Name: Leamonaghan Graveyard & Heritage Site Group, Leamonaghan, Ballycumber, Tullamore, Co. Offaly.

Case Reference Number: PAX19.324161 at Lemanaghan and surrounding townlands, Co. Offaly (www.lemanaghanwindfarmplanning.ie) Proposed development of 15 no. wind turbines, a permanent 220kv on-site substation, and associated infrastructure.

Dear Sir / Madam,

On behalf of Leamonaghan Graveyard & Heritage Site Group I hereby submit an observation regarding the above Case Reference.

We are a voluntary group of local people who come together every week to maintain and upkeep the Monastic Si, which includes the old graveyard and monastery of St Manchan, St Manchans Road (Togher), Holy Well and St Mella's Cell.
We cut the grass, trim the hedges and maintain the site in honour of St Manchan. We take great pride in the work that we do. We are never short of volunteers, young and not so young, to carry out the work. We work closely with Amanda Pedlow, Heritage Officer with Offaly County Council. The grass, and the hedge along the Togher are cut with hand tools, and no herbicides are used.

Chapter 13 – Cultural Heritage

The Monastic site is held in very high esteem by the people of Lemanaghan, and further afield. It is of huge significance to the local people, who live and breathe St Manchan.
The Monastic site in Lemanaghan is closely linked with Clonmacnoise.
St Manchan himself was educated in Clonmacnoise. He was a respected scholar who was also a noted poet. One of his peoms, 'Manchans Wish' has survived to this day. There is a lot about St Manchan that we do not know. Some people claim that he may be of Welsh descent. More claim that he was the same person as St Manchan of Mohill, Leitrim while others claim that he came from Clonmacmoise and was given the vicarage of Lemanaghan by the Abbot in Clonmacnoise around 645 AD. St Manchan was the first Abbot of Liath (now known as Lemanaghan) where he set up a monastery and spread the Christian faith throughout the parish. St Manchan's mothers name was Mella and he had two sisters, Grella and Greasallach.

St Manchan had a very prolific cow that never went dry. This cow supplied milk to all of the townsland of Lemanaghan. St Manchan gave this milk free and never looked for any payment. The farmers of Lemanaghan and their forefathers have never sold milk in honour of the tradition first established by St Manchan. Farmers in Lemanaghan have upheld this tradition of not selling milk since the seventh century.

St Manchan died in 664 AD of the yellow plague which desolated Ireland at the time. St Manchans Feast Day is held on 24th January and this date is observed as a holy day by the local people. Mass is celebrated in honour of the saint in both St Mary's Church, Pullough and in St Manchans Church in Boher.

To follow is St Manchans Prayer which outlines a list of things that he wished to have near his monastery. A lot of these things exist today, and that's the way we would like to keep it.

Manchan's Prayer

O Son of the living God, ancient eternal King
Grant me a hidden hut to be my home in the wild,
With green shadow water running by its side
And a clear pool to wash off sin by grace of the Holy Ghost

A lovely wood close by around it on every hand
To feed the birds of many voices, to shelter them and hide
Southward facing for warmth with a stream in its grounds
And choice land of thick growth good for every crop

Some sensible disciples (their number I will fix)
Modest and obedient praying to the King:
Four times three - or three fours - correct for every need;
Two sides within the church on the north side and the south

Six pairs besides myself gathered all about me
Praying for all Eternity to the King who lights the Sun
A lovely church, with linen, a home for heaven's King
With bright lamps shining down on the clean bright scriptures;

And a special house to go to for minding of the body,
With no lust or luxury or any harmful thought.
And the things that I will have there and tend there, for certain,
And hens, fresh and fragrant leeks, bees and speckled salmon...

Ample food and raiment for the King of fairest fame
And I seated somewhere praying to God a while

St. Manchan

Presented to Mr. Brian Cowen, Minister for Foreign Affairs
from the people of Leamonaghan, January 2003

A Conservation Plan was drawn up for Lemanaghan by the Heritage Council in 2007 to protect the site and the surrounding area
https://www.heritagecouncil.ie/content/files/lemanaghan_county_offaly_conservation_plan_2007_2mb.pdf

The following are some extracts from the Plan:

Executive Summary: A key point of this document is that it was created to ensure Policies are set out for the care and management of the historic place within its setting....Provide a framework for decision-making on future developments to infrastructure and land use.

Please refer to page 50 – proper understanding of the place, page 51 for land Use, and to page 52 for potential conflicts

Section 5.4: Proper Understanding of the place: "Lemanaghan has been recognised only at local and specialist levels……thus care will be required to identify potential archaeology in any future developments"

Section 5.6: Land Use: it specifically states that it is important that the options considered for the post-industrial use of the bog are sympathetic to the significance of the site.

Section 4: Statement of Significance: Lemanaghan is a sacred place of great antiquity. The site was an important centre of Christian worship throughout the Middle Ages. There is also evidence to suggest that it may have provided a focus for pagan ritual before the establishment of the monastery. The place retains a sense of peace and tranquillity and is relatively untouched by modern life

It is critical that the Monastic site is not undermined by a large scale Industrial Development, such as the proposed Wind Farm. We are committed to protecting the heritage and spirituality of the locality and the Monastic site must be protected for future generations.

St Manchans Monastic Site and Recent Archaeological Discoveries

The EIAR heritage chapter (Number 13) has not addressed the discovery of human remains in Mella's cell in January 2025. The heritage and archaeological significance of Lemanaghan is now much greater than when the proposed wind turbine project design was first drafted. In early 2025, human remains were discovered at St Mella's Cell, which is within the Monastic Site at Lemanaghan. This finding was reported on by the RTE this year - *Monastic remains uncovered after Storm Éowyn*. The remains were exposed when four Scots Pine trees were blown down and uprooted during Storm Eowyn on 24th January, 2025. Coincendencially this is the Feast Day of St Manchan. The remains were carbon dated to between 662 AD and 939 AD – contemporaneous with St. Manchan himself who died in 664 AD. This discovery has not been identified by archaeological baseline surveys carried out for the proposed wind farm project and thus raises the question of whether further remains, or other archaeological features may be present within or proximate to the proposed wind farm. The Heritage chapter has been prepared without the full knowledge of the site's burial significance. **This is a major omission on their part.**

The full report is attached at the end of this document. Appendix 1

There has always been significant academic and research interest in Lemanaghan

- Dr Denis Shine and Kevin O'Dwyer brought a group of international archaeology students on a recent guided tour of the historic Offaly monastic site at Lemanaghan bog
- https://www.offalyindependent.ie/2023/02/26/group-of-international-archaeology-students-visit-monastic-site/
- Excavations initial: https://excavations.ie/report/2025/Offaly/0035750/

Youtube videos showcasing the interest and meaning of Lemanaghan, produced by the Irish Heritage Council:

https://youtu.be/8T5tiSWDmhE?si=--E0Rq_n_3wZlB3D

https://youtu.be/NKVjDhZuf7s?si=dyn5yInVLFoQ36Ze

https://youtu.be/rYInGWFoKpM?si=Q0cf9VE_H0BamK5v

https://youtu.be/emrm_H78iFc?si=xSdeB-HHAqpktBmA

The Irish Heritage School published video material that presents Lemanaghan as part of an interconnected early medieval monastic and ritual landscape, where value derives from its wider peatland setting, spatial relationships, and continuity of use rather than isolated monuments alone. The educational videos emphasis that such landscapes are experienced environments in which setting, visibility, and movement are central to interpretation. This supports the conclusion that Lemanaghan is a coherent cultural landscape whose integrity and experiential value would be materially diminished by large-scale industrial development.

Chapter 14 – Landscape and Visual

Photomontage VP 13A + B and Photomontage VP14 in the application show some very disturbing pictures of the proposed wind turbines. We are shocked to see the pictures of the proposed wind turbines towering over the site. The selection of photos supplied by the developers is not representative of the Monastic Site.

Photomontage VP 13A + B state that the Monastic Site is 1.2km southeast of the nearest Turbine (No.5).

The sight of the Turbines in the near distance shown in the photographs will have a major negative impact on the Monastic Site. The pictures do not reflect the enormity of the proposed wind turbines.

Photomontage VP14 states that Mella's Cell is 1.28km from the nearest Turbine (No. 14). Again, all the photographs seem to be taken from a similar angle to try and mask the impact of the proposed turbines. The images are taken from the same area (corner) of the Cell, and do not reflect what the reality of the situation will be if the proposed wind turbines are given permission.

Hereunder are some images which were taken a few years ago. You can see the simplicity of Mella's Cell. It is a one roomed building and it is located within a rectangular enclosure. It is very unusual that it is of a rectangular shape, while most other historic enclosures are circular. Mella's Cell is noted for its tranquillity and sense of wilderness and has remained undisturbed by modern life. The

Scots pine trees are in the background (2 of these trees are no longer with us). To the left of Mella's cell, in the pictures below, one can see all across the open bog land of Lemanaghan and as far as the Hill of Bellair. It is a sight to behold.

However, the proposed wind turbines will decimate the skyline and disturb the peace and tranquillity associated with the site.

When one walks from Mella's Cell, up the Togher, to the Holy Well and Monastery, they will have full view of all of the Turbines if the proposed Wind Farm is given permission. This will have a detrimental effect on the "peacefulness and serenity" of this walk, which is a very important part of the experience of visiting the site. The proposed wind turbines will dominate the entire area, and will detract from the natural beauty and wilderness of the site. Many people who visit Lemanaghan get "peace of mind". This will be taken away from them forever, if the wind farm is given permission to proceed.

To the left is a picture that was taken a few years ago, and it shows pilgrims leaving Mella's Cell, and heading up the Togher towards the Holy Well and St Manchans Monastery. There is a wonderful view of the surrounding areas, and many pilgrims get immense satisfaction and "release of all woes" on the walk between the different areas of the Monastic Complex.

The development of a wind farm in Lemanaghan Bog would be a visually discordant feature in the rural landscape and would adversely affect the character and setting of the monastic site. It would seriously injure the visual amenities of the area, and would not be sympathetic to the sensitive nature of the landscape.

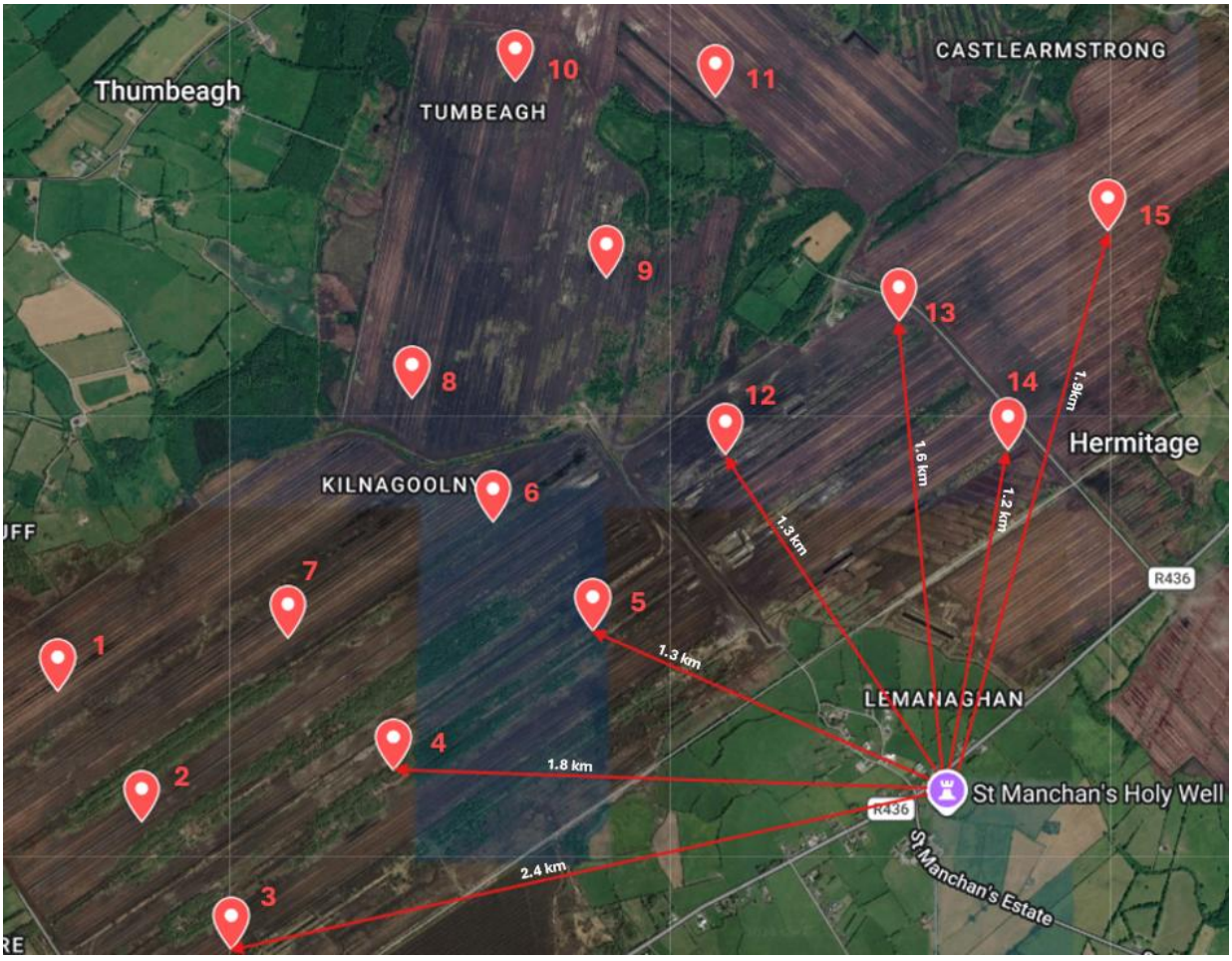
To the left is a Picture of St Manchans Road (Togher) – it's a stone flagged road which connects Mella's Cell to the Holy Well and Monastery.

Above picture shows local people gathering at St Manchans Holy Well which is situated at the beginning of St Manchans road (Togher). Folklore suggests that the Holy Well was formed when St Manchan struck a rock with his stick. It is also believed that the Well was blessed by St Manchan. Tradition states that lots of ailments are cured by the Holy Water in the Well, especially warts. One must visit the well for three consecutive Fridays, pray to St Manchan, and bless oneself with the holy water from the well. Belief in St Manchan is the basis of a successful outcome.

Local people are always on hand to give a "guided tour" of the Monastic site to visitors. They relay the many stories about St Manchan. It is very important to us that the story of St Manchan is kept alive and handed down from generation to generation.

On the left is the side entrance to the Monastery (facing west), and on the right is the view from the main entrance (facing east/south east).

Proximity of the Wind Turbines to the Monastic Site.



Turbine	Latitude	Longitude	Distance from St. Manchan's (km)	Distance from Mella's Cell (km)
1	53.2965	-7.787	2.99	3.334
2	53.2926	-7.7828	2.684	3.024
3	53.2888	-7.7783	2.433	2.76
4	53.2941	-7.7703	1.858	2.201
5	53.2983	-7.7603	1.329	1.659
6	53.3015	-7.7653	1.791	2.11
7	53.298	-7.7755	2.269	2.611
8	53.3052	-7.7693	2.247	2.552
9	53.3088	-7.7596	2.097	2.337
10	53.3146	-7.7641	2.811	3.039
11	53.3142	-7.7542	2.487	2.658
12	53.3035	-7.7537	1.393	1.638
13	53.3075	-7.745	1.627	1.744
14	53.3037	-7.7396	1.207	1.25
15	53.3101	-7.7346	1.982	1.97

Lemanaghan is a special place. The proposed wind farm will destroy the area and it will destroy the lives of the people who live in Lemanaghan. It will also destroy the experience for those who visit Lemanaghan.
As mentioned earlier, Lemanaghan has always been closely associated with Clonmacnoise. There is a pilgrim path which linked Lemanaghan to Clonmacmoise, and this ancient path goes through Lemanaghan bog. This ancient roadway dates back to the 7th Century when Christians travelled from Lemanaghan to Clonmacnoise. This pathway was made of oak planks which were preserved by the bog. Evidence of the pathway was documented by Ellen OCarroll in her book which was published in 2001 – **The archaeology of Lemanaghan – the story of an Irish bog.**
A number of walks have taken place over the years from Lemanaghan Monastic Site, along the pilgrim path, through the bog, to Boher Church to see the Shrine where St Manchans bones are enshrined. St Manchans Shrine is one of the most valuable artefacts that's housed outside of the National Museum. The people of Lemanaghan have taken care of the Shrine for centuries.
Lemanaghan is a rich oasis of history and heritage and therefore Lemanaghan bog is totally unsuitable for the development of a wind farm.

