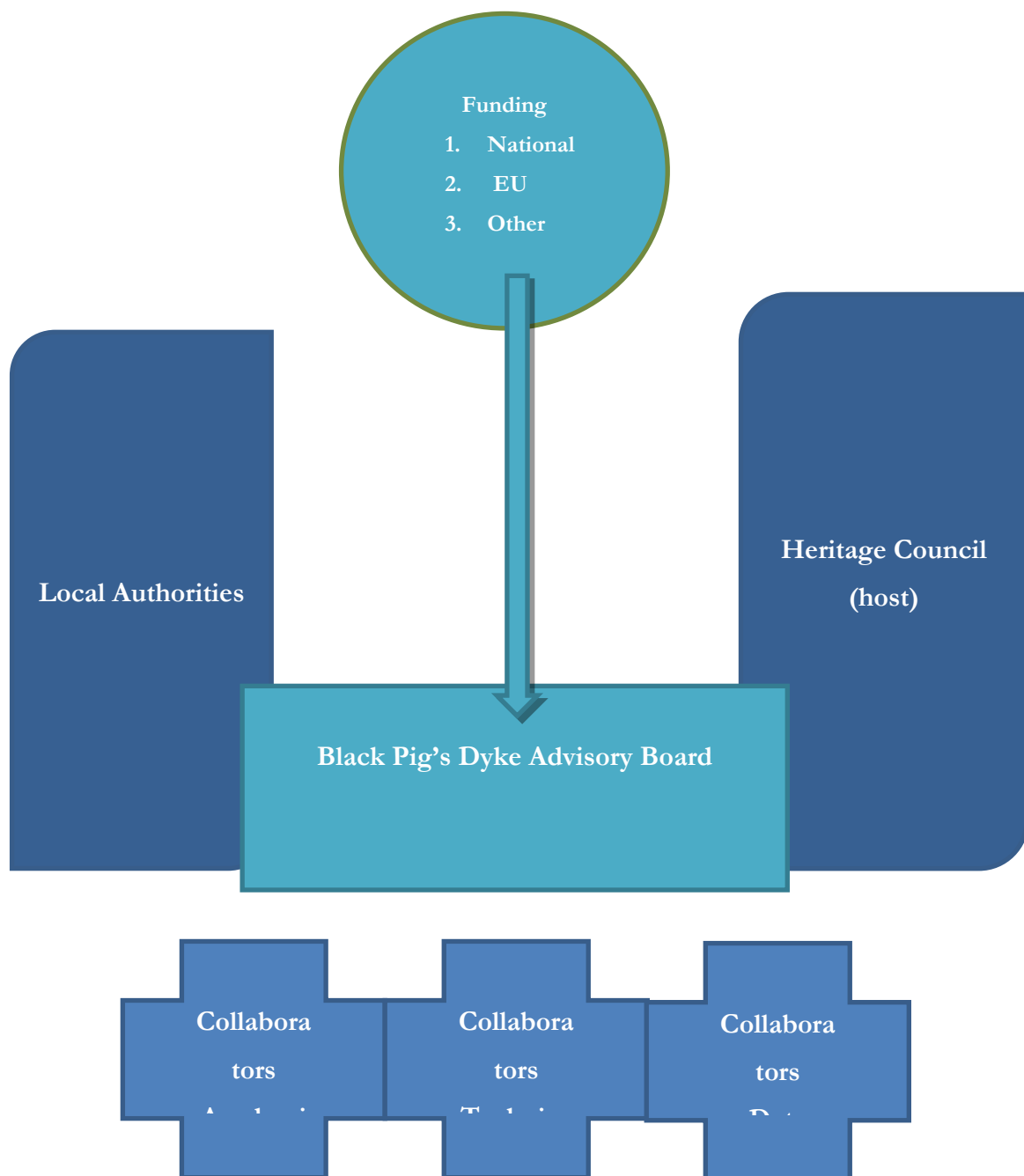


Fig. 3 - Overview of how the BPD Advisory Board should be organised

4.3 Overview of BPD Board Responsibilities:

1. Track developments in the BPD management and finances. Remain suitably apprised of BPD related, external and internal, issues
2. Assist in advancing the goals and mission of BPD, as appropriate, through public speaking, professional work, and outreach to contact networks and communities involved
3. Act as steward of the BPD mission and help ensure that the work of the BPD is appropriately aligned with any collaborators' agendas and the broader national strategies to advance BPD objectives sustainably
4. Involve the relevant communities at all levels
5. Participate in information updates
6. Engage in a professional reflective, self-evaluative process to improve the BPD advisory board effectiveness

