Final excavation report of a brushwood trackway/ platform and the nearby discovery of Giant Irish Deer at Ballyoran Bog, Co. Cork

July 2006

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Licence No.: **04E1014 extension**

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Project details

Project N8 Rathcormac Fermoy Bypass
Site Name Ballyoran Bog
Site Type Brushwood platform/trackway and remains of 6 Giant Irish Deer
Licence No. 04E1014 extension
Licensee John Tierney

Townland Ballyoran
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1 Introduction

Eachtra Archaeological Projects were engaged to monitor works within previously untested or unresolved locations along the route of the new N8 Rathcormac/Fermoy Bypass, between June 2004 and February 2005. These works occurred both within and outside the extents of the CPO and were initially monitored under licence 04E0948. However, with the introduction of the National Monuments (Amendment) Act in the summer of 2004, the remaining archaeological investigations within the roadtake took place under Ministerial direction. In the course of monitoring internal works, three previously unknown archaeological sites were discovered. These sites comprised two burnt mounds in the townlands of Fermoy and Scartbarry, and a brushwood feature (possibly a trackway or platform) within a bog in Ballyoran townland. These sites were excavated subsequently. The partial skeletal remains of six Giant Irish Deer were also retrieved from Ballyoran Bog.

1.1 Site Location

This report details the results of the archaeological excavation of three sites and the retrieval of Giant Irish Deer skeletal remains from a further location along the mainline of the new N8 Rathcormac-Fermoy bypass. These investigations were undertaken by Eachtra Archaeological Projects. The sites concerned were discovered in the course of monitoring internal works within the CPO-take for the scheme, in the townlands of Fermoy, Ballyoran and Scartbarry.

The Rathcormac-Fermoy bypass is approximately 17.5 km in length. It will extend from the northern end of the new N8 Glanmire–Watergrasshill road, in the townland of Meenane, passing west of Rathcormac and east of Fermoy; towards its convergence with the existing N8 Cork-Dublin Road at Moorepark West to the north (see Figures 1-3).

The archaeological site resolved in Fermoy townland comprised a *fulacht fiadh* at National Grid Co-ordinates (NGC) 181441 096233. The site was located *c.*1.5 km south of Fermoy town, Co. Cork, within the southern perimeter of Fermoy townland and in the Barony of Condons and Clangibbon. The site occurred towards the base of the western face of a hill, in an area known as Fermoy Wood. It occurred at Chainage 12140 of the road scheme.

The remains of a brushwood platform or possible trackway were excavated in Ballyoran bog at NGC 181405 095852. Ballyoran townland is located within the parish of Castlelyons, in the barony of Barrymore. The platform or possible trackway occurred at Chainage 11750 of the roadtake, approximately 390 m south of the *fulacht fiadh* excavated in Fermoy Wood. The skeletal remains of Giant Irish Deer were also retrieved from unspecified locations within Ballyoran bog.

A *fulacht fiadh* was also discovered in the townland of Scartbarry, in Kilshanahan parish, to the north of the Scartbarry Road overbridge (S04) and northeast of Watergrasshill. The site was located at NGC 178310 087370, within the southern confines of Scartbarry forestry plantation at Chainage 2620 of the road scheme.

1.2 Scope of Project

This Archaeological Services Project was carried out on behalf of the PPP company, Direct Route (Fermoy) Ltd. It succeeds Phases 1 and 2 of the Archaeological Services Contract. The purpose of the project concerned was to monitor internal works within previously untested or archaeologically unresolved locations along the route of the new N8 Rathcormac/Fermoy bypass. These 'unresolved' areas included wetland terrain and woodland that could not be investigated under Phases 1 and 2 of the contract. Groundworks in advance of road construction were thus monitored at Scartbarry Wood and Fermoy Wood, where dense forestry precluded the Phase 1 investigations, and Ballyoran Bog, to the south of Fermoy Wood, where ground conditions had proved too unstable to allow test trenching. Archaeological features uncovered at these locations during the monitoring process were resolved. The sites at Fermoy Wood and Ballyoran were excavated under State licence 04E1014 and 04E1014 ext. respectively, while the site at Scartbarry was excavated under Ministerial Order A014/002, subsequent to the amendment to the National Monuments Act (July 2004).

Phase 1 of the Archaeological Services Contract involved the general archaeological testing of the route and the target testing of sites identified within the Environmental Impact Statement. The testing programme was carried out by ACS Ltd. under licences 02E0713-02E0720, issued by the Department of the Environment, Heritage and Local Government, between May and July 2002 and September and October 2002. Phase 2 of the Archaeological Services Contract comprised the excavation of 44 sites of archaeological potential, uncovered during the programme of testing. These sites were fully excavated in advance of construction between May and October 2003.

Eachtra Archaeological Projects were appointed by the PPP Company, Direct Route (Fermoy) Construction Ltd., to monitor internal works within the remaining 1.1 km of untested road take and to monitor external works associated with road construction. In the course of these works, three *fulachta fiadh* were discovered and excavated in the townlands of Fermoy (NGC 181441 096233), Fermoy Wood (NGC 181441 096233) and Scartbarry (NGC 178310 087370) respectively (Figure 2). The remains of a brushwood platform or possible trackway were excavated in Ballyoran bog (NGC 181405 095852). The skeletal remains of at least six Giant Irish Deer were also retrieved from unspecified locations within Ballyoran bog. A ring-ditch (NGC 179129 090559) was discovered and excavated in the townland of Ballybrowney and a prehistoric house site was excavated at Gortore (NGC 181815 101661).

1.3 Date & Duration of Works

The excavation of the brushwood trackway at Ballyoran Bog commenced on 18/08/2004 under licence 04E1014 extension and was completed on the 28/08/2004.

1.4 Size & Composition of Excavation Team

The archaeological excavation team consisted of the licence holder and one assistant.

2 Receiving Environment

The landscape between Watergrasshill and Moorepark, through which the new M8 will navigate, generally comprises gently rolling, open farmland, combined with wooded river valleys and Old Red Sandstone ridges. The new route will traverse a total of seven watercourses, the principal of which are the Rivers Bride and Blackwater. Brown podzolics, which are particularly suited to pasture and constitute the predominant soil type within Cork County, dominate the region concerned. The geology of the route broadly consists of glacial deposits with some alluvial sediments in the river valleys. Low-lying areas are occasionally peaty. The road scheme commences on the northern edge of the Watergrasshill Anticline, which comprises purple mudstone and some sandstone of the Ballytrasna Formation (a sub-type of Devonian Old Red Sandstone) (Sleeman and O'Connell 1995). From there it continues across the Bride River valley which is founded on Waulsortian limestone (GSI Sheet 22, Bedrock Geology 1:100,000 map). To the west of Rathcormac village, where the mainline traverses the higher ground of the Bride valley, the Waulsortian limestone is supplanted by the red and purple mudstones and pale red sandstones of the Ballytrasna Formation (ibid.). To the north, the Bride valley is flanked by an extension of the Nagles Mountains comprising a sandstone ridge. Having traversed this ridge, the mainline then descends into the limestone region of the Blackwater River valley before concluding its course in the Knockmealdown Sandstone formation of the Kilworth Mountains (ibid.). Predominantly sandstone-based Quaternary sediments, 'deposited from glacier ice or glacial meltwater flowing from the ice' (Sleeman and O'Connell 1995, 1) overlie the bedrock geology of the motorway route.

Ballyoran Bog is located at *c.* 60m OD in the valley of the Shanowennadrimina Stream. The Shanowennadrimina Stream (Seanabhann na Droiminne or old river of the white backed cow) is a tributary of the River Bride. The bog is a small fen bog which formed in a narrow pass in the foothills of the Nagles Mountains between Corrin 219m OD and the summit at Ballyoran 128m OD. The bog was reclaimed and is now under permanent pasture.