We respectfully ask the Commission to deny permission for the proposed wind farm in Lemanaghan for all of the reasons outlined in this submission.

Yours faithfully,

Deborah Corcoran,

Secretary of Leamonaghan Graveyard and Heritage Site Group

Appendix 1

Excavations at ‘Mella’s Cell’ Lemanaghan, County Offaly SMR OF015-004006-

Archaeological Report

VOLUME I - REPORT

Prepared for: National Monuments Service and Offaly County Council

By: Dr Denis Shine and Dr Annamaria Diana

Archaeological Licence Ref.: 25E0558

Townland/Location: Churchlands - Lemanaghan, County Offaly

ITM: 617507, 726933

Monument Name: Mella’s Cell (oratory)

SMR: OF015-004006- (and associated complex)

CMF Reference No: CMF25-3-OF001

Date: April 2026

Project Name:	Lemanaghan Rescue Excavation
Archaeological Licence Ref:	25E0558
Townland:	Lemanaghan
Site Type:	Hermitage/Oratory
ITM:	E 617507m, N 726933m
Date of Excavation:	October 2025
Excavation Director:	Dr Denis Shine
IHS Senior Archaeologist:	Dr Denis Shine
Post-excavation:	Dr Denis Shine and Dr Annamaria Diana
Project manager:	Dr Denis Shine
Report Authors:	Dr Denis Shine and Dr Annamaria Diana
Report Status/Revision:	Final Draft
Technical Reviewer:	Dr Stephen Mandal
Report Editor:	Dr Denis Shine and Dr Annamaria Diana
Approved By:	Dr Stephen Mandal
File Name:	Excavations at 'Mella's Cell' Lemanaghan, County Offaly SMR OF015-004006-

Executive Summary

On behalf of Offaly County Council (OCC) and the National Monuments Servis (NMS), Dr Denis Shine of the Irish Heritage School (IHS Ltd), on behalf of CRDS Ltd, has undertaken archaeological monitoring and excavation at the site of site of Mella's Cell (SMR OF015-004006), at Lemanaghan monastery, County Offaly (OF015-004006-; ITM617507, 726933). The works were conducted under archaeological licence to the National Monuments Service (NMS) (Licence No. 25E0558), to an agreed methodology which was drawn up at the request of both Amanda Pedlow (OCC Heritage Officer), and latterly Grace Fegan of the NMS.

The enclosure around Mella's Cell is planted with several mature trees, including several large Scots Pine. Storm Eowyn felled four of these trees on site on January 24, 2025. Three trees fell internally in a northeast direction, whilst a further tree fell across the associated enclosure. Their uprooting resulted in significant disturbance to the inside of the enclosure, with human remains exposed in the three internal root plates. These remains were assessed on several occasions by the NMS, including by their in-house archaeologist and osteoarchaeologist Dr Linda Lynch, who confirmed the remains of multiple individuals within the internal tree boles. The site was also visited by the National Museum of Ireland (NMI) on a number of occasions, who removed some loose bone from the site that was subsequently retuned to the IHS for analyses.

Following these examinations a successful grant application to the Community Monuments Fund 2025 (CMF25) was made to cover the costs of archaeological monitoring and tree surgery at the site, to redress the storm damage. These works were to include a visual examination of the exposed human remains in situ and reinstatement of the tree root systems to as level a surface as is practicable. Aside from the recovery of three suitable pieces of bone for C14 dating, all human remains were to be preserved in situ. Considering the unusual and complex nature of the work, a senior archaeological team was preferred for the works, to include Dr Denis Shine (licensed Director) and Dr Annamaria Diana (human osteoarchaeologist) as well as a supervisor and surveyor.

After successfully tendering to OCC for the project, an archaeological licence for these works was issued to Denis Shine on the 25th of June 2025, with monitoring works completed on 21st and 22nd of July (preliminary visual recording was also undertaken immediately after the licence was issued). Whilst the tree surgery was completed, with no damage to the site, the root plates unfortunately could not be levelled without excavation (which was not permitted under the terms of the licence). The failure to level the root plates was due to significant 'bedding' of the root plates as well as erosion of sediment from the tree root systems into the underlying cavities in the months since Storm Eowyn.

At the conclusion of the works the site was left safe and as level as possible and discussions were held with OCC, NMS, the NMI and the local community on the best strategy to deal with the remaining root plates and the human remains they still contained. On balance, it was decided to hand excavate the root plates in full to the level of the ground surface, fully removing and documenting any burials. These works were done under an extension to the existing licence, which was issued on October 10th; this stage of excavation was not funded by CMF2025, instead being financed as a rescue excavation by the NMS, which was also awarded to the IHS following a competitive tender process.

Considering the long time period between the exposure of the remains and their excavation, rescue excavations were expedited and commenced the day after the award of the licence, continuing until October 16th. The works were undertaken by the same experienced team, including Dr Denis Shine (licensed Director), Dr Annamaria Diana (human osteoarchaeologist) Dan O' Meara (supervisor and photogrammetry specialist), Richard Reid (supervisor and surveyor) and two site assistants. During the works the remains of four articulated burials were exposed, recorded and excavated. A significant amount of disarticulated human bone, some of which eroded from the burials in the period between January and October, was also recovered. All this material has now been fully assessed, together with bone collected by the NMI.

This report details excavation methods, archaeological records, and results of the analysis of skeletal articulated remains and disarticulated human bone recovered at the site. It also includes radiocarbon dates for the burials which, based on current evidence, seemingly date to between the seventh to tenth century AD.

Naming the place

A number of different names and spellings are in current use for sites and monuments at Lemanaghan. The spelling of Lemanaghan itself, and of places within Lemanaghan, has been based on that listed in Ordnance Survey (OS) mapping. This is in recognition of the OS as the source of standardised Irish placename spellings.

Acknowledgements

The excavations at Lemanaghan would not have been possible without the support of several statutory bodies. The work was actively supported by OCC's Heritage Office, and latterly the NMS. We gratefully acknowledge the funding from these bodies. We would also like to acknowledge the support of the NMS and National Museum of Ireland (NMI) in processing our archaeological licence.

A small number of specialists have contributed to the analyses of the collections namely Dr Annamaria Diana for human bone and Órla Scully for metal. Ms Susannah Kelly, of University College Dublin, also provided conservation services for the single ferrous artefact, while Queens University Belfast provided prompt radiocarbon dating services.

Finally, the local community have worked with us on several ventures over the last few years. We greatly appreciate their assistance in terms of advice, local knowledge, logistical support and ensuring easy access to the site.

Fieldwork Staff

Most importantly, we would like to acknowledge the following staff and individuals who contributed to this project.

FIELDWORK STAFF

Directors and Supervisors	Drs. Denis Shine and Annamaria Diana, Richard Reid and Dan O'Meara
Tree Surgery	Woodfield Horticultural Services (Dermot Ward)
Assistants	Claire Dunne and Riley Roberts
Surveyors	Richard Reid
Report production	Dr Denis Shine (Author) Dr Annamaria Diana (Editing) Dr Denis Shine and Richard Reid (Illustrations) Dan O Meara (photogrammetry and drone services)

Disclaimer

The results, conclusions and recommendations contained within this report are based on information available at the time of its preparation. Whilst every effort has been made to ensure that all relevant data has been collated, the authors and IHS accept no responsibility for omissions and/or inconsistencies that may result from information becoming available subsequent to the report's completion.

Abbreviations and Definitions

Abbreviation	Definition
DHB	Disarticulated Human Bone
DIER	Database of Irish Excavation Reports
GPS	Global Positioning System
ISAP	Irish Stone Axe Project
ITM	Irish Transverse Mercator
IHS	Irish Heritage School
NMI	National Museum of Ireland
NMS	National Monuments Service
OCC	Offaly County Council
OD	Ordnance Datum
OS	Ordnance Survey
RMP	Record of Monuments and Places
TB	Tree bole

Coordinate System

All coordinates are in Irish Transverse Mercator (ITM).

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1. Introduction

Mella's Cell (617507, 726933) is a Recorded Monument (OF015-004006-; a hermitage) that is located adjacent the monastic complex of Lemanaghan in the townland of the same name, c. 350m from St. Manchán's church (Figures 1.1 and 1.2). The monument is currently located within a sub-oval grass covered walled enclosure (OF015-004014) which measures *c.* 42m by 31m. This enclosure is entered at its western limit via a 'kissing gate', where it adjoins firstly an open reclaimed pasture field and then a togher (OF015-004011-) that connects the cell to the archaeological complex; this complex includes an ecclesiastical enclosure (OF015-004008-), a tower house (OF015-004001-), St Manchán's church (OF015-004003-), early Christian cross-slabs (OF015-004005-/032) and a probable later medieval building (OF015-004009-).

The enclosure around the cell is planted with several mature trees, including several large Scots Pine. Following Storm Eowyn January 24, 2025, four of these trees were uprooted. Each of the internal root plates/boles (three in total) were observed as containing human remains. The fourth tree, positioned atop the southern boundary of the enclosure, fell in an easterly direction, largely on top of the enclosure itself. This tree bole did not contain any human remains.

This report details results of the excavations carried out at the site as well as the specialist evaluation of human remains recovered.

1.1 Site location

Lemanaghan is a townland in the Electoral Division of Srah, in the Civil Parish of Lemanaghan, Barony of Garrycastle, County Offaly. Its Irish name is Liath Mancháin (Mancháin's grey land, O'Brien 2006, 180). Lemanaghan borders the following other townlands: Ballydaly to the west; Castlearmstrong to the north; Curraghalassa to the south; Derrica More to the west; Derrynagun to the east; Kilnagoolny to the west; Leabeg to the north; Pollagh to the east; Rosfaraghan to the west; Straduff to the west; Tumbeagh to the north; and Turraun to the east. Lemanaghan is situated about 17 kilometres east of Clonmacnoise, one of the most important monastic settlements in Ireland.

As stated, the monument recorded as Mella's Cell/Oratory is located on private land, with access allowed through a gate placed by the landowner.

1.2 Date and circumstances of fieldwork

Archaeological excavations of the site were carried out between the 11th and 16th of October by a team including Dr Denis Shine (licensed director), Dr Annamaria Diana (bioarchaeologist), Dan O' Meara (supervisor and photogrammetry specialist) and Richard Reid (supervisor and surveyor).

Documentation of the storm damage had been previously undertaken on June 26th and 27th by the same team, before tree surgery of the fallen trees was undertaken, under archaeological supervision, on July 21st and 22nd; the June and July works have already been previously fully reported (see Shine and Diana 2025) but are also summarised again in Section 5.1 of this report.

1.3 Statutory approvals

The archaeological excavation detailed in this report was carried out under Archaeological Licence Registration No. 25E0558 issued by the Department of Housing, Local Government and Heritage in consultation with the NMI.

1.4 Surveys and previous work

1.4.1 IHS Survey

Prior to the damage caused by Storm Eowyn, the IHS regularly undertook community-based research at the site. Firstly, a short survey programme was undertaken at Lemanaghan in November 2023, when the tower house remains were recorded with a total station; at this time photogrammetry was undertaken of the tower house and several elements of the wider monastic complex and a full record was also finalised of all the carved stone from Lemanaghan, which is currently stored in an adjacent vacant nineteenth century schoolhouse (see: Lemanaghan - A 3D model collection by IrishHeritageSchool - Sketchfab).

Additional total station recording at the site was undertaken in January 2024, including a survey in the adjacent graveyard. Finally, on a commercial basis, the IHS monitored conservation works to Lemanaghan Tower house, funded by CMF2024, in summer 2024.

These works were in advance of the monitoring and excavation at the site of Mella's Cell itself, which, as stated, was completed in June-July and October 2025 respectively.

1.4.2 Geophysics

An archaeo-geophysical survey of the area of the site (Figure 1.3) was undertaken by the Environmental Geophysics Unit, Maynooth University, on behalf of the Heritage Office of OCC in 2004 (Gibson and George 2004) to assess the size of the enclosure surrounding Mella's Cell, the structural nature of the togher and possible other anomalies around the building. The results were summarised as follows (Figure 1.4).

Ground penetrating radar across the togher did not yield a very distinctive signature though computer processing did show that the most significant change occurred around 20-40 cm depth.

Resistivity data allow very clear cross-sections of the togher to be displayed. The profiles show that background resistivity values are relatively low in the top 30 cm with values of 100-200 ohm metres except where the traverse crosses the togher. This is generally associated with a regular zone of high resistivity values of 600-700 ohm metres. This is most likely due to slabs of rock placed on the surface.

Below depths of around 60 cm either side of the togher the resistivity values are high (600-1000 ohm metres). However, this pattern does not extend across the togher. A deeper low resistivity zone replaces the high resistivity surface signature or the togher. This suggests that the togher was not produced simply by laying stones across the field but it is possible that a trench was excavated, backfilled with looser material and then capped by stones.

Major arcuate and linear features were found in the vicinity of St. Managhan's church to the NE, SW and SE using magnetometry which may represent important boundaries. Some features were located within St. Mella's enclosure and to the east of it. No features of archaeological interest were located either side of the togher along its length though two major magnetic anomalies were discovered.

1.4.3 Conservation works

The Heritage Council previously commissioned a Conservation and Management Plan for Lemanaghan to include both St Manchán 's church and associated monuments, Mella's Cell (known locally as Kell), the Holy Well and Tree and the togher (Quinlan and Moss 2007); this plan was prepare in consultation with OCC and the local community.

The plan was completed in May 2001 by Margaret Quinlan Architects and finalised in November of that year. As reported by Quinlan and Moss (2007, 10) the policies they set out (11 in total) aimed to:

- Clarify ownerships and responsibilities.
- Protect the surviving monuments and provide guidance on their conservation.
- Foster greater understanding and awareness of the significance of the historic place.
- Ensure that other initiatives relating to Lemanaghan are compatible with the preservation of its significance.
- Provide a framework for decision-making on future developments regarding infrastructure and land use.

A notable finding from the report was the identification of several significant difficulties with the 'Pilgrim Path' from Lemanaghan to Boher, as it was proposed in an earlier 1999 report, therefore an

alternative Pilgrim Path route was suggested. This report heavily cites the historical summary from the original Conservation and Management Plan.

1.5 Details of statutory protection that applies to the site

At stated Mella's Cell, located in private ownership, is a recorded monument (SMR OF015-004006-) protected under the National Monuments Acts 1930-2014. The Cell forms part of a larger archaeological complex, that includes an ecclesiastical enclosure (OF015-004008-), a tower house (OF015-004001-), St Manchán's church (OF015-004003-), early Christian cross-slabs (OF015-004005-/032) and a probable later medieval building (OF015-004009-). The monastery of Lemanaghan is itself set within a rich wetland archaeological landscape (see Section 3 and Appendix 2.2).

2. Baseline research

To set the proposed development within its wider archaeological, architectural and cultural heritage landscape, a paper survey of archaeological, architectural heritage, historical and cartographic sources was undertaken.

2.1 Recorded archaeological sites and monuments

The Record of Monuments and Places was consulted for the relevant parts of County Offaly (www.archaeology.ie). This is a list of archaeological sites known to the National Monuments Service. The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, OPW Archaeological Survey notes and other relevant publications (Figure 2.1 and Appendix 2.2).

2.2 Topographical finds

Published catalogues of prehistoric material were studied: Raftery (1983 - Iron Age antiquities), Eogan (1965; 1993; 1994 - bronze swords, Bronze Age hoards and goldwork), Harbison (1968; 1969a; 1969b - bronze axes, halberds and daggers) and the Irish Stone Axe Project Database (Archaeology Dept., U.C.D.). A review of the online resource Heritage Maps (https://www.heritagemaps.ie/WebApps/HeritageMaps/index.html) identified several finds (Figure 2.2). Previous research (see below) has also identified numerous artefacts associated with Lemanaghan.

2.3 Archaeological Excavations

The excavation bulletin website (www.excavations.ie) was consulted to identify previous excavations that have been carried out within the study area. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2023 (Figure 2.3 and Appendix 2.3).

2.4 Down Survey

Taken in the years 1656-1658, the Down Survey of Ireland is the first ever detailed land survey on a national scale anywhere in the world. The survey, led by William Petty, sought to measure all the land to be forfeited by the Catholic Irish in order to facilitate its redistribution to Merchant Adventurers and English soldiers (www.downsurvey.tcd.ie). The Down Survey maps of the county of Offaly (King's County) and the 'Barony of Garricastle' (Carrycastle) are given as Figures 2.4-2.5.

2.5 Cartographic sources

Analysis of cartographic sources is important in tracing the development of the site. Sources included:

- Ordnance Survey 1st Edition – Scale 6 inches: 1 mile (1838-1842). The first comprehensive series of maps covering the whole of Ireland, which was the first country in the world to be mapped in this manner (Figure 2.6).
- Ordnance Survey 25-inch Maps: Scale 25-inches: 1 mile. Mostly date from the 1890s up to c. 1915 with later printings (Figure 2.7)

2.6 Aerial Photography

Available online sources for aerial photography were consulted, including the Ordnance Survey, Geological Survey and National Monuments Service collections (see Figure 2.8).