4.4 Principles for Management Operation:

Exploration of new ideas and partnerships will be a guiding ethos throughout the project:

- Open, honest and pro-active communication
- Mutual respect for one another's experience
- Willingness to explore and experiment with new ideas and methods
- Excellence in all actions
- Taking responsibility for implementation

4.5 Project Aims and Principles for BPD Management

Aims:

1. Complete urgent Research and Cultural Resource Regional Cultural Project proposals
2. Achieve excellence in archaeological and methodological research outcomes
3. Work towards a Best Practice Methodology in Landscape Archaeology
4. Internal sharing of expertise, communication and new approaches to conservation, education, IT, technology, marketing
5. Implementation of EU & National directives and strategies, for example Burra Charter, European Landscape Agenda and European Commission Cultural Agenda
6. Implement an innovative Dissemination of Information plan at all project stages
7. Maximise beneficial project outcomes at local and national levels at all project stages

8. Future actions should seek national to international professional awards and certificates to endorse the professionalism of the BPD work. For example, national Heritage Awards, Europa Nostra awards, European Heritage Label.

5. Resourcing:

5.1 Exchequer Resourcing

Discussions with the Department of Arts, Heritage and The Gaeltacht have indicated that current budgets are constrained. Long-term funding for the future of the BPD is unlikely in the short term, given wider economic circumstances. However, it is advised that the most promising course of action is to make a very robust case for exchequer funding for the BPD through established agencies such as the local authorities and the Heritage Council, separate to overall budgetary arrangements. The case for the research potential, potential for innovative community management, its facilitation of fruitful pan-EU partnerships and economic rewards should be part of such a proposal. If DAHG funding is not available for the project, other supports may be offered in lieu. Collaboration between other Departments such as the Department of Education and the Department of Transport, Tourism & Sport may be more realistic. A prestigious project of this nature may be open to match funding also (see CEB cultural loans). A proposal for the BPD should be compiled by someone very familiar with the project value and potential.

Project Support:

- Research
- Cultural Resource

Advantages: Knowledge of the people and processes in getting exchequer funding, are possibly familiar. Support by the DAHG may attract match funding and ease government collaborations. It may be limited to national project partners.

Disadvantages: Match funding will be sought from other governments to complete the pan-EU partnerships suggested.

Requirements: A well-structured case to be put to the DAHG to begin with. It should cover the significance of the project, the added value of

outcomes if the BPD is treated as a showcase for international research, and the facilities created for the BMW region.

The Irish Research Council – this is an agency of the Department of Education. Their mission is to enable a vibrant research community in Ireland. They have specific grants available to the Humanities sector. The Research Project Grants Scheme provides funding for research activities such as “*hiring additional research staff, establishment and maintenance of knowledge-transfer initiatives, networking and collaboration*” (Irish Research Council website, 2014). It aims to aid research activities and add to competitiveness in future international funding applications.

IRC Project research grants

| GRANT | AVAILABLE MONEY | TIMEFRAME |
|--|------------------------|------------------|
| Starter Research Project Grant | €125,000 | 15 Months |
| Advanced Research Project Grant | €380,000 | 3 Years |
| Interdisciplinary Research Project Grant | €380,000 | 3 Years |

A call is put out in April of each year. All applicants must have academic staff appointments for at least two years for the Starter programme; the advanced programme requires academic standing of at least four years. This is recommended as a solution for academic collaborations, and could be a solution for funding a Principal Investigator. To open more strategic partnerships to the NMI, it is recommended that contact be made to become a registered host or official strategic partner with the IRC.

Project Support: - Research

Advantages: This provides a full-funded Principal Investigator to manage the research project

Disadvantages: No established relationship with the IRC.