The northern extents of the new road scheme traverse the eastern side of the North Cork area, while the bulk of the route lies within East Cork. Volume 2 of the *Archaeological Inventory of County Cork* pertains to the East and South Cork regions (Power *et al.* 1994). This volume records a total of 2717 archaeological monuments within these divisions of the county. Over a quarter of the sites recorded in this volume date to the prehistoric period and the majority of these prehistoric sites constitute *fulachta fiadh*. Approximately 45% of the monuments recorded in Volume 2 comprise Early Medieval sites, with ringforts constituting the most common site type of this period. Only 14% of the recorded monuments date to the Medieval period. Volume 4 of the archaeological inventory series encompasses the North Cork region and records a total of 5496 monuments within the area (Power *et al.* 2000). Over 40% of the monuments recorded in this volume constitute prehistoric sites, of which 1626 comprise *fulachta fiadh*. A further 40% of the monuments in this area constitute Early Medieval sites such as ringforts, enclosures, souterrains and ecclesiastical centres. The Medieval period is represented by a mere 8.5% of the monuments recorded.

2.1 The Human Landscape

The earliest known human occupation of Ireland dates to the Mesolithic period (*c.* 7000-4000 BC). There is no known evidence for Mesolithic activity within the area affected by the roadtake. However, the Blackwater Valley has yielded some confirmation of Mesolithic activity along its banks, in the form of flint scatters at Castleblagh and Kilcummer Lower (Power *et al.* 2000, 2). These sites are located between 10 km and 12 km from the new motorway mainline.

There is greater evidence for later prehistoric activity within the environs of the roadtake however (see Figure 3). A number of *fulachta fiadh*, which have been listed in the Record of Monuments and Places, occur within close proximity of the bypass. *Fulachta fiadh* have been interpreted as ancient cooking places, usually surviving as 'small horseshoe-shaped mounds of charcoal-enriched soil packed with fragments of heat-shattered stones' (Power *et al.* 1994, 24). Where these features have been truncated through ploughing, they appear as black spreads. They are generally situated close to a water source (ibid.) such as streams or marshy terrain. They comprise a water-filled trough or rectangular pit, lined with either timber planks or stone (ibid.) in which food was cooked. Water in the trough was heated by 'rolling hot stones into it from a fire close by' (ibid.). Once immersed in boiling water, experiments have shown that meat wrapped in straw 'cooked at a rate of twenty minutes per pound weight' (ibid.). The heat-shattered stones were removed from the trough after cooking and deposited to the side. After many cooking episodes, these stones formed a mound surrounding three sides of the trough. There are over 300 of these monuments in the east and south Cork region, recorded in the *Archaeological Inventory of County Cork Vol II* (Power *et al.* 1994). Three of these monuments occur within the townland of Skahanagh North (CO053-091). Further clusters of these monuments occur in Ballinaltig (CO053-067, 068), Coolcarron (CO035-075, 077), and to the southeast of Corrin Hill (CO035-050, 058, 068, 070). Another example of has been recorded at Ballynoe (CO035-081). In Ballyoran, a *fulacht fiadh* listed as CO035-057, occurs approximately 60 m from the centreline of the route. It is described in the *Archaeological Inventory of County Cork* (Volume 2) as being a truncated mound of burnt material measuring 20 m x 16 m x 0.3 m deep (Power *et al.* 1994, 28). During the centreline test excavations of the road corridor, further *fulachta fiadh* were encountered and subsequently resolved by ACS Ltd. These included 'Corrin 4', excavated under licence 03E1463, and two burnt mounds at 'Corrin 6', excavated under licence number 03E1636 (NRA Archaeological Discoveries).

The remains of a ring-barrow were also discovered during the advanced archaeological testing of the route corridor at Skahanagh North, to the northeast of Watergrasshill (NRA Archaeological Discoveries). These prehistoric monuments comprise a low, 'usually circular mound or level area, enclosed by a fosse and external bank' (Power *et al.* 1994, 55). Burial deposits, often in the form of a cremation and 'sometimes enclosed in a stone box or cist' have been uncovered within these features during excavation (ibid.). These burial forms have been assigned to the Neolithic, Bronze and Iron Ages (ibid.).

Corrin Hill is a prominent vista within the landscape surrounding the roadtake. A Bronze-Age burial

cairn dominates the summit of the hill, which when investigated in the 1830s, was found to contain two burials (Doody 1999, 103). A further addition to the apex of this hill is a hillfort known as 'Carn Tigherna' or 'Carntierna'. Hillforts date from the Late Bronze Age into the Iron Age (500 BC – 500 AD). The monument concerned is one of just three sites in North Cork which conforms to Raftery's definition of a 'hillfort' (Power *et al.* 2000, 205). The fort has been disturbed on its eastern side, but formerly stood to a height of 19 feet in 1886 (Power quoting Ó Murchú, ibid., 178). A Discovery Programme survey carried out in 1995, revealed additional features such as complex external earthworks and entrances which were previously unrecorded (www.discoveryprogramme.ie). The *Claidh Dubh*, a linear earthwork measuring 22.5 km in length (Power *et al.* 2000, 203), occurs to the west of the fort, stretching from the Nagles Mountains to the Ballyhoura Hills, crossing the Blackwater approximately 11 km to the west of Fermoy. Such earthworks are believed to have defended tribal boundaries (ibid.). Doody's investigations of the *Claidh Dubh* have shown that it dates prior to 100 AD (www.excavations.ie). The contemporaneity and proximity of the hillfort at Corrin to the *Claidh Dubh* could suggest that this area was a centre of regional or provincial power in the Iron Age. During centreline test excavations carried out by ACS Ltd., a probable Bronze Age settlement complex was discovered and subsequently excavated by Eamonn Cotter under licence 03E1058. This site, located in the townland of Ballybrowney Lower, predominantly comprised four enclosures and four houses (NRA Archaeological Discoveries). Centreline testing also revealed the remains of a possible Iron Age enclosure between Chainages 11180-11130 of the roadtake. This was later excavated by Aidan O'Connell under licence 04E0912.

Prior to the Anglo-Norman invasion of the region, East Cork was dominated by the Uí Líatháin tribe. The Uí Líatháin territory spanned an area extending south from the Corrin and Castlelyons region towards Cork Harbour and east towards Lismore and Youghal. It was divided amongst the descendants of the six sons of Eocho Líatháin (Ó Buachalla 1939, 28). However, by the 11th century, the power of the Uí Líatháin had been weakened through internal conflict and clashes with neighbouring clans (ibid. 29). Against this backdrop of power and conflict, one of the most widespread archaeological monuments in the country emerged, namely the ringfort. The ringfort is described as a 'circular or roughly circular area', spanning 25-50 m in diameter and 'enclosed by an earthen bank' (Power *et al.* 1994, 77). The archaeological excavation of these sites has indicated that they served as defended farmsteads in the Early Medieval period (ibid.). Their earthworks protected against 'natural predators like wolves as well as the local warfare and cattle raiding common at the time' (ibid.). They are generally located on gentle hillslopes with commanding views of the surrounding landscape. Few of these monuments are apparent towards the northern end of the road scheme, however, concentrations of these structures occur on higher ground, for example, within the Bride Valley. Recorded sites occur at Skahanagh North, Skahanagh South and at Scartbarry, as well as at Mondaniel and Corrin. Some of these sites have been levelled and are only apparent through cartographic analysis or in aerial photographs.

3 Research Framework

The following issues will be addressed in this excavation report:

- The date of initial site occupation/abandonment.
- The absolute/relative chronology of site use in terms of phases and events.
- The extent of the archaeological site.
- The location of known contemporary sites.
- The extent of the viable economic catchment area in terms of sources of water, food, raw materials, transportation routes etc.

4 Excavation Results

4.1 Methodology

The area of the excavation measured 8m (N-S) by 4m (E-W) (Figure 4). A grid was established in the area of excavation and the ground within it was cleaned by hand to locate and identify all archaeological features. Each identified feature was excavated, planned, photographed and recorded, with every fill and cut assigned a context number. Charcoal and soil samples were taken from appropriate fills where necessary. All artefacts were retrieved, registered, bagged and labelled.