2.7 Historical Research

Several accounts of the monastic site having also been published previously, the most notable including:

- *St Manchan's Shrine* (Murray and O'Dwyer 2022)
- *Stories from a Sacred Landscape* (O'Brien 2006)
- *Lemanaghan Heritage Conservation Plan* (Quinlan and Moss 2007)
- *The Medieval Churches of County Offaly* (Elizabeth Fitzpatrick and Caimin O'Brien 1998)

3. Archaeological and historical context

3.1 Environmental and geological context

3.1.1 Solid geology, soils and landscape

The glacial and post-glacial history of Lemanaghan is significant as it lies on an 'island' of glacial tills derived from underlying limestone bedrock, surrounded by bog. There are alluvial and lake marl sediments to the southeast, but . significantly the monastery can only be accessed by transversing bogland, regardless of the direction of approach. This important geomorphological fact meant Lemanaghan was a relatively secluded 'island monastery' historically.

The Conservation and Management Plan for the site (Quinlan and Moss 2007) describes the geology in more detail as follows:

The geological situation of Lemanaghan is within a faulted syncline of muddy limestone of Lower Carboniferous age; the syncline is surrounded by Waulsortian mudbank ('reef') limestone, and further to the east by a pure fine limestone (one of the Irish 'grey marbles'). Large drift blocks of sandstone also abound in the area, especially in the wooded area, known locally as 'The Rocks', about 2km (1.25 miles) to the north-east of the monastic settlement. These come from the Basal Sandstone unit of the Lower Carboniferous which is encountered in boreholes rather than in outcrop in the Ferbane area.

Most of the stone used in the buildings at Lemanaghan is of local drift origin; numerous very large blocks of limestone are characteristic of the local hummocky drift. The sandstone seems to be of more directly local provenance; drift-derived boulders of sandstone are generally less rounded but some of the material may derive from sub-outcrop in the wood to the north-east of the site.

All except the most recent headstones in the graveyard are limestone, sourced by local headstone makers outside the immediate area. The early carved slab in the graveyard is sandstone, as are the few stones that seem to have been footstones. The cut limestone in the windows and elsewhere in the church is not of immediately local origin.

3.1.2 Topography and landscape

Lemanaghan is located at the crossroads between the main Ferbane-to-Ballycumber road and the Lemanaghan-to-Pollagh road and occupies an upland area in Lemanaghan Bog. The monument is situated in a rural setting immediately surrounded by reclaimed pasture fields. The wider landscape around the site continues to be dominated by raised bog, particularly to the north, west and east (Figure 2.3). Mella's Cell is located within a sub-oval/rectangular grass covered enclosure. This

enclosure is entered at its western limit via a 'kissing gate', where it adjoins firstly an open reclaimed pasture field and then the previously mentioned togher, which itself connects the Cell to the main monastic complex. The enclosure around the Cell is planted with several mature trees, with large trees also located with the enclosure interior. Otherwise, the internal space is grassed and carefully maintained by the local community.

3.2 Archaeological and historical background

3.2.1 Introduction

Although characterised by a continuity of history and settlement across several thousand years, Lemanaghan is best-known for both its early medieval significance and later medieval structures. As such, whilst a brief overview of Lemanaghan's history and archaeology is reported below, a stronger focus is placed on its medieval history, during which the monastic site was founded and developed.

3.2.2 Prehistory

There are no upstanding prehistoric monuments within the study area, however the recovery of stray archaeological finds indicate that prehistoric people occupied or moved through the landscape during this period.

Four stone axeheads are recorded as being found near Ferbane (to the immediate southwest of Lemanaghan (NMI Record IA/162/66a-d; source ISAP database). Over 21,000 stone axeheads are known from Ireland (Sheridan et al. 1992, 391; Cooney and Mandal 1998, 4). They represent the 'single most numerous artefact type surviving from prehistory in Ireland' (Mandal 1997, 289; Mandal et al. 2004, 116; Woodman 1978; 1987; Cooney and Grogan 1994), with their production and usage noted as commencing in the early Mesolithic and continuing well into the Bronze Age (*c.* 2,500 BCE – 500 BCE) (Cooney and Mandal 1998, 1; Sheridan et al. 1992, 400; Cooney et al 2011, 432; Cooney 2000, 210). Since 1991 stone axeheads have been the focus of detailed research by the Irish Stone Axehead Project (ISAP). Stone axeheads were both a symbol of prestige and an ordinary working tool for people for thousands of years. They served a wide range of functions in early prehistoric Irish society, including use in woodworking, in burial and ceremonial contexts and as symbols of power.

As discussed below, numerous trackways and platforms have been recorded during archaeological surveys in advance of and during the commercial exploitation of the surrounding bogs. Whilst the majority of these have been interpreted as medieval in date, a small number are of undetermined date, and it cannot be ruled out that these are prehistoric in date, as wooden trackways and platforms in bogs have been recorded in Ireland throughout prehistory, in particular in the Iron Age.

3.2.3 Medieval Lemanaghan

As noted above, the archaeological remains in Lemanaghan bog date back several millennia, but documented history of the area only begins in the seventh century AD. In AD 645, Diarmuid/Diarmait, son of Aedh Slaine and King of Ireland, granted land at Tuaim na nErc (Ercs Mound) to the monks of Clonmacnoise in recognition of their prayers for his victory in a battle against Guaire, the King of Connacht (Murphy 1896). A monk named Manchán subsequently left Clonmacnoise to establish a monastic cell there, with his foundation later known as Liath-Manchain, or 'the grey lands of Manchán'. The choice of site for the monastery was influenced by its relatively isolated nature – an island of dry land amidst surrounding bog – as well as the presence of a natural spring well; this spring may have been used for pagan rituals by pre-Christian people in the area, creating a continuity of practice that would help facilitate acceptance of a new religion through established spiritual symbols (O'Brien 2006, 181). A network of wooden paths (toghers) – archaeologically dated to between 600 and 1100 AD – were constructed to facilitate access to the monastery across the wetland landscape (O'Brien 2006, 180).

According to sources, Manchán of Liath, son of Indagh, was most likely born in Ulster; his mother was named Mella, after which Mella's Cell is named, and is recorded as having two sisters, Grealland and Greillseach (Graves 1874-5, 134-50). According to local tradition, Manchán and his mother would meet every day at the stone flagged togher leading from St Manchán's Church to Mella's Cell, sitting silently back-to-back as Manchán had taken a vow to never speak to a woman (O'Brien 2006, 183). The same flagstones also bear the 'hoof marks of St Manchán's Cow', whose keeper is said to be the forefather of the Buckleys, a local family with strong connections to the site who were the hereditary bearers of St Manchán's Shrine up to the early twentieth century (O Brien 2006).

Manchán has also been associated with Manchán of Maothla (Mohill in Leitrim) (*Annals of the Four Masters*), where to this day a fair known as 'the Fair of Manchán' takes place annually (O Liathain 1903); however Manchán of Maothla is likely to be a different earlier saint. An accomplished poet and scholar of the scriptures, Manchán of Lemanaghan was apparently a tall man, as confirmed by George Petrie, who found 'very long leg bones' when he opened the Shrine of St Manchán (O'Brien 2006, 178). The death of Abbot Manchán from the Yellow Plague is recorded as occurring in AD 664-665, marking a crucial early event for the site.

Throughout the following centuries, the deaths of several other abbots were also documented, which point to both the monastery's significance and its close connections to Clonmacnoise. These connections were further evidenced in AD 1039 when Lemanaghan was raided by men from Imaine (Meath) (in retaliation for a conflict between the Meath men and those from Delvin McCoughlan) on St Ciaran

of Clonmacnoise's Patron Day. Archaeological artefacts and structures from this period also suggest that Lemanaghan had significant ties to Clonmacnoise, reinforcing the monastery's importance during this time.

During the twelfth century, the monastery flourished, as shown by the construction of St Manchán's church. However, the last recorded mention of Lemanaghan as a monastery dates to AD 1205, when the death of Gillebrenyn O'Bichollye, a coarb (administrator), was noted. The site subsequently declined throughout the thirteenth century being ravaged by wars, and by the early fourteenth century it had transitioned to a parish church within the diocese of Clonmacnoise. The exact date of this change in status remains unclear. However, papal taxation records from 1302-1306 confirm the transformation, showing no income from the vicarage of Lemanaghan.

Throughout the fourteenth century, the vicarage's fortunes showed little improvement, although evidence of repairs to the surrounding trackways and the discovery of coins from this period suggest the site retained local significance. However, by the fifteenth century, Lemanaghan had further declined. In 1410, the perpetual vicarage had been vacant for an extended period and was eventually granted to the prior of St Mary Gallen by order of the Pope. Further complications arose in 1489 when Philip O Buachalla unlawfully seized the vicarage, and in 1508, it was granted to Maurice Macohclayn, a canon of Clonmacnoise. Connections between Lemanaghan and the Augustinians at Gallen continued, with the clergy deeply embroiled in local politics, as evidenced by the violent death of Murtough Mac Coughlan, Prior of Gallen and Vicar of Liath-Manachain, in 1531.

A 1620 map of the area, created during a survey of the barony of Garrycastle, has not survived, leaving uncertainties about the exact location of the principal secular settlement. However, a castle existed by this time at Lemanaghan, as it was referenced by de Renzi in 1620 and associated with the 1627 English translation of the Annals of Clonmacnoise. The 1659 poll tax survey recorded a small population of 26 Irish residents in the parish of Lemanaghan.

St Managhan's Church likely remained in use until the 1641 rebellion, after which the castle passed into the hands of the Duke of Buckingham. It was mentioned in the Martyrology of Donegal, compiled in 1630, due to a shrine kept on its altar, implying the church was still intact. However, by 1682-1685 the church was described as ruinous, with services being conducted in a nearby house. Despite its declining status, archaeological evidence, including timber platforms in the surrounding bogs, indicates significant activity was still occurring in the Lemanaghan area between the fifteenth and seventeenth centuries.

The monastic site is depicted on the seventeenth century Down Survey maps (see Figures 2.4 and 2.5). The site is also depicted on the first edition Ordnance Survey map as 'St Managhans Church' and 'Grave Yard', with 'St Managhans Well' and 'Abbey' also shown (see Figure 2.6). By the time of the second edition Ordnance Survey map, the site is shown as 'St Managhan's Church (in Ruins)' with 'Grave Yard' and 'Font' as well as 'St Managhan's Well', the 'Togher' and 'St Mella's Cell (in Ruins)' also depicted. The surviving ruins on site are shown as two rectangles in St Manchán's graveyard, and one at Mella's Cell (see Figure 2.7).

3.2.4 Mella's Cell at Lemanaghan

Today Mella's cell survives as a unicameral building measuring 5.5m x 3.1m internally. The *Archaeological Survey of Ireland* further the building as:

A 10th/11th century oratory named after St. Manchan's mother stands inside a rectangular shaped monastic cashel (dims. 41.7m by 30.7m) with walls measuring 1.6m thick. Small rectangular shaped oratory (dims. 4.8m N-S; 7.3m E-W; wall T 0.8m) built from large uncoursed limestone boulders with lintelled trabeate door (H 1.75m; Wth 0.75m) at centre of W gable illustrated by Graves (1874, 140). According to Graves (1874, 141) there were no windows on the side walls. The oratory is situated in the centre of a large rectangular-shaped enclosure/cashel (43m E-W; 35.5m N-S) defined by large upright boulders (1.6m x 1m x 0.5m) of varying size and shape which gives the appearance of megalithic construction indicative of Early Christian architecture. The stone lined causeway connects the oratory to the main ecclesiastical remains located to the W. This structure may have served as a small nunnery church (Ó Carragáin 2010, 223). Local folklore from 1938 recorded that 'St. Mella's house is about a quarter of a mile from the church on the east side in a place called Kell. It is connected with the church by St. Manchan's Tochar. The four walls are standing but the roof is gone. On one of the steps going into the cell there are marks of a heel. There are also the print of toes on two stones in the cell' (The Schools' Collection, Vol. 0810, 134; www.duchas.ie). (Cooke 1875, 343; Crawford 1911, 151-6; O' Flanagan 1933, vol. 1, 82-3; Lionard 1961, 141-5) The hermitage is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-),a tower house (OF015-004001-), church (OF015-004003-), several early christian cross-slabs (OF015-004005-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Holy well (OF015-004007-) togher (OF015-004011) located to the SE of the main church.

As stated above the cell/hermitage is on the eastern periphery of a major monastic complex that was founded in the mid-seventh century and has continued in continuous secular use since that date. A

summary of the surviving components of the monastery is presented below, with further discussion on the significance of Lemanaghan also published in notable previous accounts, including:

- *St Manchan's Shrine* (2022) by Griffin Murray and Kevin O' Dwyer
- *Stories from a Sacred Landscape* (2006) by Caimin O'Brien
- *Lemanaghan Conservation Plan* (2007) by Margaret Quinlan and Rachel Moss

3.2.5 The Monastic Complex

The 2007 Heritage Council commissioned Conservation and Management Plan (Quinlan and Moss 2007) for the site describes the components of the monastic complex in elative detail as follows:

The monastic complex comprises two principal sites. The first is enclosed by a modern graveyard wall and contains St Managhan's Church and house. The second is marked by a rectangular medieval enclosure containing (above ground) a single oratory, St Mella's Cell. The two sites are linked by a medieval togher. In addition to these two elements are a holy well and tree, two bullauns, a collection of early Christian grave slabs and carved stones (now housed in the schoolhouse), and a number of more remote associated archaeological sites and artefacts.

ST MANAGHAN'S CHURCH

As it now stands, the church is rectangular, measuring 19.4m x 7.5m. (63'6 x 24'6) It is roofless, and by 2001 had a vigorous ivy growth on all walls. This was cleared during the summer of 2001. The fabric consists mainly of roughly coursed limestone and sandstone, with dressed limestone details. There are some traces of render on the internal walls.

West Gable: *This survives only to a height of 4.5m. (14'9). It is pierced at the centre by a late 12th-century doorway that survives to only two courses in height. The doorway has squat bulbous bases with leaf spurs and three-quarter engaged shafts. All are of finely tooled limestone. Some further sections of the doorway are lying close by in the north-west angle of the church and in the schoolhouse. The angle quoins of this gable were apparently also dressed but some robbing of stone has occurred.*

North Wall: *The north wall is completely devoid of opes. The only features of note are two clear vertical breaks in the fabric referred to below.*

East Gable*: This is built up on a prominent sloping plinth with fine dressed angle quoins. The gable is centrally pierced by a two-light ogee-headed window with squared hood mould, probably dating to the late 15th or early 16th century. There is a large breach in the wall directly above the east window. Internally, there is a small rectangular ambry to the south of the window.*

***South Wall**: The south wall is pierced by three windows in its eastern end. From east to west, the first is a single light with a cusped trefoil head. The central window was originally a twin light with cusped trefoil heads. The west jamb survives to springer height and the east jamb to three-quarters of its original height. On the west side there is a hood stop with an elaborate vine and rosette motif. The corresponding eastern stop is carved with an amphisbaena5 and a man; it is stored in the schoolhouse. A section of cusped trefoil with foliate ornamentation and a section of mullion, both probably from this window, are also stored in the schoolhouse. The third window is a tall round-headed ope, probably dating to the late 12th century. Internally, the south wall has a niche with a two-centred arch with a piscina. An ambry is situated immediately below the twin light window. A large breach in the wall closer to the west end marks the position usually occupied by a door in later medieval parish churches. It is likely that a 15th/16th-century doorway has been robbed from this position.*

ST MANAGHAN'S 'HOUSE'

To the north-west of the church are the remains of a rectangular building which measures 6.8m x 8.4m. (22'4 x 27'6) Only the south-west angle of the building is upstanding, although the wall footings are still visible. The masonry is similar to the east end of the church, suggesting a 15th/early 16th-century date for the building. Sections of dressed stonework similar to those found in nearby Lemanaghan Castle were removed from the structure some years ago (pers. comm. S. Corcoran). The proportions and apparent date of this structure suggest that it may have functioned as a priest's residence similar to (although smaller than) St Brendan's house at Kilmalkedar, County Kerry.

THE GRAVEYARD ENCLOSURE

A relatively modern wall surrounds the graveyard. Although the date of this is uncertain, it is marked in its present form on the first edition OS map (1837). There is a coffin shelf on the western perimeter of the wall, gates opening onto the Pollagh road, and a track which leads to the well and togher.