Requirements: A project proposal needs to be shaped by an academic who will be the Principal Investigator.

5.2 Non-Exchequer Resourcing:

Few national bodies can offer monetary funding. However, some bodies can offer high impact 'resourcing' solutions.

Staffing: Staffing requirements suggested for the BPD by this report are hindered by budgets and the government moratorium on public sector recruitment. A mutually beneficial relationship with academic institutions can lessen the burden.

UCD - Mr. Pat Cooke, Director of the MA in Cultural Policy and Arts Management sees collaboration on the BPD project as a legitimate learning opportunity in two ways. A practical element of this course offers an eight week placement in April/May. This placement will have a strategic emphasis. It is suggested that the role focus on a plan for dissemination of information from the Archaeological Research Project and creating visibility for BPD community outcomes for the Cultural Resource Project. Also, there is a business module with practical assessment: tasking a student to formulate a business plan. Accepting the most appropriate would reward the student with the kudos of writing for a national cultural project. The local authorities would be seen to be educationally supportive, and deploying the talents of innovative students. A project proposal will need to be discussed with Mr. Cooke by December of this year. Although WIT was not contacted directly, their MA in Arts Management also offers practical placements as part of their course. Archaeological specific placements should be explored in UCC, UCD, NUIM etc.

Project Support: Partial – Research

Partial – Cultural Resource

Advantages: This will reduce the financial burden of staffing. The BPD board will be seen as an active supporter of education and as initiating research. It will offer hands-on training in management skills and professionalism.

Disadvantages: This will require full-time skilled professionals to mentor students as

they learn.

Requirements:

Interested academic institutions such as UCC, WIT and UCD should be contacted, and a brief project outline offered. A simple written agreement between each academic institution and the BPD board is necessary to protect all involved.

An initial concentrated training week in the role is essential and will minimise full-time staff time in mentoring. Extension of such work placement should be strongly considered.

Technical and IT Resourcing: The Discovery Programme is Ireland's main archaeological research body. It has vast experience in acquiring funding – national and European - for programmes such as 3D-ICONS and Late Iron Age & Roman Ireland (Discovery Programme website, 2014). Their research skills involve digitising of information - using the latest technological innovations - and database management. It has expertise in long-term archaeological research projects and publication, and has an 'Equipment Pool' available. These skills could potentially be utilised by BPD. While the Discovery Programme cannot offer direct funding, it is happy to provide its expertise on technical elements. They could be a key technological partner of funding proposals, particularly EU funding. Many EU funding streams require an element of digitisation of information, and are now focusing on digital dissemination.

Digital Repository of Ireland - To maximise the benefit for all future BPD funding proposals and minimise outlay on expenditure, a small pilot study of the information recorded via various media is strongly recommended. All costs could be absorbed by the DRI, according to Dr. Sandra Collins, Director, if a long-term goal towards larger objectives is being aimed for.

For this pilot study, an appropriate amount of artefacts and documentation should be digitised. DRI can offer full technical assistance from its IT staff, and collaboration on the digitisation of artefacts and documentation with BPD. The DRI will manage and maintain all metadata. This is supporting content containing fields such as location, context, connecting data links etc. The content chosen should aim to articulate the BPD project objectives to potential funders. It could take roughly six months, depending on the content provided.

The advantage of using the DRI is in outsourcing the management of an online database for BPD content. The BPD project will retain all content ownership, the rights to put the content on the NMI website as a database, and all rights to images. Rights for the use of an image or

content could provide a source of income with minimal outlay. As the DRI has compiled various best practice documents regarding digitisation creation and management, it is a trusted body. The National Library of Ireland and the National College of Art and Design have completed successful projects in partnership with the DRI. The DRI is interested in hosting 3D scanning and holographic technology as part of its future strategy. The Discovery Programme has already contributed 3D content to the Europeana databases, and could offer expertise. The BPD could be a host for such a technological study with appropriate collaboration. Some of the more innovative BPD project objectives would be easily achieved through DRI assistance.

Project Support: Partial – Research

Partial – Cultural Resource

Advantages: The Discovery Programme has a unique understanding of the BPD requirements through its diverse experience on projects such as ArchaeoLandscapes. The DRI needs to expand its database. Therefore, both are eager to collaborate.