4.2 Stratigraphic Report

4.2.1 Introduction

The site was made up of two separate elements, the find site for the Giant Irish Deer skeletal remains and a potential platform/trackway that was discovered by the monitoring archaeologist when investigating the discovery of the Giant Irish Deer remains. Giant Irish Deer are extinct but are known to have inhabited Ireland during two separate periods in the Pleistocene, with examples from lake deposits beneath peat bogs frequently dating to the period between 11,750 BP and 10,950 BP (Woodman *et al* 1997). The Ballyoran Bog examples were found in the typical location of lacustrine sediments beneath peat and they therefore pre-date the beginnings of bog formation, and hence the construction of the trackway/platform.

4.2.2 The Brushwood Structure (trackway/platform)

While investigating the discovery of the Giant Irish Deer remains at Ballyoran, the monitoring archaeologist encountered the remains of a truncated brushwood structure in a recently exposed section-face within the bog. It was interpreted as a possible trackway or platform. The feature occurred at Chainage 11750 of the roadtake, 1.5 m below the bog surface and directly above the grey clay underlying the peat (Figure 4). The exposure consisted of the ends of brushwood rods and roundwoods, which were cut through by the machines. It appeared from examination of the surrounding spoil that this possible trackway had been truncated in the days immediately preceding the site visit. The peat (Layer 1) overlying the remainder of the feature was removed revealing fragmentary brushwoods spanning an area approximately 7 m north-northeast by south-southwest by 2.2 m. The remainder of this timber structure was fully excavated.

The trackway comprised three predominant layers: 2, 3 and 4. These layers are described individually below.

4.2.2.1 Layer 2

Layer 2 was the uppermost layer and it consisted of a deposit of crushed and disintegrated brushwood with occasional, loosely organized hazel rods occurring along its southern extents (Figure 5, plate 1 and 2). The main timbers sampled here were identified as Alder (*Alnus glutinosa*). This layer measured 0.05 m in average depth. It was defined to the south by a curvilinear alignment of brushwoods.

4.2.2.2 Layer 3

Layer 3 was underlying the brushwood deposit (Layer 2) and it contained more discernible timbers than Layer 2 (Figure 6, plate 3). The southern half of this layer comprised irregular brushwood, branches and thicker roundwood stems placed in a loosely organized manner and spanning a sub-rectangular area measuring 3 m north-south by 2 m east-west. The southern and southeastern extents of this layer, as with Layer 2, were defined by a single alignment of roundwoods and some brushwoods, averaging 0.05 m in diameter. All of the timbers were identified as Willow/Poplar (*Salix*/*Populus*). The western extents of Layer 3, as with Layer 2, were truncated by machine. Rods and brushwoods were encountered along the western extents of this layer. These were aligned definitely in an east-northeast/west-southwest orientation, with their southwestern ends truncated by the machine. It can be postulated that these timbers were part of a structure which occurred to the west of the baulk and was destroyed by machine.

4.2.2.3 Layer 4

On removal of Layer 3, a third layer of timbers was exposed immediately beneath (Plate 4). Layer 4 comprised a loosely organized, northwest-southeast orientated concentration of decayed branches, averaging 0.6 m in diameter, and a fragmented plank, which would originally have measured over 1.2 m in length and over 0.2 m in width. The sampled timbers were identified as both Alder and Willow/Poplar. This layer directly overlay greenish-yellow clay, and measured 2.6 m northwest-southeast by 1.2 m.

4.2.2.4 Cultural Material

Four pieces of animal bone were retrieved from this structure during excavation, of which two pieces have been identified as fragments of Giant Irish Deer antler (Margaret McCarthy pers. comm.). One of these antler fragments (Find no. 04E1014ext:4:1) displays a worked edge (ibid.) (Plates 5 & 6). Although the Giant Irish Deer were extinct before the first human habitation of the area, the fragments of antler retrieved from the brushwood platform illustrates that the inhabitants of this landscape had encountered Giant Irish Deer remains and used the skeletal remains as a raw material, perhaps for decoration or for tools. These were the only pieces of cultural material found in association with the timber structure.

4.2.3 Giant Irish Deer

Two tracked machines, consecutively utilising a 3 m wide and a 2 m wide grading bucket, were involved in the removal of peat and clay from Ballyoran bog prior to the laying of road foundations. It was from the clay sediments, at approximately 1 m to 1.5 m below the peat stratum (Garry Doyle, Senior Roadbridge Engineer pers. comm.), that a number of Giant Irish Deer (*Megaloceros giganteus*) skulls, large antlers, antler fragments and various long-bones were retrieved. They were recovered by construction workers from two principal locations within the bog prior to archaeological monitoring. However, no skeletal remains were recorded *in situ* during monitoring of the remaining works within the bog.

The Giant Irish Deer skeletal remains are representative of a minimum number of six individuals, all adult males (McCarthy 2006). The remains included two complete skulls, one almost complete skull, significant portions of a fourth skull and three almost complete antlers (Plates 7-13). Four post-cranial bones were recovered, probably representing only a small portion of the body parts that were originally dug up from the clay sediments as it is likely that many smaller bones were destroyed and discarded during spoil removal.

4.3 Radiocarbon dates.

Radiocarbon dates were returned from the Radiocarbon Laboratory at Queens University Belfast. The two dates returned were accelerator dates obtained from samples of wood and antler.

Table 1

Lab. Code	Sample Material	Context No.	Yrs BP	Calibrated Dates 2 sigma
UB-6777	Antler	5	11124 +- 61	cal BC 11139-10962
UB-6780	Wood	3	8958 +- 53	cal BC 8280-7965
UB-6970	Wood	2	4277 +- 39	cal BC 3012-2761

5 Discussion, Interpretation and Archaeological Significance

Peatlands cover 16.2% of the island of Ireland including three main types of bogs; blanket bogs, raised bog and fen bogs. Peat is an organic deposit made up of layers of dead plants that accumulated in waterlogged parts of the landscape and in order for an area to be classified as a peatland the depth of organic soil material must be at least 0.45m on un-drained lands and 0.3m on drained land. Layers of woody fen peat were evident in the soil profiles from Ballyoran Bog, demonstrating that it is a fen bog, a type that typically occurs in flat river flood plains and poorly drained hollows. The peat from these bogs was formed in waters that were mineral-rich and it is generally fibrous in nature. The platform/trackway at Ballyoran Bog was laid down in the context of growing fen peat, and the practice of constructing wooden pathways across peatlands While wetland sites, including platforms and toghers or trackways, have been excavated on a relatively frequent basis in the Irish midlands, the occurrence of such features is a rarity on a local and regional level for County Cork because large expanses of peatland are unusual.

The skeletal remains from the Giant Irish Deer at Ballyoran Bog were recovered from a typical find location, in lacustrine deposits beneath peatlands. There is a concentration of Giant Irish Deer find spots in the Limerick region and the recovery of skeletal remains from Ballyoran Bog extends this distribution pattern slightly. The recovery of several skeletons in one location is relatively common; the most famous find-spot is Ballybetagh Bog in Co. Dublin where over one hundred individuals have been found. The distribution map of finds of Giant Irish Deer indicates a range associated with fertile soils (Mitchell and Ryan 1997) and it is suggested that access to suitable grazing was crucial to the survival of the deer populations. Current theories concerning their extinction suggests that circa 11,000 BP there was a Stadial, a period of even colder weather during the Ice Age, when climatic changes and its consequent effect on vegetation depleted the deer's food resources. For the males in particular, this meant that the energy required to sustain large bodies and grow enormous antlers each year (some examples have spanned a width up to 4m and weighed over 35kg) was increasingly difficult to attain. Eventually deaths outnumbered births and the populations dwindled and died out. The Giant Irish Deer from Ballyoran Bog were found in clays below the peat and all dated examples of Giant Irish Deer from similar find-spots have returned radiocarbon dates indicate that populations lived in Ireland in the period between 11,750 BP and 10,950 BP (Woodman *et al.* 1997). The radiocarbon dating of Giant Irish Deer antler from Ballyoran Bog returned a date of cal BC 11139-10962 (UB-6777). This predates the earliest evidence for human occupation of the Irish landscape (Mesolithic, *c.*7500-4500 BC).