One early medieval stone which has been reused as a grave marker remains in the graveyard. It is decorated with a sophisticated fret and spiral pattern similar to forms found on 10th-century high crosses (see Appendix G). Apart from this, the majority of grave markers date to the 19th and 20th centuries. The ground in the graveyard falls quite steeply to the east of the church.

THE TOGHER

The togher is located to the south-east of the church and now appears to link the church and oratory. It is 368m (402 yards) in length with an average width of 4m (13'). Its surface is composed of outcropping limestone and sandstone flagstones. The word togher is generally used to describe a causeway. At most, however, this land would have been marshy, so it is perhaps not a togher in the usual sense. There are several large sandstone blocks in the vicinity of the togher that were probably

pushed into the edges of the fields in which they originally stood. Until the 1980s, there were two large upright stones about mid-way along the togher. These were allegedly dislodged during drainage works and are now in the ditch beside the togher.

ST MELLA'S CELL (KELL) AND ENCLOSURE

The enclosure is rectangular, measuring 41.7m x 30.7m (136'9 x 100'6) and delineated by an earthen bank faced with large slabs of limestone to a maximum thickness of 1.6m (5'3). It is orientated east-north-east. The vegetation and condition of the enclosure wall make it difficult to ascertain the original location of the entrance. The first edition OS, which denotes the building and enclosure as 'the abbey', shows the togher meeting the enclosure wall to the west, while later editions show it twisting around the enclosure to just beyond the south-west corner. With the possible exception of a section in the north-east corner, it appears that the enclosure wall was never rebuilt and may be contemporary with the cell. There is no trace of the foundations of other buildings or of burial within the enclosure.

The 'Kell', 'Kyle' or 'St Mella's Cell' is single-cell oratory, the only unaltered early Christian oratory in County Offaly. It is rectangular and measures 5.5m x 3.1m internally. The walls are 0.8m thick and are constructed from large blocks of mortared masonry, randomly coursed. The doorway, located in the west/north-west end of the building, is square-headed and inclined. The lintel and one of the jambstones pass through the thickness of the wall. There is evidence of an iron door fixing in the north jamb of the ope. The east gable has fallen, and there is some indication of minor repair works. There is no indication remaining of the original form of the east window, and there are no windows in the side walls of the building. The oratory is orientated east/north-east.

ST MANAGHAN'S WELL

The holy well lies to the north of the togher. When it was renovated during the 1930s, four grave slabs in upright positions were revealed, set out in a cruciform pattern.

BULLAUNS

Two bullauns of local sandstone are associated with the site. One is located at the junction between the Clara-Ferbane road and the Lemanaghan-Pollagh road; the other is located at the entrance to the holy well.

CROSS SLABS

There are 12 cross slabs from the site (described in greater detail in the Appendix G). Most are quite crudely carved and therefore difficult to date. However, they are probably early Christian, dating from the 8th to the 10th centuries. The majority are now stored in the nearby schoolhouse, and two are affixed to the wall of St Managhan's Church.

ARTEFACTS ASSOCIATED WITH THE SITE

A number of significant artefacts is related to the site but are now remote from it.

- *St Managhan's Shrine — a 12th-century gilt bronze, enamel and yew wood reliquary casket, now on display in the Roman Catholic parish church at Boher.*
- *The Lemanaghan Crozier — an 11th-century crozier of gilt bronze and wood discovered in two parts in Lemanaghan Bog.*
- *The Wooden Staff — a blackthorn staff discovered stuck upright in Lemanaghan Bog adjacent to a medieval trackway.*
- *Polished stone axe-head — discovered in Corhill Bog to the north-west of Lemanaghan Island.*
- *Stone axe-head — polished stone axe-head, discovered in Straduff townland in 1996.*
- *Flint scraper — Neolithic flint scraper, found during excavation by the IAWU a little to the west of the find place of the stone axe-head.*
- *Spearhead — discovered in Leabeg townland during commercial turf-cutting operations. The blade is oval. The socket, now misshapen, is of circular cross-section and extended to the tip of the weapon, forming a very pronounced midrib on both faces of the blade.*
- *Shoes — One well-made leather shoe and fragments of another were recovered from Curraghalassa Bog. One is post-medieval and the other medieval.*
- *Wooden Finds — Wooden finds from Curraghalassa Bog include the lid and base of a stave-built wooden vessel, probably Late Iron Age, and a number of perforated and dowelled shafts. Parts of an ash-wood turned bowl were found associated with one of the shoes.*
- *A hoard of silver coins, the only find of coins in an Irish bog, was discovered in Curraghalassa Bog. There are 20 coins in all, dating to the reign of King Edward 1 (1279-1301). Nineteen were minted in London and one in Waterford.*

4 Methods

4.1 Aims and scope of excavations

As stated previously, rescue excavations at Lemanaghan (which followed archaeological monitoring) were carried out as a response to the severe storm events on January 24, 2025, which felled four mature trees at the site. Three of these trees fell internally in a northeast direction, with their uprooting resulting in significant disturbance to underlying human remains that the trees had grown through. The main aim of the excavation was to scientifically record and excavate these remains to protect them from further damage and recover them for analysis. A subsidiary aim was to ensure that the site was left accessible and safe.

4.2 Quality management

All excavation, post-excavation, reporting and publication undertakings were carried out, or are currently being carried out, in accordance with the IHS in-house best practices.

4.2.1 Quality control for primary data

Quality control was maintained on-site by the Excavation Director (Dr Denis Shine), site supervisors and key IHS staff. Details of the on-site quality controls are described in 'Recording Methods' set out below. The quality of data at each stage of the post-excavation works was checked and signed off by the Excavation Director. Site records were typed into pro-forma Excel spreadsheets to create a digital database of the archive. This was undertaken through a comprehensive off-site archive checking procedure which involved a full check of all site drawings, survey information, site notes etc. The digital record sheets were populated in line with the IHS style guide so that the quality of the data produced at the earliest stages of the process would be in line with the final output for the reporting and publication requirements. All record sheets were subject to a full check by the Excavation Director for quality control. The data produced is now stored off-site on IHS cloud backup systems, namely One-Drive (see below).

4.2.2 Data processing and data storage (facilities, software)

As stated, all data were typed into pro-forma Excel spreadsheets to create a digital database of the archive. The entry into this digital database was also reviewed and verified by Dr Annamaria Diana, who provided copy-editing oversight throughout the post excavation and reporting process.

For this particular site, virtually all documentation was associated with burials and skeletal remains that were not contained in clearly identifiable archaeological strata, thus osteoarchaeological recording represents the bulk of documentation created and submitted. However, the database also includes digital photographs and site drawings digitised in CAD and/or Illustrator, the results of specialist analysis and PDF archive scans of all drawings. The digital database for projects is backed up to a hard-drive at the conclusion of the archiving process. All data and documents have been uploaded to the IHS cloud-based systems. Microsoft OneDrive is the primary means of storing the digital archive. OneDrive also offers an effective medium for controlled sharing of data and collaborating on documents with remote IHS team members. In cases of lost or corrupted data and documents, OneDrive also allows the recovery of previous versions of data.

4.2.3 Quality control for reports and publications

IHS has a rigorous system of report editing, checking and sign-off for reports and publications. All reports are copy-edited and verified/signed-off by a senior member of staff, who ensure all reports are also compliant with the IHS in-house writing style. Sign-off is typically not completed solely by the Site Director, ensuring that all reports are clear and concise, without any assumed knowledge. For this report all copy-editing and verification was completed by Dr Annamaria Diana.

4.3 Excavation methods

All excavations, including removal of the roots systems, were undertaken entirely with hand-tools and in accordance with excavation specifications detailed in the excavation Method Statements (see also Section 5), including:

- All necessary on-site site illustration, photography, survey and recording were undertaken to meet requirements as detailed in the excavation specifications.
- All spoil was sieved through 5-10mm mesh or less.
- Processing and appropriate bagging of artefacts remains were in accordance with the excavation specifications and policies of the NMI.
- All skeletal materials were excavated strictly under the direction of osteoarchaeologist Dr Annamaria Diana according to best practice guidelines (see below).

4.4 Recording methods

IHS adheres to the *Policy and Guidelines on Archaeological Excavation* (DAHGI 1999), the *Standards for the Care and Treatment of Archaeological Objects from Excavations* (NMI 2022) and the IHS internal fieldwork guidelines for all on-site excavation and recording.

4.4.1 Registers

A detailed and comprehensive recording process was followed including the use of specific pro-forma registering systems such as Burial/Skeletal Sheets, Drawing Records, Photograph Records, etc.

4.4.2 Excavation, written descriptions and records of archaeological features

Given the complex and unusual nature of the site, excavation and recording methods had to be adapted to successfully carry out fieldwork. Concerted attempts to identify and record stratigraphy were made, although disturbance by tree roots and soil collapse effectively removed clearly identifiable archaeological strata in most instances. All archaeological features/deposits and burials were carefully photographed (Appendix 1.6), drawn (Appendix 1.4) and recorded (Appendix 1.1). As well as the registering system employed on site, specific pro-forma recording documentation were used to record the composition, stratigraphic relationships and interpretation of all features, where identifiable.

4.4.3 Drawing of archaeological features

Each burial and tree bole was drawn to a scale deemed appropriate. Plans were generally recorded at a scale of 1:10, with cross-section and/or long-section drawings typically taken on this site using photogrammetry. Each tree bole was recorded through scale drawings as well as by surveying equipment. Site plans recorded all skeletal remains and archaeological features identified on the site and were carefully checked, scanned, and digitised where appropriate.

4.4.4 Photographic recording and videography

All archaeological features were photographed at relevant stages (i.e. pre-excavation, mid-excavation and post-excavation at a minimum). Typically, a digital camera with a pixel count of eighteen million pixels was used to take high quality photographs suitable for use in reports, presentations, displays or publication. Where practicable, care was taken to ensure that the portion of the excavated area visible within the photograph was clean and clear of spoil, tools and equipment, tarpaulins, etc. Photographs included a north arrow and appropriate scale. Aerial drone photographs, typically using a DGI Mavic Pro, were also taken of the excavation (these were also used in the preparation of 3D photogrammetric models). In addition to the registered site photographs a second camera was also employed on site to capture constant images throughout the excavation process; this was done due to the constant imminent risk of the collapse of the root plates and the human remains they contained. Finally, a limited amount of video footage and drone footage was taken. This was captured with a view to

preparing an educational video on the site and the excavation, as part of a wider series of videos on Lemanaghan monastery (see Section 10 for more details).

4.4.5 Surveying

Initial site surveying was undertaken using a Pentax R-2505NS Total Station. This survey captured the location of the fallen trees and the areas of disturbance but also laid out three local gridlines at each root bole, which were then used throughout both the monitoring and excavation stage of works. As a matter of course, survey data was also quality checked regularly and downloaded to a secure format as part of the IHS quality control procedures.

4.5 Finds retrieval and sampling methods

The treatment of artefacts and human remains for the project complied with the policies of the NMI as set out in Standards for the Care and Treatment of Archaeological Objects from Excavations (NMI 2022), the Code of Conduct for the Treatment of Archaeological Objects ratified by the Institute of Archaeologists of Ireland (IAI 2006) and the Technical Paper for Archaeologists for the Treatment of Human Remains (IAI 2006). One find only (an iron knife blade, Appendix 3.1) required immediate conservation or specific storage requirements; this was promptly recovered in line with the guidelines set out in First Aid for Finds (Watkinson and Neal 1998) and sent to conservator Susannah Kelly.

4.6 Specialist contributions and/or consultations

The IHS engages a suite of specialists for analyses of different material/artefact types. For samples requiring radiocarbon dating IHS engage the services of Queens University. Dr Órla Scully (metal) and Dr Annamaria Diana (human osteoarchaeology) were engaged, as appropriate, to analyse the artefactual and human skeletal remains from Lemanaghan.

As with all our excavations, these specialists not only provided specialist contributions but were also available for consultation or to give advice on sampling strategies, sieving regimes, artefacts retrieval etc, throughout the course of the excavation. As stated, Dr Annamaria Diana was also on site for the entirety of the excavation, to direct the recovery and recording of the human remains.

4.7 Conditions

Whilst the excavation occurred in October field conditions were generally favourable with no rain, meaning remains were not exposed to adverse weather conditions. Unfortunately significant disturbance of the human remains, including erosion from their original context, was observed on site

due to the timeframe between exposure and final excavation (January to October). Conditions were also favourable during the monitoring phase of works.

4.8 Constraints on methods

There were no specific constraints on methods, other than the exceptional nature of the excavation itself. With particular reference to Tree Bole 1, Burials 1 and 2 were in imminent risk of partial or whole collapse. To mitigate against this risk extreme care was taken during excavation, whilst a continuous record of progress photographs and photogrammetric models was captured to ensure a record existed should the tree bole sediments collapse.

4.9 Dissemination

A programme of both publication and dissemination has already been started. This programme is described in full in the Community Archaeology Report in Section 10 and so is not elaborated on here.

5 Archaeological Monitoring, Excavation and Recording

As stated, the archaeological works were undertaken in direct response to storm damage caused by Storm Eowyn to the enclosure at Lemanaghan (Figures 5.1-5.4), which resulted in the exposure of human remains.

5.1 Phase 1 - Recording and Monitoring Works

5.1.1 Archaeological Survey and Recording of Human Remains

Phase 1 archaeological works, also conducted under licence 25E0558, included a visual record of the human remains in situ, collection of three suitable pieces of bone for C14 dating, tree surgery of all the fallen trees and attempted reinstatement of the tree root systems. Unfortunately, the root plates could not be levelled during initial site works due to significant 'bedding' of the root plates and erosion of their sediment into the underlying cavities. The methodology for the works was agreed during a site visit on May 19, 2025, between NMS archaeologist Grace Fagan, Heritage Officer Amanda Pedlow, Site Director Dr Denis Shine and arborist Dermot Ward, and was designed to accurately record the damage and any exposed human bone (which was to be left in-situ), whilst addressing the fallen trees in an appropriate and safe manner. With the exception of the tree boles not moving from their up-rooted position, which was acknowledged as unlikely during the site consultations, the works were completed successfully.

Before any site works, the tree boles were carefully surveyed, with a localised grid established for recording purposes (notably for photogrammetric recording of the tree-bole 'sections') (Figure 5.4: note, this grid was also used for the excavation itself). Photogrammetry of the tree-boles and root plates was then undertaken (to be used to create scaled photogrammetric sections off site) (Figures 5.5-5.6), before three human bone fragments were collected for C14 dating, one from each tree bole. Visual inspection and recording of any exposed remains were undertaken strictly under the direction of osteoarchaeologist Dr Annamaria Diana according to best practice (including The Treatment of Human Remains document by the Institute of Archaeologists of Ireland - IAI 2004) and the Code of Conduct for the Archaeological Treatment of Human Remains document by the IAI (2006). As stated, all skeletal remains were left 'in-situ' with only a record taken, including appropriate photographic, written and drawn records.

Recording of the human remains on site was complimented by reference to the records taken by the NMS archaeologist and osteoarchaeologist, Dr Linda Lynch. A brief record of loose DHB encountered on the ground surface of the site was also captured shortly after storm Eowyn; at this time this bone

was placed back in the adjacent tree-boles and covered with loose topsoil for safekeeping, but not before a photographic record was taken and ultimately provided to Dr Annamaria Diana. These remains were not re-exposed during Phase 1 to avoid adversely impacting any additional skeletal material, but their initial discovery is detailed below. Finally, the NMI removed human bone from the site during two site visits. This was returned to the IHS and included in the final analysis.

It should be noted that, when collectively considering the IHS' own on-site observations with personal communication shared by locals (including the first person to assess the site after the storm) and with information reported in the NMS report, it is clear that the position, presence, number and distribution of skeletal remains has altered over the long period of time between the remains discovery in January and their documentation in June; as such, the information reported for Phase 1 works is representative only of the moment that the remains were first recorded. A much more detailed account of the bone in the root plates is given in Section 5.2, which details the skeletal remains as they were unearthed in October 2025.

Exposed human skeletal remains, within and below (where possible) the three root plates, were visually inspected, photographed and recorded. Generally, while some bones – both isolated or as clusters of disarticulated fragments – were more prominently exposed, others were covered by (and trapped within) roots and soil. In most cases, complete disarticulation and commingling were observed, although in others – described in detail as preliminary observations in this report – it was possible to assess some degree of articulation, providing proof of the presence of anatomically connected skeletal remains and a hitherto unknown historic burial ground, that was disturbed by the storm in January 2025.