It is strongly recommended that completion of a pilot study is a necessary step to any funding future for the BPD. This is a cost-free solution. It can only add to the value of the project and the visualisation of the project potential to others.

Disadvantages: None foreseen

Requirements: Discussions should be initiated with DRI to draw together an outline and timeframe for a sample study.

5.3 European Resourcing

European funding has potentially the most to offer the BPD project. Research of strategic agendas behind grant strands shows that applications will be considered more seriously if they show elements of pan-European connections, job creation, technological advances using innovation, and methods of excellence. The BPD project can potentially tick all of those boxes. There are many funding routes available but the following steps are necessary to initiate application to all.

1. A strong research proposal document and sample digitisation project will be the basis of all applications. This will create important visualisation for collaborators and funders alike. .
2. Develop a relationship with bodies such as the Irish Humanities Alliance (IHS). The IHS is a joint initiative of Humanities researchers within eleven higher education and research institutions, including all of the universities North and South, and the Royal Irish Academy. This will ease the BPD programme's connection to other potential collaborators. The IHS has Horizon 2020 Work Programme Committees on:
 - Communications and Advocacy
 - EU and Horizon 2020
 - Funding and Policy
 - New Directions in the Humanities
 - Publications, Impact and Research Evaluation

All are relevant to the future outcomes suggested for the BPD. It will meet in October 2014 to decide upon an initial draft text for the content of Calls and Topics for inclusion in the 2016–2017 Work Programmes. It is important that the BPD board partake in providing material to the national delegates, and communicate to them suggested outcomes of the BPD project.

3. Establish a relationship with the Irish Research Council (IRC). The IRC is the contact point for many EU funding streams. Most host organisations are universities. However, the research role the BPD hopes to engage in will be part of its qualification for this status. Not only will this status help with anticipated BPD funding, it will be fruitful for large funding opportunities for dissemination elements.
4. Search for collaborative partners. Pan-European research groups will be favoured in all EU funding applications. An appropriate forum to initiate partnerships is Net4Society. This is an online platform that provides a broad geographic search pool for research partners, with 901 research proposals currently registered (Net4Society website, 2014). It is a network of researchers and key players for all Socio-economic Sciences and Humanities (SSH) in the EU Framework Programme. It is strongly suggested that a profile and proposal be registered on this site. Dialogue with the National Contact Point, Paul Kilkenny of the IRC, is also advised to make the reach of the proposal more effective.

Horizon 2020 – this is Europe's largest ever fund for research and innovation available to Ireland. Over the 7 year programme it has a budget of €79 billion. Ireland aims to win €1.25

billion for the research and industry sectors - an average of €3 million per week (Horizon 2020 website 2014). The following specific envelopes of funding are appropriate to BPD under the relevant Reflective Societies – Cultural Heritage and European Identities section:

1. Reflective-2-2015 - Emergence & transmission of EU cultural heritage and Europeanization. The opening date for the first call is 10th December 2014 with a deadline of 28th May 2015. Funding is available for projects of up to €1.5 - €2.5 million per project. It is promoting multidisciplinary and comparative research on the emergence of a European cultural heritage in a historical perspective, and the best way to transmit it. The content and methodology of education and curricula should be taken into account, as well as the role of new technologies and media. It will address how the local, regional, national and European aspects of cultural heritage are interlinked, how they are understood (or not) by citizens, and encouraged (or not) by various stakeholders and promoters of cultural heritage. This is in line with the BPD research and cultural resource objectives. It may be more useful for BPD research project.
2. Reflective-11-2015 - Enabling Innovation: Creating Impact from Social Sciences and Humanities (SSH). The opening date for the first call is 10th December 2014 with a deadline of 28th May 2015. It will have indicative budget of up to €2 million per project. This strand will analyse the potential and challenges of SSH valorisation at European level, and will develop solutions for advancing the practical application of research results, methods and expertise of SSH into products and services. This is seen as a 'second-stage' source for funding, if the BPD is to bring its longer term objectives for a cultural resource to fruition.
3. Reflective-8-2015 - Communication and dissemination platform. The opening date for the first call is 10th December 2014 with a deadline of 28th May 2015. It will have an indicative budget of up to €1 million per project. The supporting action should foster dialogue and cooperation amongst researchers themselves (not only from EU-funded projects but also those funded by other international or national organisations when relevant) and between researchers and other stakeholders (policy makers, public institutions, civil society, trade unions, practitioners etc.), from a multidisciplinary policy perspective and focusing on innovation, inclusion and growth valorising the impact of research findings. Again, this may be a funding source more suited to the BPD cultural resource aspect.