The discovery of the Giant Irish Deer remains within the environs of the site is significant on both a regional and national level as the current level of knowledge of these animals is somewhat limited. The majority of the remains of Ireland's mammalian faunas were discovered during cave excavations of the late 19th and early 20th centuries and some of these samples have been dated back to 30,000 years ago, with an example in Castlepook Cave in Cork dating to 32,060+/-630 BP (Woodman *et al.* 1997, 129-135). However, Giant Irish Deer from lake clays usually date to between 10,000 and 11,000 years

ago. Finds are overwhelmingly biased towards recovery of male skeletal remains, partly because the females did not have the enormous antlers and therefore are less likely to be noticed during accidental recovery. Researchers suggest that the reason so many male skeletons have been found is because, like modern deer populations, male and females generally lived in separate groups only coming together for the autumn rut. During this period, males of modern populations rarely eat and so they start the winter undernourished. Giant Irish Deer probably used the mineral rich grasses around lakes in order to replenish their energy at this period; in unsuccessful cases the animals evidently perished and, because they died in waterlogged areas, their remains survived several millennia.

The timber remains from Ballyoran Bog are possibly the remains from two different structures; a potential platform (a sub-rectangular surface) and an alignment of timbers along the western extents of Layer 3 that may have been a trackway. However, because of the truncation of the latter feature it is difficult to ascertain its purpose or destination. The platform timbers, though relatively disorganised in configuration, were deposited with some care and they must have overlain a particularly wet area of marshy terrain in order to facilitate passage. The timbers of Layer 4 probably served as a foundation for them, while the brushwoods above (in Layer 2) may represent repair to the original structure. Moreover, this sub-rectangular structure may have served as a rough walking or working surface for the builders involved in the construction of the potential trackway. With wetland areas serving as a habitat for a range of wildlife, the structure represented by these timbers may have also served as a hunting platform.

The identification of the wood samples from the platform/trackway suggested that alder and willow/poplar timbers were the main wood types in use (Johnston 2006). These trees generally grow in damp places and can tolerate intermittent waterlogging. It is therefore likely that the wood from this structure was sourced on the bog or near its edge before felling and it was perhaps not specially selected but was used when necessary. A radiocarbon date of cal BC 8280-7965 (UB-6780) was returned from Layer 3. The date is problematic because it predates all known human activity in the area. It is possible that old wood, preserved in the bog, was used in the construction of the trackway, and this is why the date returned was so early. A second piece of timber, from Layer 2, was sent for radiocarbon dating in the hope of clarifying the actual date of use at the site. A Late Neolithic radiocarbon date of cal BC 3012-2761 (UB-6970) was returned. This is also an extremely early date for construction of a trackway within peatlands and begs the question of whether the site was naturally formed. However, the chop mark on the Giant Irish Deer antler fragment retrieved from the site is a positive indication of human activity.

The archaeological potential of this site is moderate owing to its truncation prior to archaeological investigation. Despite the paucity of artefacts retrieved from the bog, analysis of the environmental samples recovered has provided an indication of the associated landscape. The worked Giant Irish Deer antler fragment (04E1014ext:4:1), recovered from the basal layer of the potential platform, together with the recovery of partial Giant Irish Deer skeletal remains from within the environs of the site, has

shown that later inhabitants of the area were aware that there were deer remains in the bog, and that these were exploited for decorative or utilitarian purposes.

6 Conclusion

Eachtra Archaeological Projects were engaged to monitor works within previously untested or unresolved locations along the route of the new N8 Rathcormac/Fermoy Bypass, between June 2004 and February 2005. Three previously unknown archaeological sites were discovered in the course of monitoring internal works. One such site was at Ballyoran Bog, where remains of Giant Irish Deer and a possible brushwood trackway were excavated. The skeletal remains of the Giant Irish Deer are a rare occurrence on archaeological sites, but one of the most interesting aspects of the excavation was the discovery that later inhabitants of the area were aware that deer remains were present in the bog, as tool marks on antler fragments demonstrate. Excavation and post-excavation analysis of the brushwood platform/trackway has revealed that the occupiers of this site exploited the immediate environs of the bog for construction materials. The discovery of the possible trackway is significant, given that the majority of those sites recorded in Ireland are located in the Midlands. In conclusion, the site at Ballyoran bog is important on a provincial, as well as a national scale.

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8 Figures

Figure 1: Portion of discovery map showing route of N8 Rathcormac Fermoy.

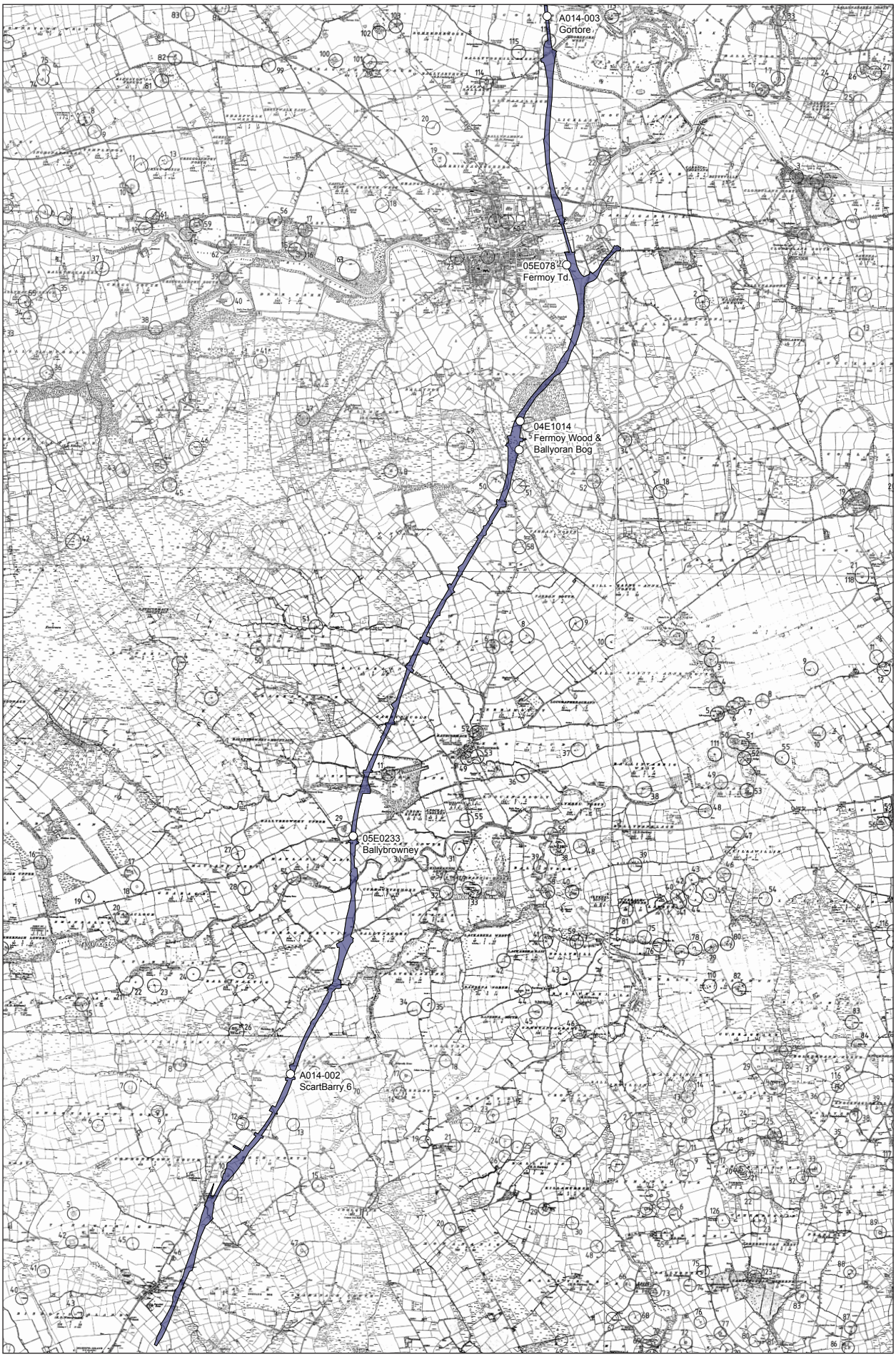

Figure 2: Portion of RMP sheets CO027, 028, 035, 036, 044, 045, 053 and 054 showing route of the N8 Rathcormac Fermoy.