Tree Bole 1

'Tree 1', the largest of the fallen trees disturbed an area of over 4m in width (Figure 5.5) when first recorded. At the time of the inspection at the end of June, human remains were visible on the west-facing view of the dislodged soil and root plate, and inside the tree bole, more precisely skull fragments/elements in the former and rib and long bone fragments on the south-east end of the latter. Although it was not possible to be sure of the extent, position and orientation of the disturbed burial(s) from the visible section at the time, the 'silhouette' of a cranial vault, a mandibular condyle and axis from the second cervical vertebra were in close vicinity and therefore most likely indicating articulation. A fragment of cranium was also present just below these skeletal remains, in the pit, certainly fallen from the skull embedded in the section. The landowner and community members also confirmed that a full skull was present when they initially visited the site after the storm.

Tree Bole 2

Skeletal remains from Tree Bole 2 were recorded only within below ground level in the cavity/pit left by the uprooted tree (Figure 5.6). At the bottom of this pit large and medium sized stones surrounded several fragments of ribs and spinal elements – at least six rib fragments, one spinous process and one vertebral body were counted at the time. This cluster (which seemed to extend within the root plate and beyond the exposed roots), probably indicated the presence of the thoracic area of an articulated burial – now disarticulated but still displaying anatomical vicinity. This was confirmed by Dr Linda Lynch's observations. No skeletal remains were observed on the uprooted 'section' at the time of the visit, although one small cranial fragment (included in the DHB database) was collected by the NMS on their second visit to site.

Tree Bole 3

This was the most 'stratigraphically' complicated tree bole recorded on site (Figure 5.7). The 'section' created by the root plate was elongated in shape and presented sparse and clustered bones on its west half. At first appraisal, the (partially) exposed bones and bone fragments were disarticulated and commingled. However, after closer inspection, some of the bone displayed a certain degree of articulation, specifically hand bones (possibly metacarpals) located in the lower mid-section of the root plate. Further west of this cluster was a humeral shaft, which possibly corroborated the possibility of a partially articulated arm. Similarly, just above the hand bone cluster, a femoral head and possible associated pelvic bones could be observed. Given that the assessment was carried out exclusively by visual inspection without removing or disturbing the bones from their original location, definitive identification was not possible at the time. Other fragments observed included the possible distal end of a femur and a long bone shaft in the same area of the plate; on the westernmost point of the root plate several bone fragments could also be seen through the roots, within very loose soil. The findings were consistent with the presence of disturbed articulated burial(s), orientated east-west according to the customary Christian ritual, with the lower and upper limbs still in line with said orientation, despite being lifted up from their original position.

Tree Bole 4

No human bones or any archaeological features or materials were observed in Tree Bole 4.

Bones returned by the NMS

A box returned to the IHS from the NMI, after being removed during a site visit, contained: two rib body fragments (one including the sternal end), two associated fragments of right pelvic bone (with a wide greater sciatic notch indicating a female individual and auricular surface indicating an adult), one fragment of the inferior end of the sacrum, and two small fragments from the ilium. These bones were to originally be reinterred on site but could not be reburied when the root plates could not be repositioned during monitoring works. They have now been incorporated into the larger assemblage from Stage 2 excavation works. In addition to these remains the NMI also collected further remains from the site in early October 2025. These remains were also returned to the IHS and also incorporated into the final osteological dataset (Section 5.3).

5.1.2 Archaeological Monitoring

After archaeological survey and recording of the human remains, as detailed above, the trees themselves were removed by arboriculturist Dermot Ward as per the specifications agreed on site on May 19th, and subsequently submitted to the NMS as part of the agreed archaeological Method Statement (Figures 5.8-5.15).

Branches were chipped on site, with the tree trunks cut into small sections and transported off site into the field to the immediate west of Mella's Cell enclosure – from which point they were to be taken by the landowner. Movement of the chipper and specialist mini digger/bobcat was carefully monitored and managed - with heavy duty protective matting used where required. Works were also conducted in fine weather in July when ground conditions were hard and the ground surface was unlikely to be impacted.

Particular care was taken entering the monument, which could only be accessed safely at a small break at the enclosure's northwest quadrant, where the bank is already denuded. Protective matting was used at the access point (Figure 5.14). Finally, a few loose stones directly north of the oratory (deriving from conservation works that Margaret Quinlan supervised at the site in 2007) were in the way of tree surgery works and were moved *c.* 4m to the south (with arrangement of the authorities and landowner) to permit access at this side of the site. All activities involving machinery, including site access, were carefully supervised by the monitoring archaeologists, with no damage or disturbance to the site surface occurring during works.

It was hoped that when the trees were removed the root plates might 'fall' back toward their tree boles. However, the root plates had been 'bedding in' for several months, and it was acknowledged during the site meeting of May 19th that these root plates may not return to the original position (or leave a level surface). Unfortunately no movement occurred in the root plates during monitoring

works. As such the IHS were engaged to undertake a second separate phase of work, when the root plates were excavated by hand under an extension to the existing license.

5.2 Phase 2 - Archaeological Excavation

5.2.1 Description of excavation works

The excavation works included the following main components (see also Section 4):

- All works were carried out under an extension to the existing licence, in strict accordance with the submitted Method Statement.
- All excavation works (including the full removal of wood chippings installed as a temporary measure during the monitoring phase) were conducted and recorded to the standards of an archaeological excavation. The works included the full excavation of human remains within each internal root plate under the direction of both Dr Denis Shine and Dr Annamaria Diana.
- All excavation was conducted strictly with hand tools, with written, drawn and photographic records taken throughout the process. All excavated spoil was sieved through 5-10mm mesh. As previously stated, all skeletal materials were excavated according to best practice (including The Treatment of Human Remains document by the Institute of Archaeologists of Ireland (IAI 2004) and the Code of Conduct for the Archaeological Treatment of Human Remains document by the IAI (2006).
- In accordance with the Method Statement, skeletal remains below ground level, were preserved in situ where possible, with all unnecessary ground disturbance strictly prohibited and not proceeding past where the root boles met the ground surface.
- The overall scope of the work was to recover human remains laid bare in the exposed root plates to ensure their protection whilst leaving a safe site, without trip hazards or cavities. Soil garnered during the excavation of the root plates was used to landscape a good level finish on site – before the excavated areas were reseeded.

5.2.2 Excavation results

From October 11th to 16th, Phase 2 archaeological excavations aimed to systematically 'excavate' the internal root plates, recording and lifting both in situ and disarticulated human skeletal remains encountered above ground level (Figures 5.16-5.18 show each tree bole prior to commencing works on October 11th). A total of four articulated burials – identified as Burials 1, 2 (in Tree Bole 1), 3 and 4 (in Tree Bole 3) – were carefully exposed, documented and lifted (Figures 5.19 and 5.20). Tree Bole 2 did not yield any skeletal remains at the time of excavation. Of note, given that possible grave cuts were only identified for Burials 1 and 2, while archaeologically they were all referred to as 'burials'

during excavation, in the Osteological Report (Section 6) individual skeletons are reported by Skeleton number based on the principle that the term 'burial' includes both the archaeological features (grave cut, fill) and the articulated skeletal remains (Skeleton no.) contained with them.

As stated, fieldwork circumstances were very unusual and required a 'creative' approach of extremely cautious, meticulous and systematic excavation to expose the bone without causing the collapse of large sections of the root plates, which were unfortunately incredibly dry and unstable especially in areas were the soil was embedded within roots. Notwithstanding the excavation's exceptional nature, with care it proved possible to expose both fairly well and poorly preserved, if partial, articulated burials.

For each root plate, the same approach was followed: 1. Careful progressive manual removal of smaller roots to allow exposure of soil and bones; 2. Excavation and recording (photographing and planning) of all skeletal material; 3. Removal of bigger roots (carried out manually to avoid damage to the burials and only after an initial record of the burials was captured); 4. Lifting of burials and disarticulated bone; 5. Excavation down to ground level/sterile layers; 6. Landscaping of the impacted areas to a level/safe surface. As stated, all soil recovered was also sieved to ensure no bone fragments or possible artefacts were overlooked.

Tree Bole 1 – Excavation and in situ description of Burials 1 and 2

All roots extending over and beyond the 'section' of the root plate were carefully removed (Figure 5.21). From the collapsing east side of the root plate, an articulated lumbar and sacrum were retrieved, while the rest of the articulated spine and ribs could also be seen at *c.* 40cm from this group of bones. After further exposure of the skeletal remains and the observation of a possible grave cut, they were identified as Burial 1, occupying the east side of the root plate. The left side of the thorax, left arm, upper spine and skull were subsequently exposed in situ (Figures 5.22 and 5.23). The right side of the body had been truncated, with portions of the burial also possibly further being dispersed from the root plate in the months between the storm and excavations. Thoracic, lumbar vertebrae and sacrum fragments had half fallen/completely fallen from the section to the ground at the time the excavation works started and were collected immediately; these could be confidently associated with the burial when the rest of the skeleton was exposed. Femur fragments were also exposed at the bottom of the section towards its eastern limits; it was not possible to establish whether they may relate to Burial 1. Skeleton 1 was precariously embedded in dry compacted yellow clay, which was prone to collapse in large chunks if not carefully excavated, with the skull in a particularly unstable situation, positioned on top of an undermined 10-15cm deep 'lens' of dry soil protruding south of the main section face (Figure

5.24). Despite these challenges, collapse was avoided and in situ bones were successfully exposed, documented and lifted, while the grave fill excavated down to the base of the possible grave cut ([**F1005**]). This cut was *c.* 60cm in width, but only 5-10cm in depth; its fill (**F1004**) was a marginally siltier clay than the surrounding clay deposit and was also slightly more fawn in colour; the grave fill contained frequent small stone inclusions but was otherwise sterile. The cut's length and shape were unclear, with its full form masked by root disturbance and collapse of the deposits (Figure 5.19). Whilst only a shadow of the cut was preserved along the burial's western side and its shape was very unclear it seemingly had an imperceptible break of slope at the top, sloping sides and imperceptible break of slope at the base, which was flat (Appendix 1.1).

As stated, Skeleton 1's right side of the upper body and right pelvis, as well as the lower limbs, were truncated by the fallen tree. The head was lying on the individual's left side, maxillary and mandibular dentition were in excellent state of preservation (Figure 5.25); the skull would also have been very well preserved if not for crushing and fragmentation caused by soil pressure and root activity. The left arm was parallel to the body, with the hand resting just below the left pelvic area, of which only the heavily crushed and fragmented ilium survived. Dentition and stage of fusion of the bones indicated an adult, possibly young. On the east side of the tree plate three femoral midshaft fragments were exposed – and retrieved as DHB given the lack of physical association or articulation with Burial 1 – from the brown and yellow deposits. Crucially, a rib Burial 1 was dated to 662-817 cal AD (Appendix 3.2).

On the west side of the root plate, the skull 'profile' recorded by both the IHS and NMI was used as reference point to assess whether an articulated burial (Burial 2, including individual Skeleton 2) was still in situ. Much like Burial 1, this inhumation was difficult to excavate and lift, in this instance due to very large roots growing through the lower limbs, pelvis and upper limbs area –with the skull only barely held in place and suspended by small and large roots. Burial 2 was also positioned in an awkward diagonal/sloping position, due to the way the tree had uprooted and 'lifted' it when falling (see Figure 5.26 for the burial position in relation to the roots and ground level). This individual's skull was the only exposed skeletal element at the time of discovery of the human remains on site and was thus subjected to more post-depositional and taphonomic damage – with fragments fallen from it being recorded by both the NMI and IHS – and returned to the underlying tree cavity for their preservation on first discovery. The nearly complete spine, right shoulder and arm (including the hand), pelvic girdle and both femora – truncated at the knee joint by the tree – were carefully exposed and recorded (Figures 5.27 and 5.28). The left arm was missing, the closest to the 'border' of the tree plate and thus most likely amongst the bones fallen and obliterated within the pit when the tree fell down. The first element of the sacrum was fused, indicating an adult older than 30-35 years of age. The surviving skull elements, including the right side of the facial bones and cranial vault, were very fragmented, same as

part of the mandible and maxilla and associated dentition but were still held in place by roots and kept in situ for as long as possible to allow photographs and assessment (Figure 5.29).

Similar to Burial 1, a possible heavily disturbed grave fill (**F1006**) was recorded, consisting of fine yellow clay with small stone inclusions, which was quite compacted immediately close to the bones. No clear shape for a grave cut could be discerned except for a 'shadow' of a possible cut, 1.6m long and 0.7m, wide along the burials eastern edge. This cut was assigned the number [**F1007**]. While the cut could not be accurately discerned it was recorded based on a subtle change in soil compaction as having a possible imperceptible break of slope at the top, sloping sides and imperceptible break of slope at the base, which was flat (Appendix 1.1). Of note, observations provided by the initial NMI report were consistent with both our preliminary notes in Phase 1 and the subsequent identification of Burial 2.

Finally, composition of the soils in the root plate weas also recorded and included (in order from top to bottom): 1. Dark brown friable and loose humus-rich topsoil (**F1001**). This was extremely dry and crumbly, with heavy root disturbance – a single ferrous blade recovered from this layer was assessed by specialist Órla Scully (Appendix 3.1); 2. Compacted yellow clay containing frequent large stones and heavily disturbed by roots (**F1002**). The graves were seemingly cut through this layer; 3. Indurate 'sterile' grey and yellow gravelly clay, later clarified as subsoil that has been disturbed by the falling trees (**F1003**). Similar stratigraphy was recorded at the other tree boles (Appendix 1.1).

Tree Bole 2 - Excavation

The root plate was excavated to ground level, with all material being sieved. However, no human skeletal remains were encountered, and no archaeological features were recorded. Consequently, Tree Bole 2 was the first to be completed and 'backfilled'. As stated, human remains were recorded below ground level in the bole during Phase 1 works, prior to the partial collapse of the root plate. These remains have been described above and in the NMS report. Of note, attempts to radiocarbon date a piece of bone collected from Tree Bole 2 during monitoring works proved unsuccessful.

Tree Bole 3 – Excavation and in situ description of Burials 3 and 4

The area around Tree Bole 3 was cleared of any roots extending beyond the root plate 'section' and carefully cleaned (Figure 5.30), revealing that several bones had further fallen off the root plate since Phase 1 recording in June (Figure 5.31). This included some of the bones recorded by both the NMS and IHS as embedded in the root plate, which had since been clearly dislodged and fallen to the ground (namely, one femur, one humerus broken in three fragments, one radius, one rib and one fragment of pelvis – the acetabulum; the rest of the pelvis had been previously lifted and taken by the NMI for

preservation). Hand bones just below the area where they were recorded as articulated in June were at the time of excavation unfortunately mostly disarticulated.

After recording and lifting all superficial DHB – including sparce cranial vault fragments at ground level, on the east part of the root plate – excavation progressed. Articulated lower limbs (femur, tibia and fibula and feet bone fragments from the right and left leg, crushed and overlapping) were subsequently labelled Burial 3 (Figure 5.32). No grave cut or fill was apparent. A femoral fragment from Burial 3 was successfully dated to 707-939 cal AD (Appendix 3.2).

Adjacent to Burial 3, and under very large roots, another inhumation (Burial 4, Skeleton 4, Figures 5.32 and 5.33), whose right leg was initially believed to be Burial 3's right leg given the spatial relation (location and distance) between the bones, were exposed. Skeleton 4's left femur and proximal tibia were, in fact, found sloping down towards the west (the foot was at the level same level as Burial 3 and the knee joint at ground level). Furthermore, as mentioned, numerous hand bones had fallen from the west side of the baulk, which, together with the other DHB including arm bones, represent the upper limb of the two burials, commingled as superimposed and later disturbed by the fall of the tree. Therefore, only the lower limbs of Skeletons 3 and 4 were articulated in situ and could distinctively be associated with either burial after osteological analysis. It is interesting to note that these two individuals were laid in very close proximity.

Although similar to that encountered in Tree Bole 1, composition of the soils in the root plate was slightly different, consisting of, in order from top to bottom: 1. Dark brown friable and loose humus-rich topsoil (**F3001**), heavily disturbed by roots; 2. Yellow silty clay containing frequent stones from very small to large in size and notably more friable because of root disturbance (**F3002**) – as in Tree Bole 1, the graves were seemingly cut through this layer, although no cuts were discernible; 3. Indurate 'sterile' grey and yellow gravelly clay, later resolved as subsoil that has been disturbed by the falling trees (**F3003**).

6 Osteological Report

6.1 Introduction

The present human osteoarchaeological report was commissioned by the IHS, to include analyses of four burials and a disarticulated bone assemblage recovered from the site of Lemanaghan, Mella's Cell (Licence No. 25E0558, Monument No. OF015-004006-; a hermitage), Co. Offaly in October 2025.

Specialist work carried out to produce this document entailed the excavation and post-excavation processing of the skeletal remains, the creation of protocols from their recovery to storage according to standard guidelines and policies, the creation of individual recording sheets and a dataset including all data obtained from the analysis, and finally the osteological analysis and bioarchaeological interpretation of data collected from the skeletal assemblage. As detailed in Section 5.1 and Appendix 3.2 of this report, radiocarbon dating of human bone samples – one femur and two rib fragments – retrieved from the three tree boles revealed that the burials date between cal AD 662 and 939 – a crucial time defining the early medieval period in Ireland.