Project Support:

- Research (Reflective 2)
- Cultural Resource (Reflective 8 & 11)

Advantages: These grants offer flexibility and a solid source of funding. It is the most

probable source for total project funding.

Disadvantages: There will be a tight review mechanism in place and regular reports required. Much of this can be done by the Principal Investigator. The application deadlines for 2015 are in 3 months. However, completing a sample digitisation study with the DRI and the Discovery Programme within the next six months could help in fine-tuning application proposals for 2016.

Requirements: A strong project proposal document is needed. This should be drawn up by the prospective academic collaborator.
Involve the National Contact Point at the IRC.
Register with the online research platforms to establish potential pan-EU collaborations.

European Research Council - encourages high quality research in Europe through competitive funding. The ERC emphasises the first pillar - 'Excellent Science' - of Horizon 2020. The total budget allocated to the ERC for the period 2014-2020 is € 13.1 billion. After 2016 the call budgets will gradually increase (European Research Council website, 2014; Kilkenny, 2014).

ERC funding is a respected source of monies. The most applicable grants for BPD within the ERC range between €1.5 and €3.5 million for an innovative approach to research (Table 5.4). The team leader must have a significant research profile and proven academic record. Any ERC fundee can employ, on average, 6 team members and aims to train a new generation of researchers. This is a platform with huge flexibility for the set-up and disciplines of the project team members.

Types of ERC research grants

| GRANT | AVAILABLE FUNDING | PROJECT TIMEFRAME |
|-------------------------|--------------------------|--|
| Starting Grants | €1,500,000 | Up to 5 Years |
| Consolidator Grants | €2,000,000 | Up to 5 Years |
| Advanced Grants | €2,500,000 - €3,500,000 | Up to 5 Years |
| Proof of Concept Grants | €150,000 | For ERC holder to proceed concepts marketable innovation |

The call for the Advanced Grant for 2014 closed on the 21st October. All calls for 2015 will open within the first half of the year. The different stages of grants stipulate different levels in a proven academic career. The benefits of this grant type necessitate collaborating with academia. Representative/s of such collaborations should be on any BPD board and share the implementation of the BPD project strategy.

Project Support: - Research

Advantages: This grant offers flexibility and a solid source of funding. It can take much of the BPD workload from the BPD board while achieving the project aims. The BPD board will be seen as a supporter of EU ‘excellent science’ values and an educator for the next generation of researchers.

Completing a proposal with the Discovery Programme within the next six months could help in fine-tuning application proposals.

Disadvantages: There will be a tight review mechanism in place and regular reports required. Much of this can be done by the Principal Investigator.

Requirements: A strong project proposal document is needed. This should be drawn up by the prospective academic collaborator.

Involve the National Contact Point at the IRC.

Register with the online research platforms to establish potential collaborations.

INTERREG Europe – this programme is currently being shaped and first calls for proposals will be open in Spring 2015. Its objective is to help European regions to design and implement regional policies and programmes more effectively. The programme aims to “*enable exchange of experience, knowledge and good practices among relevant stakeholders from different European regions, and strengthen research*” (INTERREG IVC website, 2014). Of INTERREG’s 4 themes, the most appropriate to the BPD project future is the Research & Innovation aspect. It will have a budget of €359 million for 2014-2020. Depending on technical innovations and pan-European research relationships, it could be of use to the BPD. This funding stream has a practical emphasis which could be tailored to the Cultural Resource project. Using this stream would necessitate European collaborations, not just for the Research project, but for the exchange of regional cultural resource learning.

Project Support:

- Research
- Cultural Resource

Advantages: These are constructive sources of funding with potentially large amounts to offer.