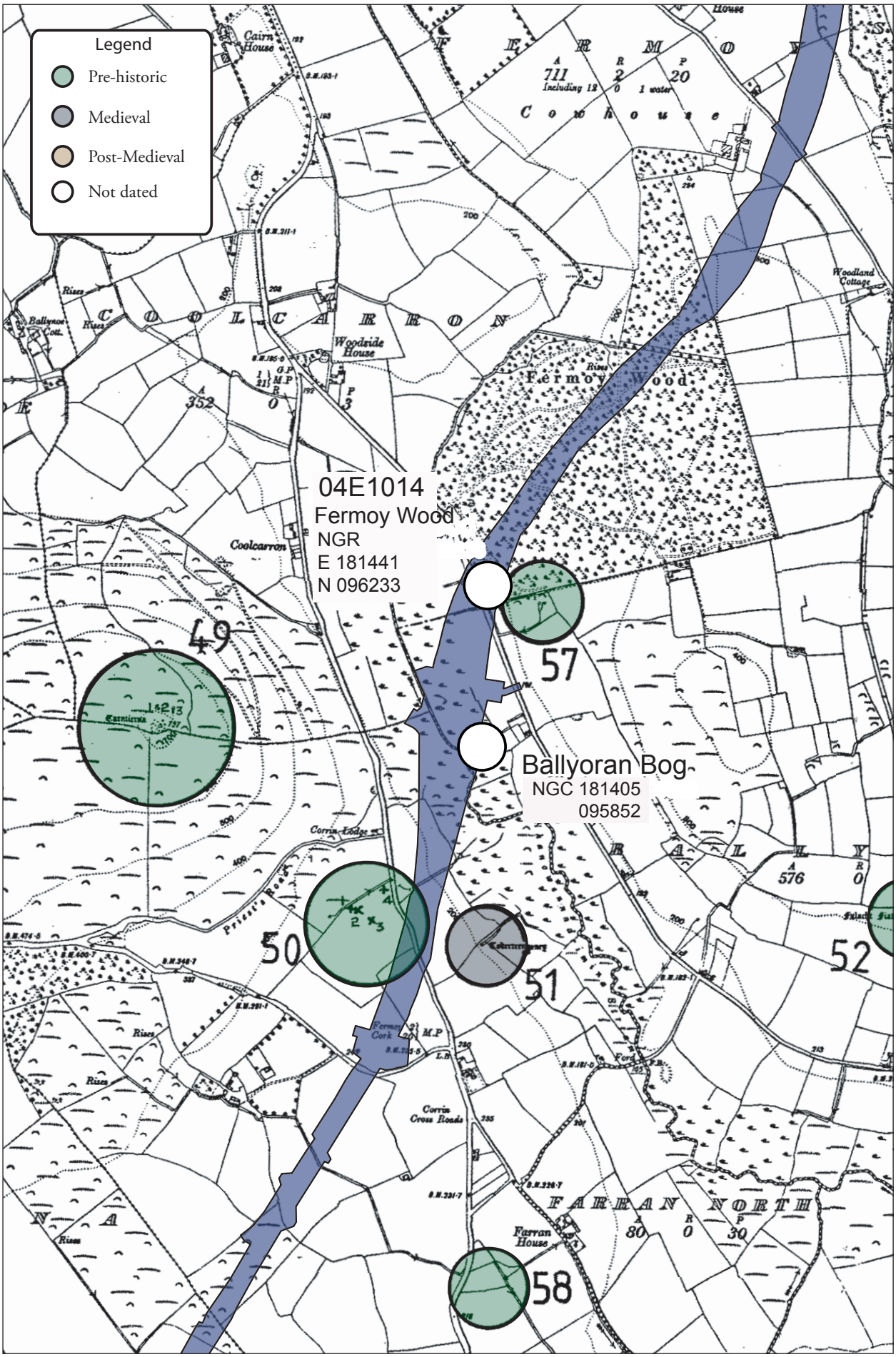

Figure 3: Portion of RMP sheet CO035 showing location of Ballyoran Bog excavation.

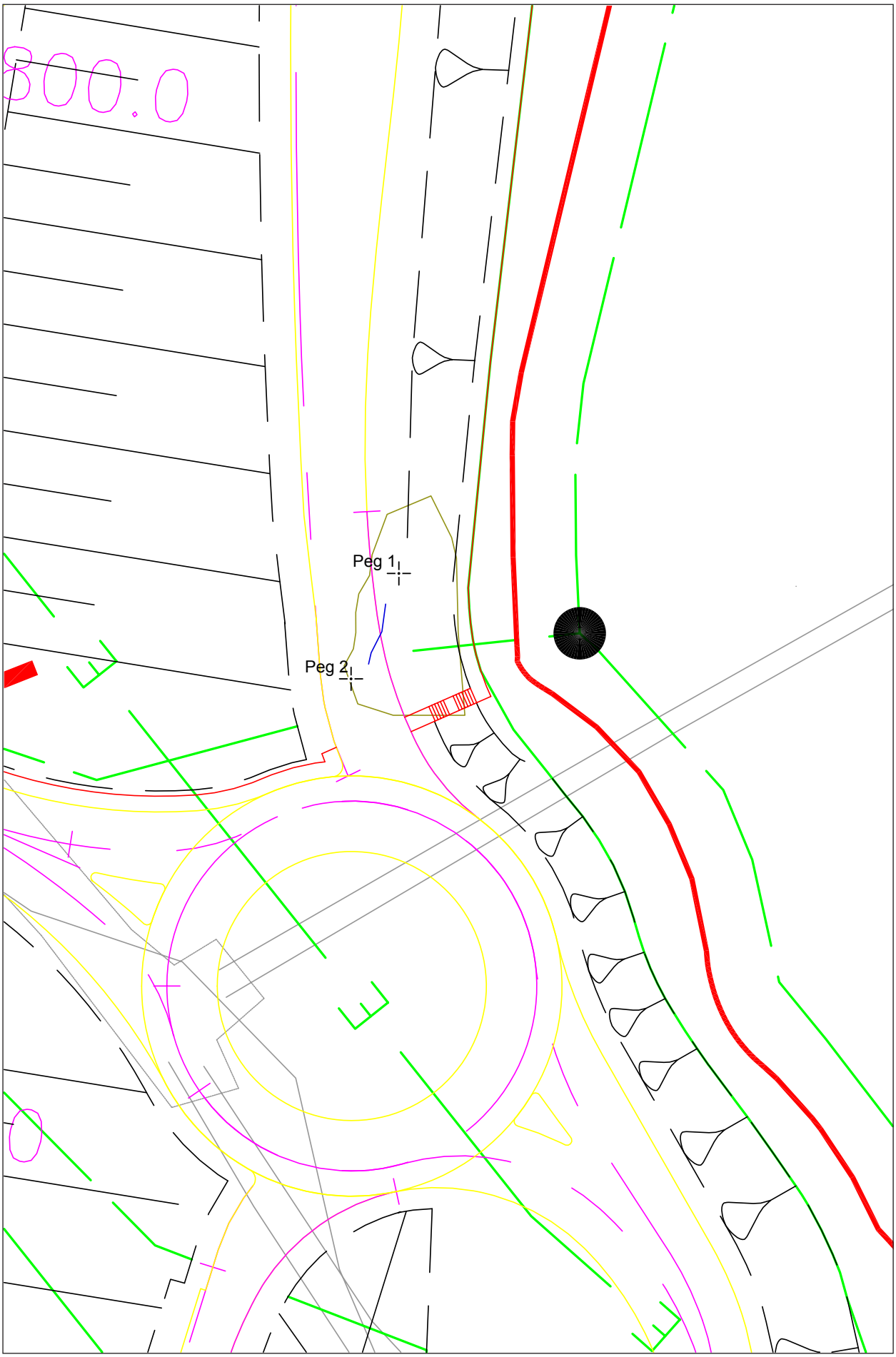

Figure 4: Portion of route of N8 Rathcormac Fermoy showing location of Ballyoran Bog excavation.