The skeletal assemblage recorded (and recovered) during fieldwork at the site consisted of four articulated supine inhumations – Burials 1-4 in Tree Bole 1 and Tree Bole 3 (henceforth mentioned as TB1 and TB3), containing Skeletons 1-4 – and over 500 disarticulated bone fragments. To these, one possible articulated burial (identified by both the NMI and IHS survey teams in January 2025 but massively eroded and below the limit of excavation in October 2025 and therefore not re-identified, excavated or lifted) can be added.

This report details the results of the analysis and interpretation of data collected from articulated Skeletons 1-4 and both associated and non-associated disarticulated human bone, also including complementary and supportive data collected in Appendix 4A (articulated skeletons catalogue), 4B (DHB database), 4C (supporting data) and 4D (metric measurements).

As typical of the Christian funerary practice, the burials were all oriented east-west, with individuals laid supine, their legs extended and forearms resting on the abdominal area (Burial 2), or along the body (Burial 1). The following burial typologies were identified:

- *Articulated individual burial*, including a relatively complete skeleton (>50% of the skeleton present) – Burial 2
- *Incomplete articulated burials*: still in anatomical connection, and constituting roughly of <50% of an articulated skeleton (Burials 1, 3 and 4)

- *Disarticulated human bone (DHB) or commingled remains*: some certainly from one of the four identified burials, others from disturbance of previous inhumations.

6.1.1 Aims and objectives

Excavation, post-excavation treatment, and analysis of all human skeletal remains from this site were carried out in concordance with general guidelines outlined by the Institute of Archaeologists of Ireland (IAI – The Treatment of Human Remains, 2004; Code of Conduct for the Archaeological Treatment of Human Remains 2006; Keating 2024).

Osteological analysis of human skeletal remains from archaeological and forensic contexts is delivered through standardised methods and is paramount not only to biological profiling and for the observation of sexual dimorphism and robusticity, but also for the identification of trends in disease prevalence, skeletal development, mortality by age groups, and dietary patterns. Articulated inhumation (individual or multiple) burials are most informative because they provide insights into burial practices, taphonomic processes and allow the anatomical and paleopathological analysis with relative knowledge of depositional factors. On the contrary, disarticulated and commingled bones present additional challenges because they are de-contextualised from their original burial location, generally more fragmented, and lacking anatomical connection because of post-depositional disturbance. Thus, while for articulated burials it is possible to carry out a full assessment by individual, disarticulated remains must be recorded assuming each bone might be from a different individual and then observed as a group to assess minimum number of individuals.

6.1.2 Methodology

Skeletal remains were processed in post-excavation prior to analysis. All bones were cleaned with soft, slightly dampened brushes to remove excess soil without further damaging them and to facilitate the observation of cortical bone surface, anatomical traits, and diagnostic features. Soil removed during this process, or remaining in the trays, was dry- and wet-sieved to recover small bone fragments and possible other organic and inorganic components. The bones were then left to dry completely at ambient temperature, away from direct sunlight.

To carry out the osteological evaluation, skeletal remains were laid out in anatomical position on a black foam mat; post-mortem broken bones were temporarily reconstructed. Skeletal datasets and recording sheets were completed (inventory, metrics, biological profile, pathological changes) while macroscopically inspecting the bones (with a magnifying glass when appropriate) and photographs of diagnostic and pathological details were taken. For Burials 1-4 individual skeleton inventories were

filled out both as visual charts (Appendix 4A) and coded datasets (submitted to CRDS/IHS as digital data available upon request), while for the DHB assemblage each element recorded was given a unique identification number on the master inventory (Appendix 4B). Fields recorded were feature number, DHB number, bone identification number, skeletal area, skeletal element, description, anatomical side, preservation score, completeness, diagnostic measurements, age category, age by years, biological sex, pathological lesions, and non-metric traits.

Guidelines provided by human osteology and forensic anthropology manuals (İşcan and Loth 1989; Buikstra and Ubelaker 1994; Bass 2005; White and Folkens 2005; Schaefer et al. 2009) and methodological case studies (e.g. Saunders et al. 1992; Bedford et al. 1993; Baccino et al. 1999; Bello et al. 2006) were followed to assess the biological profile of the skeletal remains under study (Appendix 4.C). The identification process is crucial for the analysis of human skeletal remains because the anthropologist often relies on fragmented and/or reconstructed rather than complete bones. As a result, successful data collection on skeletal remains is directly proportional to their condition and, of course, to the experience of the observer. The better the preservation, the more inspection of diagnostic features and measurements are facilitated. State of preservation of articulated skeletons and individual bones is assessed through the observation of two characteristics: 1) condition of the cortical bone and 2) completeness (Table 6.1). The former was scored on a scale of 1 to 5 (1 = very poor; 2 = poor; 3 = fair; 4 = good; 5 = excellent). Completeness of the skeletons and DHB was assessed by percentage of bone present (<20%, 20-40%, 40-60%, 60-80% and >80%), and with a score for completeness of the skeleton, calculated according to the percentage of the bones present in relation the total number of bones in a complete skeleton – Skull = 20%; Torso = 40%; Arms = 20%; Legs = 20% (Buikstra and Ubelaker 1994).

Table 6.1. State of preservation – completeness and condition scores.

Completeness	Condition/cortical bone degree of damage
<20% present	Very poor
20-40% present	Poor
40-60% present	Fair
60-80% present	Good
>80% present	Excellent

Dentition, both loose and associated to a socket, was examined and recorded using the FDI (Word Dental Federation) method, where each tooth is assigned an individual two-digit number – as shown in the diagram below (Table 6.2). The first digit represents the location in the mouth (quadrants 1 to 4 for permanent teeth, and quadrants 5 to 8 for deciduous teeth starting from the right maxilla in a clockwise direction) and the second digit represents the tooth (1 to 8 for permanent teeth, 1 to 5 for deciduous ones).

Table 6.2. FDI dentition identifiers.

PERMANENT DENTITION

Right maxilla															Left maxilla
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
Right mandible															Left mandible

DECIDUOUS DENTITION

Right maxilla									Left maxilla
55	54	53	52	51	61	62	63	64	65
85	84	83	82	81	71	72	73	74	75
Right mandible									Left mandible

Measurements were taken to the nearest 0.01 mm with a sliding calliper, an osteometric board, and measuring tape on complete or reconstructed bones according to guidelines by Buikstra and Ubelaker (1994) and Bass (2005) and always on both sides if present (Appendix 4.D). Cranial and post-cranial measurements can be used for the estimation of age, sex, ancestry, and for the calculation of indices, stature and the comparison between populations (Buikstra and Ubelaker 1994, 69; Larsen 2015; Pietrusewsky 2008).

After evaluation, human remains from each burial context and disarticulated human bone were photographed and bagged in high-quality sealable finds bags by anatomical element/side/bone or DHB number; they were then carefully placed by burial/DHB identification number in archival quality boxes ensuring their preservation and storage to the highest standards, as directed by the National Museum of Ireland guidelines (NMI 2022).

6.2 Analysis

The following sections detail results of the evaluation of data collected from skeletal remains in Lemanaghan. Biological assessment was performed by means of standardised methodologies based on data built on modern, forensic and archaeological skeletal assemblages against documented biological profiles. Articulated skeletons are also described in detail individually in the Catalogue (Appendix 4A) while analysis of the DHB assemblage is discussed as a whole in Section 2.2 below and a detailed inventory reported in Appendix A.

6.2.1 Articulated burials

State of preservation

Bone condition and completeness is determined by intrinsic (bone chemistry and composition, as well as the individual's robusticity, age, sex, and health status) and extrinsic (burial practices, environmental agents, human activity, excavation methods, and others) factors (Henderson 1987). Number and completeness of bones present and condition of the bone at the macroscopic level (presence of weathering, erosion, post-mortem damage, discoloration and breakage) were considered to define the state of preservation of skeletal remains retrieved at Lemanaghan (Table 6.3).

Skeleton 1 displayed a high degree of post-mortem fragmentation and diverse preservation patterns. While cortical bone surface was overall fairly preserved, with some bones yielding more evidence of taphonomic damage than the others – root erosion, weathering and discolouration mostly – the skeleton was incomplete, missing the right arm and lower limbs and virtually a large part of the cranial vault and thorax. Surviving bones – particularly the spine and ribs – were also extremely fragmentary and incomplete. Embedded in a very compacted, dry area of clayey soil, the maxillae and mandible, however, were very well preserved in situ (Figure 5.25 and Figure 6.1).

Skeleton 2 was the most complete of the articulated burials, with only the lower half of the legs, left arm and right humerus missing. However, erosion of the cortical surface was high and the bones were, again, considerably fragmentary.

Both Skeletons 3 and 4 were represented by articulated lower limbs exposed across the central portion of the root plate, and disarticulated commingled bones from their upper limbs, thorax and pelvis, collapsed from the west end of the plate over the course of the months before excavations were undertaken. Luckily, the difference in age between the two individuals (Skeleton 4's bones presented immature epiphyses and fusing lines, while Skeleton 3 was an older adult) allowed the segregation of Skeleton 4's hand bones and attribution of the pelvic bones and upper limbs to Skeleton 3 by exclusion. The latter's bones were the most affected by taphonomic damage and root activity, which had pierced

and fractured most of the bones. Skeleton 4 displayed similar taphonomic patterns, including some dark, burned-like staining (Figure 6.2), but almost complete feet, which were protected by a root arching over, and not growing through them (Figure 6.3).

Table 3 below summarises the outlined descriptions and preservation scores for articulated Skeletons 1-4.

Table 6.3. State of preservation of articulated skeletons from Lemanaghan.

Skeleton #	Condition	Completeness	Overall
1	Fair	Skull 10% Torso 25% Arms 10% Legs 0%	45%
2	Good	Skull 5% Torso 35% Arms 10% Legs 10%	60%
3	Poor	Skull 0% Torso 5% Arms 5% Legs 15%	25%
4	Good	Skull 0% Torso 0% Arms 5% Legs 15%	20%

Age at death

The age of a skeleton is defined by standard techniques. In the adult, the ageing process is expressed by degeneration of the bones, especially in areas subject to physiological stress, particularly at the level of joints and cartilage-to-bone areas, rather than by growth and development like in juveniles. Age determination was carried out by observing, scoring, and recording epiphyseal fusion and the morphology of diagnostic features (Buikstra and Ubelaker 1994; Schaefer et al. 2009), specifically: in adults, dental attrition (Scott 1979; Brothwell 1981, 1989; Smith 1984), the pubic symphysis and the auricular surface of the ilium (Todd 1920; Lovejoy et al. 1985; Brooks and Suchey 1990; Buckberry and Chamberlain 2002), stage of fusion of the medial clavicle (Black and Scheuer 1996) and of the sacral elements (Schaefer et al. 2009) and appearance of sternal rib ends (İşcan et al. 1984; İşcan and Loth 1989). For juveniles (sub-adults) dental development and eruption (Gustafson and Koch 1974; Ubelaker 1989) as well as long bone lengths (Schaefer et al. 2009) and epiphyseal fusion (Scheuer and Black 2004) were evaluated for age estimation. For disarticulated remains, selection by age was first undertaken by roughly distinguishing adult and juvenile bones, followed by narrower brackets when possible.

Age group categories considered in this study were: foetus (up to 40 weeks in utero), perinatal (around the time of birth), infant (newborn to two years), young child (2-6 years), older child (6-12 years), adolescent (12-18 years), young adult (18-25 years), young middle adult (25-35 years), old middle adult (35-45), old adult (over 45 years). The generic 'Adult' (over *c.* 18 years of age) or 'Juvenile' (below approximately 18 years of age) were assigned to fragments that could not be more accurately assessed, but that displayed enough elements to decide whether they were mature or immature.

Dental attrition could be used for the estimation of Skeleton 1 and 2's age, while auricular surface of the ilium and fusion of the sacral elements could be evaluated for Skeleton 1, Skeleton 2 and Skeleton 3. Skeleton 4's fusing epiphyses indicated a juvenile – the youngest individual amongst the four articulated inhumations. According to these observations and resulting composite scores, Skeleton 1 was a young adult (most likely in their early 20s), Skeleton 2 a young middle adult, Skeleton 3 an old middle/old adult and Skeleton 4 an adolescent/very young adult (Appendix 4C).

Biological sex

Reliability of sex identification is vital for the reconstruction of a population's biological profile, although accuracy is contingent upon the completeness of skeletal remains (Meindl et al. 1985, 79). Sex estimation was carried out only on adult skeletal remains by combining the scores of visually assessed morphological features (as described by Walker in Buikstra and Ubelaker 1994) and the sectioning points of metric measurements (Bass 2005). On a complete adult skeleton, the morphology of the pelvic girdle (Phenice 1969; Rogers and Saunders 1994) and skull (Williams and Rogers 2006), in conjunction with general size and diagnostic metric measurements/indices of specific bones, are the most reliable traits to determine an individual's biological sex. The pelvis is evidently a crucial bone for the observation of sexual dimorphic characteristics, given its biological function in human reproduction.

Based on the skull and pelvic morphology, Skeleton 2 could be assigned to the female category, while Skeletons 1 and 3 were possible females according to, respectively, skull and pelvic characteristics, and pelvic and morphometric observations. For Skeleton 4 sex determination was inconclusive because of insufficient elements and the presence of immature epiphyses (Appendix 4C).

Non-metric traits

Human remains from Lemanaghan were screened for the presence of non-metric variation (discrete traits, non-metric traits, or epigenetic traits, Berry and Berry 1967; Corruccini 1978), which are non-conforming characteristics of the skeleton caused by genetic or environmental factors.

On Skeleton 1, a non-metric variant was present on both mandibular foramina. The mental foramen is a passage for nerves and vessels and important anatomical landmark on the mandible. The left one was slightly obliterated by a thin and sharp bony bridge which led to the splitting of the foramen into the main mandibular foramen (MF) and an accessory one (AMF) (Bruna-Mejias et al. 2024), while the right side of the mandible also presented a very small accessory, but completely separated foramen (respectively Figures 6.1 and 6.4). This trait's prevalence on modern populations varies according to ethnicity and sex, ranging from 1% in the Russian population to 10% in the Arabic population, with a lower presence of this foramen in Caucasian populations and a greater predominance in Middle

Eastern countries (Iwanaga et al. 2015). As it is the case for the Lemanaghan skeleton, this variant has also observed been observed on archaeological human assemblages (in a general overview by Thomaidi et al. 2025 and from Byzantine Turkey by Çırak et al. 2017).

Skeleton 4 exhibited a variant on the calcaneus, the peroneal tubercle (Figure 6.5), which projects from the lateral view of the anterior third of the bone. It was probably bilateral, but the left one was damaged post-depositional. Serving as fulcrum for the *peroneus longus* tendon, when enlarged, it has been linked with flat/cave feet and other foot issues (Hyer et al. 2005). On archaeological remains, among others, this variant has been recorded on Ramose's remains – one of Queen Hatshepsut's higher officials (Basha et al. 2024, 18). While attempting to articulate the metatarsals, slight abnormal curving was observed in this individual's feet – therefore possibly linked with the presence of the tubercle.

Metric analysis

Skeletal measurements on remains from Lemanaghan were restricted by high degree of fragmentation. Where possible, however, measurements were taken on both complete and reconstructed bones for the attribution of biological sex and stature (Appendix 4D). An individual's stature is a complex variable resulting from the confluence of genetic and extra-somatic (cultural and environmental) factors affecting the development and growth of the human body (Eveleth and Tanner 1991). The direct link between diet, disease and stature means that stature can provide insights into the general health of a population (Ortner 2003, 41). In this study stature estimation was based on the maximum length of any complete (and/or reconstructed) long bone and calculated by means of regression equations provided by Trotter and Gleser (1952) and Trotter (1970).

For Skeleton 1, stature was calculated using the maximum length of the left radius, which returned a value of 163.00 +/- 4.24cm. Skeleton 2's right ulna allowed the calculation of a stature of 164.93 +/- 4.30cm, while with the right radius the obtained value was 161.58 +/- 4.24cm. For Skeleton 3 no estimation was possible due to incompleteness of all long bones. While it is not recommended to calculate stature for individuals as young as Skeleton 4, an attempt was made using the left tibia with Nikita and Chovalopoulou (2017)'s equation on Greek populations for undetermined sex, which returned a value of 163.32cm.

All morphometric data are reported in Appendix 4D.