Disadvantages: The final agenda for INTERREG Europe (which is the successor to INTERREG) will not be launched until December 2014

Requirements: A strong project proposal document is needed. This should include and be shaped by an academic who will act as the Principal Investigator.

Other EU Sources:

Creative Europe – this combines the former 2007-2013 separate support mechanisms for the culture and audio-visual sectors (Culture & MEDIA Programme) in a one-stop-shop open to the cultural and creative industries. It has a particular strand of funding applicable to the BPD which supports cross-sectoral and cross-border cooperation between professional and institutional platforms and networks in the culture sector. It has a total budget of €1.46 billion (WelcomEurope, 2014).

Joint Heritage European Programming – their Heritage Plus grant this year has three topics to address – 1) Safeguarding tangible cultural heritage and its associated intangible expressions; 2) Sustainable strategies for protecting and managing cultural heritage, and 3) Use and re-use of

all kinds of cultural heritage. This is a programme that covers many of the future objectives for the BPD. However, the deadline for 2014 is the 22nd October. The 2015 call should be researched.

The Council of Europe Development Bank (CEB) – this provides loans and guarantees for the protection and rehabilitation of historical and cultural heritage. While Ireland is not in its target countries list, it can apply for amounts of up to 50% of the total costs (WelcomEurope, 2014). This may be an option to explore with the Department of the Arts, Heritage and the Gaeltacht with the assistance of other government departments, for match funding.

Project Support: Partial – Research

Partial – Cultural Resource

Advantages: These are constructive sources of funding with potentially large amounts to offer. A solution can be given to the Department of Arts, Heritage and the Gaeltacht by applying for match funding for the BPD project, rather than a full amount. Collaborations are not restricted to academia.

Disadvantages: Funding will need strong management for a successful application between the different sources of match funding.

Requirements: A strong project proposal document is needed.

‘Champion’ - to add weight to the BPD fund-raising, a champion should be sought. For example, someone of international stature but with a connection to the study region would bring with them excellent contacts and possible investment.

6 Road Map – Research and Cultural Resource Projects

| Priority | Type | Timeframe | |
|----------|---|----------------------|----------------------|
| 1 | Establish an official project management board with an appropriate title | Organisational | Short-term |
| 2 | Select board members based on appropriate skills and expertise in achieving project objectives | Organisational | Short-term |
| 3 | Draw up organisational guidance documents: <ul style="list-style-type: none"> - Terms of Reference to address board structure - 5 year Strategy Document - Financial Feasibility Study for Research and Cultural Resource Project - Access & Dissemination Plan - Annual objectives and implementation of goals review - Document to control financial responsibilities | Management | Short-term |
| | Initiate relationships with stakeholders such as regional assemblies, government departments, collaboration platforms such as Net4Society, National Trails Officer, Irish Pilgrim Paths, ERA, Irish Research Council, academia, OPW and other owners of sites involved in projects | Project Facilitation | Short to Medium-term |
| 4 | Draw up a sample study with the DRI to digitise existing research and documentation | Project Facilitation | Short-term |

| | | | |
|----|---|----------------------|--------------------|
| 5 | Identify ‘Timepath’ route | Project Facilitation | Short-term |
| 6 | Draw up a Funding Proposal for each project – research and cultural resource – using the sample DRI study as a visualisation tool for potential | Project Facilitation | Short-term |
| 7 | Employ a Fund Development officer to acquire dedicated funding streams | Project Facilitation | Short-term |
| 8 | Establish relationships with key collaborators, who will co-resource project tasks and staff | Project Facilitation | Short-term |
| 9 | Meet on an agreed basis to review the projects’ achievement and objectives | Management | Medium-term |
| 10 | Identify and meet all funding requirements | Management | Medium-term |
| 11 | Implement Strategy Plan | Management | Long-term |
| 12 | Disseminate information from Regional Cultural Projects at every stage targeting professional and public audiences | Management | Short to Long-term |

Timeframe for Key Priorities:

- **Short Term** –0 – 6 months (framed on 2015 deadlines for EU funding)
- **Medium Term** – 1 – 3 years
- **Long Term** – 3 – 10 years

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