Figure 5: Plan of brushwood layer 2 on trackway.

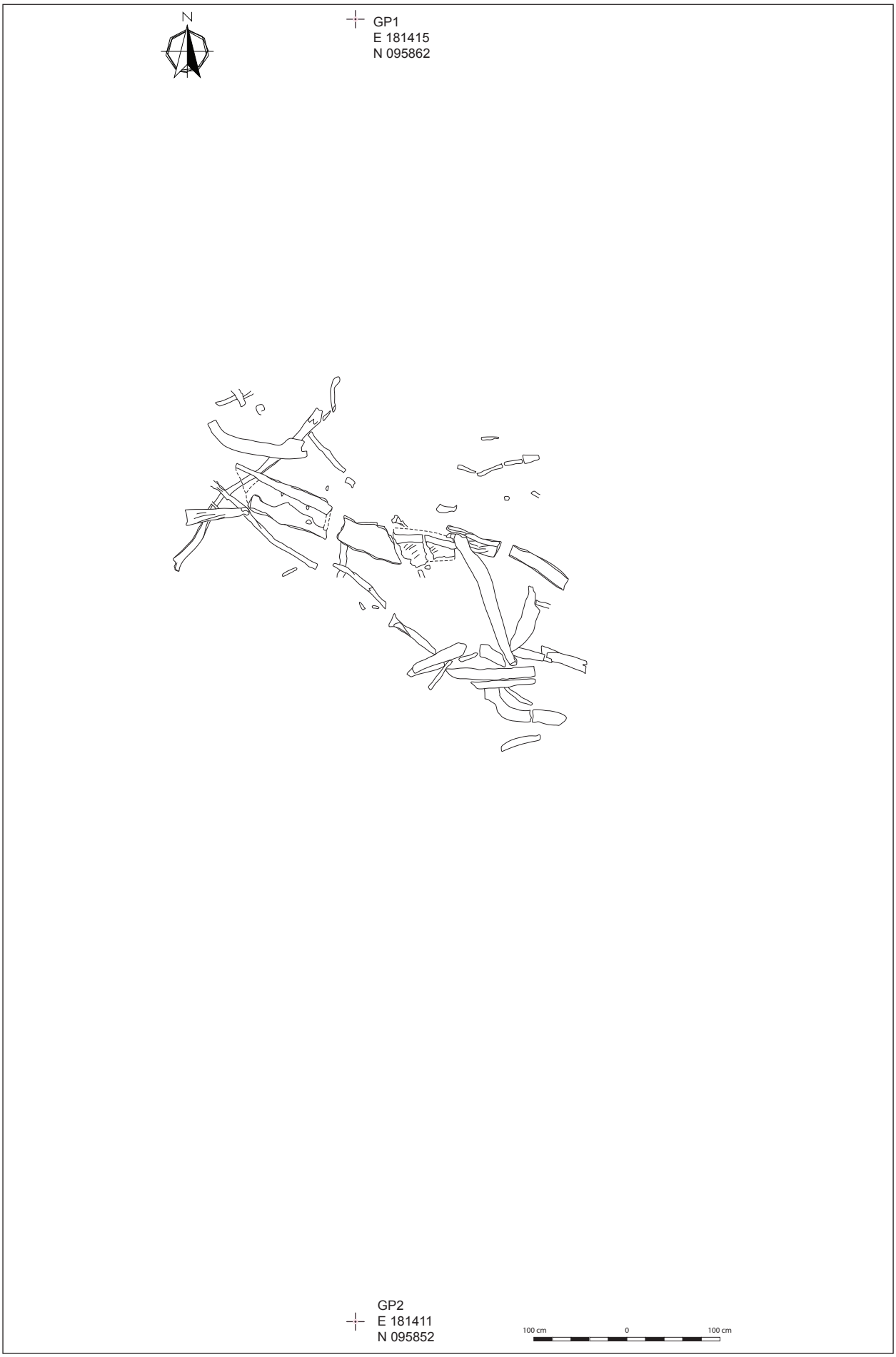

Figure 6: Plan of brushwood layer 3 on trackway.

9 Plates

Plate 1: Layer 2 with brushwood of trackway.

Plate 2: Layer 2 of trackway from SSE.

Plate 3: Layer 3 of trackway from SE.

Plate 4: Layer 4 of trackway from NNE.

Plate 5: Fragment of worked antler 04E1014ext:4:1

Plate 6: Worked edge of fragment of antler 04E1014ext:4:1

Plate 7: View of Giant Irish Deer

Plate 8: Specimen 1 Complete skull

Plate 9: Specimen 2 Complete skull and lower portion of right antler and base of left antler

Plate 10: Specimen 3 Parietal and frontal portion of skull

Plate 11: Specimen 4 Almost complete skull with portion of right antler

Plate 12: Specimen 6 Almost complete left antler

Plate 13: Specimen 7 Almost complete right antler

10 Appendices

10.1 Appendix 1: Stratigraphic Register

Layer No.	Description	Plan No.	Sample No.
1	Peat stratum overlying Layer 2 to a depth of 1.5 m		
2	Disintegrated brushwoods with occasional roundwoods, loosely organised hazel rods, hazel nuts, overlying Layer 2	1	1-8, 16
3	Loosely organised brushwoods, more substantial roundwoods & hazel stems, hazel nuts, underlying Layer 1 & directly overlying Layer 3	2	9-14
4	Concentration of decayed branches & one plank directly below Layer 2 & overlying the clay natural (Layer 5). Basal layer of track-way/platform where worked antler was found (04E1014ext:4:1)	3	15, 17-19
5	Clay/lake sediments underlying peat & upon which Layer 4 was laid-down		

10.2 Appendix 2: Animal Bone Report

By Margaret McCarthy

INTRODUCTION

A relatively large collection of Giant Irish Deer, *Megaloceros giganteus*, remains was recovered from apparent Late Glacial sediments in Ballyoran Bog near Fermoy in 2005. The bones were uncovered by tracked machines involved in the removal of peat and clay from the bog during road construction on the bypass for the town. The remains were encountered in two principal locations at approximately 1m to 1.5m below the peat stratum.

THE REMAINS

The collection represents the remains of at least six adult males consisting mostly of skulls with attached antler and large antler fragments that became detached from the skulls during machine excavation of the deposits. There are also a number of post-cranial bones and it is likely that many more of these carcass parts were discarded with the spoil during excavation. The recovery of these few post-cranial elements suggests that complete carcasses became embedded in the lakeshore deposits during the Late Glacial period prior to the accumulation of the peat layers. The basal rose of the antler was completely developed on the six skulls, indicating fully grown antlers. These are present only in the autumn and winter and some years into later spring, in most living cervids, including the fallow deer, *Dama dama*, to which *Megaloceros giganteus* is considered taxonomically closest.