Skeletal pathology

Paleopathology, the study of disease in the past, is the science providing tools for the identification, interpretation and comparison of antemortem and perimortem skeletal anomalies caused by

conditions or traumatic events affecting the 'normal' morphology of the bones. Skeletal remains often bear the effects of disease, both chronic and acute, by displaying changes at the macroscopic and microscopic osseous level. Type and distribution of skeletal pathological lesions is key to learning their aetiology and providing a specific or differential diagnosis. Identification of pathological and traumatic skeletal changes was carried out by recording their appearance, location and size and placing them, if possible, within a disease category, according to guidelines provided by Aufderheide and Rodriguez-Martin (1998) and Ortner (2003).

Given the small size of the assemblage, prevalence rates of pathologies within the group were not calculated and lesions were recorded according to individual skeleton (in the case of articulated inhumations) or by bone (for DHB).

Metabolic disease

Skeleton 1 displayed thinning of the cortical bone and loss of trabeculae, particularly visible at the level of the occipital cerebellar fossa, on the distal radius and ulna (broken into small, very thin and fragile fragments), the clavicles and hand bones (Figure 6.6). Although non-specific, these changes could be described as osteopenia, which is a decrease in bone tissue caused by several abnormalities, including osteoporosis, vitamin D deficiency (Brickley et al. 2005), hyperparathyroidism (Zink et al. 2005), cancer (Resnick and Niwayama 1995, 1785) and severe malnutrition (Ortner 2003, 410). Considering the young age and sex of this individual and the presence of co-morbidities such as spinal disease and spondylolysis (see sections 'DJD' and 'Trauma' below), these changes could be linked with secondary osteopenia (Brickley and Ives 2008, 199).

Skeleton 2's right orbital roof exhibited very slight pitting (Figure 6.7), indicating possible incipient cribra orbitalia (Møller-Christensen and Sandison 1963; Angel 1966). An increased (but possibly not pathological) number of nutrient pits could also be observed on both thoracic and lumbar corpora vertebrae (vertebral bodies) (Figure 6.8).

Although hampered by taphonomic damage of the cortex, pathological changes could be observed on Skeleton 3's femoral and tibial shafts. The femoral diaphyseal cross-section exhibited increased porosity where the tissue is normally thick and dense, while lamellar depositions were distributed (mostly) across the posterior surface (Figure 6.9). Furthermore, both femora displayed possible antero-lateral abnormal bowing/torsion (Figure 6.10).

Of note, the morphology of the distal fibular end was also anomalous, more triangular than elongated, and with a shallow malleolar fossa (Figure 6.11); some remodelling was visible on the medial

view of the proximal fibula. Whilst non-specific, especially individually, the listed changes in combination could be indicative of nutritional deficiency or metabolic issues (Ortner 2003, 102-4) as well as the result of non-specific infection.

Skeleton 4's proximal left tibia exhibited a slight posterior-anterior torsion of the proximal end and shaft, making the bone look less wide and robust than usual (Figure 6.12). Although not very accentuated, this pathological lesion might also be linked with metabolic or congenital conditions.

Infectious disease

Skeleton 2 exhibited lesions consistent with inflammation of the maxillary sinus – spicules and new porous bone depositions, pitting and an enlarged vessel groove across the anterior view of the palatine process inside the sinus (Figure 6.13). The listed abnormal changes could be related with the severe dental pathology observed on this individual (see section 'Dental disease' below) but also caused by maxillary sinusitis – which, in turn, could be the result of secondary bacterial infections from the respiratory tract (Boocock et al. 1995).

Degenerative Joint Disease (DJD)

Skeleton 2's lumbar articular facets displayed osteophytosis and lipping of their margins (Figure 6.14); similar 'scalloped' extra bony growths were also observed on the left sacral articular facet. On the same individual's mandible, the surviving right condyle was wider and somewhat 'flatter' than normal and presented a concave lesion with slight pitting on its posterior view, as well as an osteophyte on its infero-lateral view (Figure 6.15).

On the same individual, at the spinal level, bone spurs and spicules were recorded on lower thoracic and lumbar vertebrae on or around superior and inferior articular facets, in addition to hypertrophic changes to some of the costal articular facets (Figure 6.16). According to early studies, the former are normal variants of the skeleton which increase with age and are synonymous of joint degeneration (Mann 2005, 87). The upper articular facets of the sacrum also displayed osteophytosis of their margins, and spicules.

Trauma

On Skeleton 1's lower spine, bilateral asymmetric *spondylolysis* – or separation of different parts of the arch (Merbs 2002, Figure 6.17) – of the (possibly) fifth lumbar vertebra's body with the neural arch was observed, in this case between the right superior articular facet and the neural arch and the left superior articular facet and spinous process (Figure 6.18). *Spondylolysis* is a cleft in the neural

arch of a vertebra at the pars interarticularis, prevalent on lumbar vertebrae, mostly L5 (Mays 2006). Studies show that this lesion may be 'a result of general high levels of sustained strenuous activity loading the lumbar spine, rather than being specific to any particular type of movement or activity' (Ibid., 352).

The same individual's sacrum also exhibited an antemortem lesion, expressed by a fracture (or non-union) of the first sacral element's median crest, the attaching fragment inferior to which survives (Figure 6.19).

Musculo-skeletal markers

The upper limbs recovered ex-situ possibly belonging to Skeleton 3 exhibited musculo-skeletal markers on the right radial tuberosity and a pronounced pronator ridge of the right ulna (Figure 6.20). Most likely related to repeated activity involving the forearm (Lieverse et al. 2009), these changes can only be listed as observations given incompleteness of the skeleton. On the same individual, enthesophytes (Villotte 2012; Villotte and Knüsel 2013) at the site of attachment of *vastus lateralis* and *abductor magnus* on the posterior aspect of the femur were also recorded.

Other conditions

On the proximal, lateral view of Skeleton 4's first right phalanx's shaft, a well-defined, elongated lytic lesion was observed (Figure 6.21). Possibly pseudo-pathological, but worth noting were tubular erosions of the medullary cavity of all metacarpals (Figure 6.22). The same individual also displayed an articular anomaly was between third and fourth metacarpals, which exhibited abnormal articular facets. Skeleton 2's right mental foramen was slightly enlarged in comparison to the left one (Figure 6.23).

Dental pathology

Most oral health indicators are also strong general health markers. In fact, they can help reconstruct diet, periods of malnutrition, and general living habits.

The two articulated skeletons with associated dentition, Skeleton 1 and Skeleton 2, displayed very different dental patterns, with the latter exhibiting a higher number of severe pathological issues. They are described in detail below by individual rather than by dental pathology to allow a clearer, comprehensive picture.

Skeleton 1 had relatively healthy permanent dentition, with only a few linear calculus depositions at the cemento-enamel junction of lingual maxillary first incisors, left second incisor, second right molar, first left molar, and lingually on the mandibular central dentition. Some calcifications seemed to be

post-depositional rather than dental plaque and were therefore not recorded. A slight hypoplastic line could be observed on both lower canines and possibly very faint lines on the lower incisors.

Skeleton 2's dentition exhibited severe periodontal disease and calculus depositions – the former expressed as resorption of the gum line and lipping in some cases, the latter concentrated on the anterior teeth, both lingually and labially, and mostly lingually on the other teeth (Figure 6.24), as well as stress markers and antemortem tooth loss. Wear patterns were interesting, with the lower frontal dentition presenting a labial longitudinal, diagonal pattern corresponding to the same pattern on the lingual view of superior incisors, indicating malocclusion – deep bite, specifically. Dentition displayed hypoplastic defects across the maxillary frontal dentition, in particular one deep hypoplastic mid-line and one less prominent just above the cemento-enamel junction on the upper incisors (Figure 6.25). Diffused, severe periodontitis had caused mandibular teeth to be pushed out of the alveolar socket, with most being ready to 'pop out' from their porous and rimmed sockets (Figure 6.26). The mandibular first right molar was lost antemortem, leaving a smooth, remodelled gap. Incipient carious lesions could be observed on the interstitial distal CEJ (cemento-enamel junction) of the second right molar and possibly on the occlusal surface of the third right molar. Maxillary dentition showed the same inflammation of the alveolar bone at such an advanced stage that caused in some cases sharp, in others smooth and irregular alveolar bone edges; additionally, carious lesions were recorded on the right canine and first molar.

6.2.2 Disarticulated Human Bone

The disarticulated bone assemblage included 29 teeth, two of which were deciduous (Appendix 4B and Table 6.4 below), and *c.* 540 disarticulated bone fragments – of which about 30% (approximately n = 170) were below 10mm in size and thus only associated with a portion of the skeleton or not identified (Appendix 4A). Disarticulated bone at this site was retrieved as surface find from cleaning and during excavation of both TB1 and TB3, respectively within the layers overlying Burials 1 and 2, and more sparsely and irregularly in TB3, over Burials 3 and 4 and around the tree plate. The bone was generally extremely fragmentary, fragile and small, and, when better preserved, it was likely to belong to one of the articulated skeletons. The majority of fragments (N = 373 in total, n = 354 if counted considering fragments reconstructed from two or more fragments), however, were identified and recorded with unique identification numbers on the DHB database (Appendix 4B and Table 6.5).

Table 6.4. Number of permanent and deciduous teeth recorded in the DHB assemblage.

FDI code	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
N of teeth	**0**	**2**	**1**	**2**	**0**	**0**	**3**	**2**	**1**	**0**	**2**	**2**	**0**	**0**	**1**	**2**
FDI code	48	47	46	45	44	43*	42	41	31	32	33	34	35	36	37	38
N of teeth	**0**	**0**	**3**	**0**		**1**	**1**							**1**	**1**	**0**

*Also, 43/44 n = 1 and 44/45/34/35 n = 1

FDI code	55	54	53	52	51	61	62	63	64	65
N of teeth	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
FDI code	85	84	83	82	81	71	72	73	74	75
N of teeth	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

Table 6.5. Distribution of fragments by anatomical element.

Anatomical element	No. of fragments (considering reconstructed ones)	%
Skull	110	31.07
Shoulder girdle	5	1.41
Spine	5	1.41
Thorax	31	8.76
Arms	44	12.43
Legs	33	9.32
Pelvis	3	0.85
Post-cranial	123	34.75
Total	**354**	**100**

Preservation

Degree of fragmentation and condition of disarticulated human bone from Lemanaghan was influenced by both taphonomic factors and the weather events that lead to the uprooting of the three trees. This means that, additionally to damage and disarticulation caused by the trees growing through the burials, further disturbance and dispersion was caused by storm Eowyn. The majority of remains exhibited significant fragmentation and erosion of the cortical surface of the bone. Overall, 61.4% of fragments (n = 218) were categorised as being in 'poor' and 24.7% (n = 88) in 'very poor' condition, while 12% of fragments were scored as in 'fair' (n = 30) or 'good' (n = 13) condition, and only 1.4% were scored as 'excellent' (n = 5). When observing completeness, as predictable given the nature of the context, most fragments – 90.7% (n = 322) – were complete by less than 20%, with 3.9% (n = 14) scored as 80-100% complete and only 5.3% (n = 19) between 20 and 80% complete. When observing anatomical elements representation, the vast majority were from the skull and long bones (Table 6.5).

Demographic data

All available diagnostic elements (sexually dimorphic and morphometric traits, stage of fusion, aging features) were used, when present, to assess possible biological sex and age at death. Although the majority of remains could not be ascribed to an age category (52.8%), 45.7% were attributed to adult or possibly adult individuals. Biological sex evaluation was not possible in most cases and, as formerly described, because some of the larger and better preserved disarticulated bones recovered from TB3 could be attributed with enough confidence to Skeleton 3 or Skeleton 4 based on their ageing and dimorphic features as well as spatial analysis of their dispersal and on-site monitoring records, they were not counted as DHB.

Pathology

Very few pathological lesions were observed on the DHB assemblage, and most were recorded on teeth – 12 of 29 (of which 24 could be assessed for pathology) displayed calculus, cavities and hypoplastic lines (Table 6.6). On bone fragments, only lesions consistent with degeneration of the joints and musculo-skeletal markers, particularly at the level of arms and hands, were recorded on only nine fragments, of which seven were probably associated.

Table 6.6. Dental pathology on teeth from the DHB assemblage

Dental pathology	No. of teeth with lesions/Total teeth
Caries	2/24
DEH	5/24
Calculus	8/24
Not assessed	5/29
Not observed	12/29

6.2.3 Minimum Number of Individuals (MNI)

The Minimum Number of Individuals (MNI) aims to establish how many individuals are osteologically represented within an articulated and disarticulated human skeletal assemblage by counting repeated elements by side, morphometry and/or age category. The largest number is considered the MNI (White 1953). The MNI might not be a realistic representation of the true number of individuals composing the group of the living, however it is a baseline that establishes how many individuals have been scientifically proven to be the least to comprise the assemblage.

The calculation of MNI for the Lemanaghan assemblage was carried out DHB number first and finally by Tree Bole. When considering DHB numbers as individual entities, the MNI calculation was of 20

individuals, while if collated by Tree Bole the observed MNI was of seven (TB1), one (TB2) and five (TB3), amounting to a total of 13 individuals (three of which were juveniles) from the site (Tabe 6.7).

This information should be considered as simply descriptive and not considered definitive because of the extremely fragmentary nature of the assemblage and the very unusual circumstances of finding.

Table 6.7 Minimum Number of Individuals estimates.

Tree Bole	DHB	Frgs/MNI	MNI by skeletal element	MNI by teeth	MNI by age
TB1	1001	22/1	1	N/A	1 (adult)
TB1	1002	92/1	1	5/3 (2 adults + 1 juvenile (1-3 years))	3 (2 adults + 1 juvenile (1-3 years)
TB1	1003	43/1	1	2/2 (older adult + young adult)	2 (older adult + young adult)
TB1	1004	41/3	2	4/2	2 (1 adult + 1 juvenile)
TB1	1005	15/1	1	N/A	1 (adult)
TB1	1006	3/1	1	1	1 (adult)
TB1	1007	10/2	2	1	1 (adult)
TB1	1008	5/1	1	N/A	1 (adult)
TB1	1009	1/1	1	N/A	1 (adult)
TB1	1010	66/3	1	12/3	3 (1 young adult + 1 young child + 1 old adult)
TB3	3003	9/1	1	N/A	N/A
TB3	3004	30/1	1	1	1 (adult)
TB3	3005	33/3	3	1	2 (adults)
TB1 TOTAL 298/5 + 2 articulated burials **TB2 TOTAL 1 articulated burial?** **TB3 TOTAL 72/3 + 2 articulated burials**					

6.3 Discussion

6.3.1 Synthesis

Rescue excavations at the site of Mella's Cell allowed the identification and recovery of four articulated burials (Burials 1 and 2 from TB1 and Burials 3 and 4 from TB3), together with a disarticulated human remains assemblage; taken in tandem with an additional possible articulated burial (within TB2's root pit) this gives an estimated minimum number of 13 individuals from the excavation. In total, the articulated and the disarticulated assemblage yielded nine adults (of which one young adult, one middle young adult and one old adult are represented by Burials 1, 2 and 3 respectively), three juveniles and one adolescent (Burial 4). No males or possible males were identified. However, one individual (Skeleton 4) was not assigned to either sex and most DHB fragments did not present enough diagnostic features or were too small or damaged to be assessed for biological sex. Therefore, assuming that no males were buried at the site would be inaccurate, but where sex has been confirmed it is female or possible female.

Lemanaghan was an extraordinary but also complex and unusual excavation, with controlled recovery of the human remains being difficult due to their precarious location and disturbance between the storm event and the final stage of fieldwork. This report detailed records of the circumstances of finding and methodologies implemented for the osteological analysis of all skeletal remains, as well as a bioarchaeological interpretation of the osteological data collated. A summary of findings from the articulated burials is reported in Table 6.8.

From Tree Bole 1, two articulated skeletons were recovered and analysed. On the south-east end of the tree plate, **Burial 1** yielded the remains of **Skeleton 1**, a young adult in their early 20s at the time of death, showing some female characteristics based on skull morphology and morphometrics but indeterminate sex according to pelvic bones (although also leaning more towards possible female based on the wider, rather than narrower, greater sciatic notch). This was a small individual. The right upper limb and both lower limbs were missing, truncated by the tree plate. Although extremely fragmented, the base of the skull, mandible and maxillae, left arm, upper spine and some of the ribs were surprisingly well preserved in situ. The position of the partially preserved skeleton seemed to be slightly off the 'norm', with the head resting to the left, and with it also the thorax and the spine curved, while the left arm placed by the side of the body. This individual exhibited lesions at the level of the lower spine consistent with strenuous physical activity or congenital conditions that lead to traumatic factures, and bone anomalies (cortical bone thinning, morphological changes) consistent with possible dietary deficiencies.