The collection has been divided into three groups and is described below under these headings.

1. Complete and almost complete skulls with attached antler.
2. Large antler beams with some surviving tines
3. Post-cranial elements

Complete skulls

Specimen 1

Complete skull. Left rose and 40cm of base of beam surviving with brow tine also present. Remainder of left antler and all of right antler damaged by machine. Two complete sets of cheek teeth displaying a moderate degree of wear represent an adult individual.

Circumference of antler at base - 29cm

Molar row length - 18cm

Skull length - 55cm

Specimen 2

Complete skull. Lower portion of right antler (length 92cm) and first and second tines surviving. Base of left antler with brow tine also present. Complete rows of maxillary teeth displaying moderate degrees of wear represent an adult individual.

Circumference of antler at base - 26cm

Molar row length - 16cm
Skull length - 51cm

Specimen 3
Parietal and frontal portion of skull. No maxillary teeth. Almost complete right antler (length 1.09m) and most of the base of the left antler (length 52cm). Brow and first tine of left antler present.
Circumference of antler at base - 29cm

Specimen 4
Almost complete skull with most of right antler surviving and base of left beam with brow tine. Brow tine of right antler damaged during excavation, first tine surviving and remaining tines absent. Large left antler fragment conjoined with left pedicle.
Circumference of antler at base - 24cm

Antlers
Three almost complete antlers one of which has a small portion of the skull surviving.

Specimen 5
Left antler with very small portion of cranium attached.
Total length - 1.1m
Circumference of antler at base - 26cm

Specimen 6
Almost complete left antler with first, second, third, fourth and fifth tines. Second and third tines damaged during machine excavation.
Total length - 1.48m

Specimen 7
Almost complete right antler probably from same individual as Specimen 6. First, second, third, fourth and fifth tines all present.

Post-cranial
Just four post-cranial bones were retrieved but it is likely that the *in situ* carcasses were displaced and most of the bones discarded during the removal of the deposits by a tracked machine. The recovered sample consists of a complete right and left femur from an adult individual. There is also a right humerus and a left astragalus probably from the same individual.
Measurements (after von den Driesch 1976)
Total length (GL) of right femur - 46.5cm
Total length (GL) of left femur - 46.4cm

Total length (GL) of humerus - 39.4cm
Greatest length of lateral half (GLl), Astragalus - 7.8cm
Greatest length of medial half (GLm), Astragalus – 8.5cm

DISCUSSION

The Giant Irish Deer, so called because its well-preserved remains are often found in lacustrine sediments under peat bogs in Ireland, first appeared about 450,000 years ago in Europe and Central Asia. Its common description as the 'Irish Elk' is misleading for it is neither exclusively Irish nor an elk but an extinct species of deer. It is generally agreed that the species originated in Siberia and gradually migrated westwards towards Europe in search of a warmer climate. Besides flourishing in Ireland, the species is also known to have ranged through England, Scotland, Denmark, Sweden, France, Germany, Austria, Hungary, Russia, North Africa and northern Asia between 450,000-10,000BP. The abundance of Giant Deer in Ireland is due to the fact that most remains are found buried in lacustrine deposits beneath the peat bogs which in the past led to their discovery during the collection of turf for fuel. In recent years, they are frequently found during work on major infrastructural projects such as the Fermoy Bypass. The lake clays beneath the peat from which most giant deer bones are recovered are between 12,100 and 10,900 years old and belong to a period of time known as the Woodgrange Interstadial. This was a relatively warm period towards the end of the Ice Age. Giant deer remains have also been found in caves, along with bones of reindeer, woolly mammoth, hyena and other members of the Ice Age fauna. The Irish Quaternary Fauna Project has shown that *Megaloceros giganteus* inhabited Ireland from 37,000 to 32,000 years ago and again from 11,750 to 10,950 years ago (Woodman *et al* 1997). Giant deer from lake deposits beneath peat bogs date mostly in the range 11,700-10,900BP but those from caves go back to some 32,000BP (ibid.). In England, various sites in Norfolk take the record of *Megaloceros* back to 450,000BP (Lister 1994).

The Giant Deer has been known from remains found in Irish bogs since the 16th century (Barnosky 1985). Findings of a skull with enormous antlers were first recorded in print in 1596 when a specimen was transported to Hatfield House in England. The first scientific description of Giant Deer was by Thomas Molyneux in 1697 and the species was assigned its own scientific name by Blumenbach in 1813 (ibid.). The records of Quaternary Irish Mammals in the Natural History Museum in Dublin indicate over 400 countrywide locations where Giant Deer remains have been found (Monaghan 1995). A particularly large collection of over 100 individuals from Ballybetagh Bog in Co. Dublin are frequently referred, but numerous finds have also been made at other sites. Adams (1876) refers to 15 skulls being recovered from a bog at Whitechurch, Co. Waterford and there is a record of numerous skulls being found in Lough Gur, Co. Limerick. While this might initially seem to reflect the tendency for giant deer to be trapped in the Woodgrange Interstadial clay deposits at the base of Irish bogs, the fact that similar dates were obtained from caves at Kilgreany, Killuragh, Edenvale and Ballynamintra as part of the Irish Quaternary Fauna Project strongly suggests that these animals flourished in Ireland for one portion of the Lateglacial period (Woodman *et al* 1997).

The most striking feature of *Megaloceros giganteus* is its enormous antlers that spanned up to 4m in width and weighed in excess of 35kg (Barnosky 1986). Prime individuals stood at almost 2m high at the shoulder and the males were characterised by large bodies with the correspondingly massive antlers presumably functioning for social display. The size of the antlers varied considerably between different individuals but all had flattened palmate areas and rounded pointed 'tines' projecting from the upper edge of the palm area. The Giant Deer shares DNA with the fallow deer, *Dama dama,* which also has the same flattened antlers for which the giant deer is renowned (Lister *et al* 2005).

The suggestion that many giant deer males died through miring in lake muds or getting entangled in woodland areas is not generally accepted now. Barnosky (1985) studied the late Pleistocene vegetational history of Ireland and developed the current model that climate fluctuation and vegetation changes at the end of the Woodgrange Interstadial led to the eventual demise of the Giant Deer. He contends that, as with living deer populations, the males and females would have lived separately for most of the year, congregating only for the autumn rut. The male deer would subsequently have entered the winter undernourished and physically drained. The onset of the Nahanagan Stadial at around 11,000BP led to the collapse of the long spring season of growth of grasses and other plants which had allowed the deer to build up their body reserves for the rest of the year (Barnosky 1986). Palynological data support the idea that extinction probably resulted when nutrient rich plants that were common during the preceding Woodgrange Interstadial all but disappear from the pollen records for the Nahanagan Stadial. For the male deer in particular, this meant that the energy required to sustain large bodies and grow enormous antlers was increasingly difficult to maintain, until deaths eventually outnumbered births (Barnosky 1986). The overrepresentation of young adults in the Ballybetagh Bog samples indicates death by malnutrition during winter immediately prior to the accepted extinction event at the end of the Woodgrange Interstadial. These observations support Mitchell's (1976) earlier suggestion that a deteriorating climate led to the extinction of 'Irish elk' from Ireland. Gould's (1974) alternative extinction mechanism, which postulates that the development of woodland prevented large-antlered animals from roaming freely is less convincing as the pollen records suggest that tree cover actually decreased at the time the Giant Deer population was depleting. The temperate conditions that prevailed during the Woodgrange Interstadial were short-lived and with the subsequent collapse of the long spring season of grass and plant growth necessary to sustain the animals through the winter, the Giant Deer being without a ready food supply soon became extinct.

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10.3 Appendix 3: Wood Identification Report

By Penny Johnston

This report details the results of wood identification on material sampled from a brushwood feature (a possible platform or trackway) in a bog in Ballyoran townland, Co. Cork, which was excavated along the route of the new N8 Rathcormac/Fermoy Bypass (DoEHLG Licence no. 04E1014 extension).

Methodology

The wood was sampled on transverse, transverse longitudinal and radial longitudinal sections. Thin sections were mounted on glass slides and examined using a brightfield microscope and magnifications that ranged from x100 to x400. Identification was carried out using hardcopy identification keys (Schweingruber 1990) and online wood identification keys ("Wood Anatomy") as well as consultation with the wood anatomy reference collections at the Royal Botanical Gardens at Kew, London.

Results

All of the wood was identified as either alder (*Alnus* spp.) or willow/poplar (*Salix*/*Populus* spp.). Willow (*Salix*) and poplar (*Populus*) were classified in this indeterminate category as archaeological specimens cannot be reliably distinguished from each other on the basis of wood anatomy (R. Gale, pers. comm.). However, both willow and poplar generally occur in damp places, although not necessarily in peaty soils. The alder was probably from the Common or Black alder (*Alnus glutinosa* (L.) Gaertn.) since this species is native to Ireland. Alder trees tolerate intermittent rather than prolonged waterlogging and grow regularly in or on fen peat. The identification results from all the Ballyoran Bog wood samples are indicative of damp, if not waterlogged, growth conditions. It is likely that all the wood was growing on the bog or near its edge before felling.

Wood sample	Layer	Wood (Scientific name)	Wood (English name)
7	2	*Alnus* (*glutinosa*)	Alder
9	3	Salicaceae (*Salix*/*Populus*)	Willow/Poplar
10	3	Salicaceae (*Salix*/*Populus*)	Willow/Poplar
11	3	Salicaceae (*Salix*/*Populus*)	Willow/Poplar
16	2	*Alnus* (*glutinosa*)	Alder
18	4	Salicaceae (*Salix*/*Populus*)	Willow/Poplar
19	4	*Alnus* (*glutinosa*)	Alder

Table 1: Wood identification from Ballyoran Bog, Co. Cork (04E1014 extension)

Layer 2 was a layer of peat overlying the remaining platform/trackway. The wood was all identified as alder. The wood from Layer 3, found below Layer 2, was all from willow/poplar, and from Layer 4, the lowest/earliest layer of brushwood, there was a mix of both types of wood.

Most comparative archaeological wood from trackways and platforms are from midland bogs. At Lisheen, Co. Tipperary, alder was one of the most important wood types found, occurring at forty-three sites and being the predominant wood type at thirteen (Stuijts 2005). At Mountdillon Bogs,

Co. Longford, alder and willow were both among the list of significant wood species identified in timbers from the wetland excavations, although hazel, ash and birch were more common (Moloney 1996). However, at Clonfinlough there was very little evidence for either and the wood assemblage was predominately ash, with the only other significant wood type being oak (Irish Archaeological Wetland Unit 1993). Other comparative studies of archaeological wood include material retrieved from estuarine environments, for example at Newrath, Co. Kilkenny and from studies along the Shannon estuary. At Newrath circa ninety-five percent of the wood was identified as alder, both from random bulk wood samples and from the worked wood that was retrieved during the excavations. The only willow-type found was small to medium roundwoods (Susan Lyons, personal communication).

In these studies timber analysis can often reveal evidence for selection of wood types and management of woodland. However, at Ballyoran the restricted speices range indicates that the wood from this site was taken from nearby and was perhaps not specially selected but was used when necessary. There is no added evidence to suggest whether the site was deliberately constructed or not. The timbers may have been fragments of natural wood that was thrown down haphazardly to raise the ground level in a wet area of the bog, or they may have even been from trees that simply fell into the bog.

Summary

The wood from the potential platform/trackway excavated at Ballyoran Bog, Co. Cork was identified as alder and willow/poplar and both types of wood are indicative of damp growing conditions. This suggests that the wood from the site was sourced within the bog or on its margins.

Acknowledgements

Wood identifications were checked by Rowena Gale, Peter Gasson, Ingelise Stuijts and Ellen O'Carroll.

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Online wood anatomy databases

Wood Anatomy http//:www.woodanatomy.ch

10.4 Appendix 4: Peats and Mires: General Description of Ballyoran Bog, near Corrin, Fermoy

By Jim Kiely

Peatland covers 16.2 cent of the island of Ireland. Within the Republic peatlands cover 17.2 percent of the land surface.

Peat is an organic deposit made up of partially rotted remains of dead plants which have accumulated in water logged parts of the landscape. Waterlogged soils are very poor in oxygen and for that reason the complete decomposition of dead plants cannot take place. Partial decomposition of the dead plants produces organic acids which hinder the work of soil microbes that would otherwise be involved in plant decomposition.

In Ireland, the organic matter content of mineral soil ranges from 3%-10%. Peat soils usually have 30 to 98% organic matter. For land to be classed as peatland the dept of organic soil material must be ay least 45cm in the case of undrained land and 30cm on drained land. Areas where peat accumulates are called 'peatlands'or 'bogs'. 'Bog' is derived from the Gaelic 'Bognach' meaning a quagmire . There are three main types of bogs in Ireland.

Blanket Bogs consist of a carpeat of peat extending over large areas of land. They are mainly in the west, south-west and north-west of Ireland. They are in areas of high rainfall usually over 175 rain-days each year. There are two types of Blanket Bog.The Atlantic Blanket Bog found in low-lying (below 200m) areas of western counties. The second type is Mountain Blanket Bogs. They are found in mountainous areas (above 200m) throughont the country

Raised Bogs are the second main type of peat land. They occur extensively across the Central Plain of Ireland. These soils in their undisturbed state are the natural organic formations which are so characteristic of the midlands. 'The Bog of Allen' is the well known example . They have formed in basin topography on calcareous gaclial drift. Although formed in basins the mode of formation has resulted in the characteristic raised apperence hence the term 'Raised Bog' formation is a fen-type peat deposit, consisting of sub –fossil plant remains ranging through trees,shrubs,herbs,sedges and grasses. The main bulk of the peat deposit is the raised cap of Sphagnum Peat arising from the decay of various Sphagnum mosses.

Fen Bogs

Fen peat is the basel layer of the Raised Midlands Bogs. In most cases the Fens of today did not reach the Raised Bog stage. They occur in flat river flood plains and poorly drained hollows. This peat is fiberous in nature (e.g., wood, grasses etc) and it was formed in relatively mineral rich water conditions. They are now under permanent pasture. The Corrin Bog is such a reclaimed Fen. These observations were supported by studies on the Corrin bog about 10 years ago. Layers of woody fen were seen in soil

profile that were excavated during soil drainage studies.

Chronology

Peat began to form in Ireland early in the post-glacial period i.e., shortly after 10,000 B.P. The widespread cover of Blanket Bog been dated to 4,150-2150 B.P.

10.5 Appendix 5: Site Archive (Basis) Summary

Type	Description	Quantity
Plans	1:20 plan (drawings)	3
Photographs	Digital and prints	50 digital, 24 prints
Registers	Context/Features	1
	Photograph	1
	Drawing	1
	Finds	1
	Samples	1
	Diaries	1
Samples	19 environmental samples which include wood, soil and bone	19

10.6 Appendix 6: Dissemination Strategy

Ballyoran Bog 04E1014 extension		
Publications		
Excavations 2004	Text submitted January 2004	Publication pending
NRA publication	Text submitted February 2006	Publication pending

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10.7 Appendix 7: Programme Schedule Dates & Deliveries

Ballyroan Bog 04E1014ext	
Phase 1 Monitoring	August 2004
Phase 2 resolution	Duration of excavation 18.8.04-28.8.04
Phase 3 post-excavation	
Postex Assessment & Stragegy	Document submitted to Cork County Council March 2005
Interim Excavation Report	Report submitted to Cork County Council November 2005
Final Excavation Report	Report submitted to Cork County Council April 2006
Publications	
Excavations 2004	Summary submitted January 2005
NRA Monography	Summary submitted to Cork County Council February 2006