Skeleton 2 was retrieved from Tree Bole 1's west profile from the archaeologically identified **Burial 2**. A young to middle adult female, this individual presented severe dental pathology including calculus, cavities, periodontal disease and enamel hypoplasia – the latter indicating at least two severe episodes of physiological stress as a child (Reid and Dean 2000) – and dental attrition consistent with malocclusion. These changes were obviously co-related and led to a disastrous oral health, with most teeth significantly pushed out of their sockets, and also possibly caused a maxillary infection. The thorax and, particularly, the lower spine displayed mild to moderate signs of joint degeneration, but the rest of the preserved skeleton overall presented 'healthy' articulations.

Tree Bole 3 yielded the remains of two articulated individuals from **Burials 3 and 4**. **Skeleton 3** was an old adult female – as suggested by pelvic diagnostic features, however intermediate from metric measurements. Although pathological observations were limited by incompleteness, taphonomic damage and fragmentation of the skeleton, it was possible to assess that this individual suffered from a few health issues. Possible abnormal bending, lamellar bone depositions and morphological anomalies indicated metabolic and/or infectious conditions, while skeletal musculo-skeletal markers highlighted lifestyle and activity patterns (Molleson 2007) – unfortunately, difficult to identify or link with a specific occupation in this case.

Of **Skeleton 4**, the youngest of the articulated burials, an adolescent/young adult in their late teens, only the second half of the lower limbs and some of the left hand bones survived. Sex could not be assessed both because of incompleteness and the presence of immature epiphyses. Some anomalies were recorded at the level of the feet, which presented features possibly indicating affected mobility or abnormal shape of the foot. Slightly 'twisted' proximal end of the tibia could possibly relate to such changes.

Table 6.8 Summary of findings on articulated skeletons from Lemanaghan.

	Skeleton 1	Skeleton 2	Skeleton 3	Skeleton 4
Condition	Fair	Good	Poor	Good
Completeness	45%	60%	25%	20%
Age (years)	18-25	30-35	45-50	15-19
Sex	Female?	Female	Female?	Indeterminate
Non-metric traits	Additional mandibular foramina	N/O	N/O	N/O
Pathology	Metabolic changes - secondary osteopenia (?); dental calculus	Infection; DJD of lower spine; severe dental pathology; metabolic (DEH)	Non-specific lamellar lesions; possible metabolic changes	Possible non-specific infection or metabolic
Trauma	Lumbar spondylolysis and possible sacrum perimortem fracture or non-union	N/O	N/O	N/O
Stature	163.00 +/- 4.24cm	164.93 +/-4.30cm - 161.58 +/- 4.24cm	N/A	163.32cm (?)

Dentition recovered from site was either disarticulated, or belonged to Skeleton 1, whose teeth were well-preserved in situ and all associated with the alveolar sockets, or Skeleton 2, the dentition of whom was almost complete but mostly loose because of fragmentation of the maxillae and mandible but also the severity of periodontal disease. Caries, calculus, antemortem tooth loss, periapical cavities and periodontitis are indicators of an individual's oral hygiene, diet (Hillson 2005) and general health (Larsen 2015). The epidemiology and progression of these lesions is mostly inter-linked, given that some of them can develop as secondary effect of the others. For example, a diet high in sugars and other refined carbohydrates, can lead to the formation of dental cavities (Hillson 2005, 291) which, if untreated, eventually cause the loss of the diseased tooth and further infection of the alveolar bone expressed by periapical cavities. DEH In particular, hypoplastic defects of the dental enamel, can be caused by pathological and developmental or hereditary conditions (Hillson 2005, 168). The most common cause for the formation of hypoplastic defects at the dental level in archaeological specimens can be ascribed to vitamin D- and vitamin B- deficiencies, which result in degeneration, atrophy and abnormal arrangement of odontoblasts, e.g. in the appearance of pitted and/or linear hypoplastic lines (LEH) (Sarnat and Shour 1941).

Overall, these individuals exhibited evidence of several health issues and deficiencies, as seen in other cases from medieval Ireland (McKenzie and Murphy 2018), and a stature in line with other Irish assemblages, although somewhat above average. For example, in Ballyhanna, average height was generally short, with male heights ranging from 152.6cm to 179.4cm (mean height 167.1cm), while females height ranged from 142.7cm to 164.5cm (average height 154.8cm) (McKenzie and Murphy 2018, 134). It would be interesting to assess if, for example, anomalous bowing and torsion observed on some of Skeleton 1 and 3's bones could indicate, among other possibilities, residual rickets or similar conditions resulted from vitamin deficiencies (Mays et al. 2006). These observations need, however, more detailed analyses to carry out differential diagnoses.

The disarticulated assemblage was not very informative because of the very poor state of preservation and high degree of fragmentation of most bones. Teeth and some diagnostic bones, however, allowed an estimate of a minimum number of individuals and provided some information about the existence of other individuals – particularly children – buried in the graveyard prior or after the articulated burials analysed in this report.

6.3.2 Conclusions

Recovery and analyses of the skeletal material from Lemanaghan was complicated by both the exceptional circumstances of the burial discovery and the time period between discovery and excavation.

Nonetheless, the excavation has still provided fascinating new information on both Mella's Cell and the wider monastic complex of Lemanaghan itself.

The possible existence of a nunnery at Mella's Cell has been proposed for some time (e.g. Collins 2021, 40), while the site has been clearly linked with a female, St Manchán's mother, Mella, who has been recorded as living at the oratory that bears her name (see Section 3.2.4 of this report). This link to a female anchorite and possible presence of a satellite female religious community seems more noteworthy now that three of the articulated burials recovered at Mella's Cell have been ascribed to females or possible females, whilst no remains have been ascribed as male.

Unfortunately with such a small sample size it is impossible to argue with certainty that Mella's Cell was a dedicated female burial place. Equally it is difficult with the limited information acquired from the excavations to ascertain the identity, status and role of these individuals in the early medieval community. However, there are rare instances in the archaeological record of female only burials grounds. For example, at Cooleeshalmore, Threecastles, County Kilkenny a group of at least four inhumation burials were uncovered during the archaeological monitoring of roadworks in the early 2000s (Neary 2003). Radiocarbon dated to cal AD 540-660, these individuals were all females, roughly aligned east-west, and located at a distance of approximately 800m from the nearest church; the excavator concluded that they represented a segregated female cemetery (Neary 2003, 102).

Typically where females (and most males) have been found they have traditionally been interpreted as indicative of a lay cemetery (Collins 2021, 41). Even in instances where females are found on monastic sites, they are normally also considered as representing 'lay'. For example in recent excavations in Ferns, County Wexford, a female burial unearthed in the cloister/calefactory area of the monastery was considered a lay person, buried in the immediate period preceding the layout of the cloister (Shine et al. 2023). There have been critiques of such assumptions (e.g. Harrington 2002) and, as mentioned, discoveries of dedicated female burial places (Hamlin and Foley 1983; O'Sullivan and Kinsella 2013, 338;).

Whilst there are occasional occurrences of a separate church and/or graveyard dedicated specifically to women is Lemanaghan such a location, where a nunnery was established with a distinct female burial space? The data at our disposal after the analysis and interpretation of skeletal remains is unfortunately too limited to reach final conclusions. However, the presence of burials that can only be osteologically ascribed as females or possible females does certainly hint at a dedicated usage for women – a reasonable suggestion considering the site is thought to have served as a nunnery. As

importantly the excavation has certainly clarified the existence of a previously unknown early cemetery at the site, which was used from at least the seventh to tenth centuries.

7 Summary and Discussion

As stated, following the Phase 1 monitoring and recording works (and after discussion with OCC, NMS, NMI and the local community) it was decided to hand excavate the root plates to ground level, fully removing and documenting the human remains. From October 11th to 16th the human remains were exposed, excavated, photographed, planned and subsequently lifted by anatomical elements. Throughout the excavation process a significant number of photos to create photogrammetric models were also taken, as they allowed quick and accurate data capture, should a collapse occur of the brittle root plates. At the conclusion of the excavation the tree boles were backfilled and levelled, with only discreet tree trunks, which now act as grave markers, left in situ (Figures 7.1-7.3).

Despite the challenging excavation circumstances a minimum number of five inhumations was established including the four, fully excavated, articulated individual burials, as well as a virtually certain fifth articulated burial in Tree Bole 2 (which was documented during Phase 1 works but not excavated). The minimum number of individuals estimated after osteological analysis amounted to 13 individuals, of which most were adults, although three juveniles (from the DHB assemblage) and one adolescent (Burial 4) were also identified. From the assemblage attempts were made to radiocarbon date remains from each tree bole, including a rib from Burial 1 (in Tree Bole 1) and a femoral fragment from Burial 3 (in Tree Bole 3). As no human bone was observed in Tree Bole 2 during the excavation, a left rib fragment collected during Phase 1 works was also submitted for dating but proved unsuccessful. However Burial 1 was dated to 662-817 cal AD, whilst Burial 3 was dated to 707-939 cal AD (Appendix 3.2), indicating a burial ground that was in use from at least the seventh to tenth centuries. The date for Burial 1 is broadly congruent with the date range for a ferrous blade from Tree Bole 1, the only artefact recovered during the excavation, namely a 'Type J' tanged knife with regrettably broad dating values from c. the ninth to fifteenth centuries (Appendix 3.1).

As stated previously there was no existing historical evidence or local knowledge of a burial ground at Mella's Cell, with the extant graveyard located around the medieval church of St Manchán, 400m to the west. This obviously raises the question as to whether the burial ground at Mella's Cell represents a distinct type and/or a different phase of burial at Lemanaghan. Separate burial grounds for the wealthy, children, unbaptised infants, suicides, or slain people are often recognised in early documentary sources. However, burial grounds specifically for women are much less seldom recorded (Hamlin and Foley 1983, 43-44). Hamlin and Foley have mapped a number of such possible sites where separate burial grounds and/or special churches for women are likely to be located (Figure 7.4), including Inishmurray (County Sligo), Templemurry Lady's Church in Lough Ree (County Longford) and

Inishglora (County Mayo); they also note Glendalough (County Wicklow) and Clonmacnoise and Lemanaghan (County Offaly) where a church or graveyard associated with women, or female religious communities, is located at some distance from the 'main' monastic complex (Ibid.). In a more detailed study Tracy Collins (2021, 38) has categorised three main types of female religious communities: 'major' (seven in total including Ballyvourney, Clonbroney, Cloonburren, Kildare, Killaraght, Killeedy and Killevy), 'lesser' (33 sites), and 'satellite' (including Annaghdown, Finglas, Tallaght, Armagh and Lismore – where no archaeological evidence remains – but importantly also Clonmacnoise, Glendalough and Lemanaghan, where evidence of female religious communities is still extant). According to Collins' survey the latter (Clonmacnoise, Glendalough and Lemanaghan) are extremely rare in having remaining built and monumental heritage, with all three sharing the same rectilinear (rather than circular) outer enclosure - with Mella's Cell in particular unusual in its construction method (Collins 2021, 40).

The most obvious parallel for Lemanaghan is obviously Clonmacnoise, not least as the two are so closely related historically. At Clonmacnoise the Nun's Church was founded by Derbforgaill (Dervogilla), daughter of Murchad Ua Máel Sechlainn, King of Mide in AD 1167 (the Nun's Chapel being one of the few Irish Romanesque churches with documented foundation and completion dates). The site, also known as Dervogilla's Chapel, was founded as a nunnery *c.* 500m east of the monastery and connected to the main monastery by a paved roadway, bearing obvious similarities to the spatial arrangement of St Manchán's Church and Mella's Cell at Lemanaghan (FitzPatrick and O'Brien 1998, 41). Considering the historical link between Lemanaghan and Clonmacnoise in the early medieval period, their general layout, and the occurrence of stone paved roads at both (idem, 41), it could be argued that one may have inspired the other. Of note to the northwest of the Nun's chapel at Clonmacnoise footings of a small square shaped building (OF005-029003-) survive that are similar in scale to Mella's Cell; there are also other wall footings of another building of unknown function immediately to south of the Nun's Chapel. One or both of these building might have acted as an anchorite or be related to a nunnery at the site before the building of the Nun's Church. These buildings could conceivably be contemporary to Mella's Cell, which has been argued to be tenth to eleventh century in date.

Ó Carragáin, has previously suggested that a dichotomy between secular and ecclesiastical space and function at monasteries is unlikely to have fully established in the period AD 500-800 (Ó Carragáin 2010), but rather come from the ninth century onward. Such a proposition fits well with the suggested construction date for Mella's Cell. Notably a tenth century date also aligns well with both the later span of radiocarbon dates from this excavation, and a recorded building boom at Lemanaghan's sister monastery at Clonmacnoise, when the cathedral (OF005-004001-) was first constructed. As such it

seems plausible that both sites may have been reorganised around this time, with different areas of female space more clearly established. Certainly, as argued by Murray and O'Dwyer (2022, 34), the existence of a nunnery at Lemanaghan (and Clonmacnoise) in the tenth to eleventh century would suggest thriving and wealthy monastic communities, that were capable of supporting such a division of space (Nugent 2020, 108). In the case of Lemanaghan it is also possible that a formal layout of female space was established around a previously understood burial ground, which based on the admittedly small sample of excavated skeletal material may have been dedicated to women.

8 Significance of the site

Mella's Cell is a recorded monument (SMR OF015-004006-) protected under the National Monuments Acts 1930-2014 and represents the only largely unaltered early medieval oratory in County Offaly. Importantly Mella's Cell has also long been argued by leading academics, such as Tomás Ó Carragáin (2010), to have served as an early to later medieval nunnery (Murray and O'Dwyer 2022, 22). Together with its sister monastery of Clonmacnoise Lemanaghan is one of only a handful of smaller female religious communities with either an extant 'nunnery' building or enclosure. Significantly the excavations described herein have now confirmed that the site was also used as a burial ground from *c*. the seventh to tenth centuries. Tantalisingly no confirmed male burials were encountered during the excavation which, whilst based on a small sample size, supports its argued use as a nunnery and/or burial place for females.

The building is part of a wider archaeological complex and is located *c.* 400m east of the major early medieval monastery founded by St Manchán in the seventh century; as stated previously, this monastic complex contains, amongst numerous other features, a multi-period church (OF015-004003) (with a Romanesque doorway and several early Christian cross-slabs) a rectangular building (OF015-004009-) (possibly a later medieval priests house), a holy well (OF015-004007-), a togher (OF015-004011-) and an early medieval monastic enclosure (OF015-004008-). Collectively these monuments make Lemanaghan monastery one of twelve major monastic sites within the limits of County Offaly.

The monastery also lies at the centre of a major archaeological landscape, as indicated by both the density of known archaeological monuments and the large number of archaeological relics found in bogland surrounding the site; many of these relics have been found due to peat harvesting, notably Lemanaghan's early medieval crosier. Important wetland excavations around the site have also identified toghers connecting to St Manchán's over several centuries. This includes a seventh century split oak plank walkway (dated through dendrochronology to AD 653 ±9), which lay under a gravel, flagstone and plank walkway, which itself lay under a 4.2m wide wooden walkway (dated through dendrochronology to AD 1158 ±9) (Murray and O'Dwyer 2022, 27). These walkways clearly infer that Lemanaghan was an important site being regularly accessed throughout the medieval period.

As important as the site's historical significance, built heritage, rich archaeological landscape or rarity is its continued importance to the local community, with Lemanaghan remaining a location of deep sacred significance and a site of worship to the present day.

9 Future work and recommendations

9.1 Artefacts

The single ferrous artefact will be retained for the national collection in accordance with the National Monuments Acts 1930 to 2014 and will be submitted to the NMI. This blade has already been examined by Órla Scully and conserved by Susannah Kelly of UCD.

9.2 Human skeletal assemblage

Given their historical relevance and potential role in contributing important information about early medieval Lemanaghan and monasticism at large, it is recommended that isotopic and aDNA analysis of the articulated skeletons be considered should funding become available. The skeletal assemblage should also be curated and boxed as per NMI guidelines for submission to the national collection.

9.3 Publication and dissemination plan

This document represents a full and detailed final stratigraphic report under the terms of the National Monuments Acts 1930-2014. While the excavation results are currently being disseminated they would clearly merit publication in a suitable scientific journal and potentially a national more 'general interest' journal, such as *Archaeology Ireland* or the *Journal of Irish Archaeology*. A summary of the final results will also be published in the Excavations Bulletin Resource (Appendix 2.1).

In tandem to academic publications, local and community dissemination should also be considered, especially since the community are so actively involved with the archaeological complex. Some community engagement with the excavation has already begun and is described separately below.

10 Community Archaeology Report

Regular communication with the local community was maintained throughout the monitoring and excavation phases and has been continued throughout the analyses of the collections. With the permission of the NMS the community have also been furnished with preliminary reports as they were completed. Using this information the community were extremely active in promoting the findings from the site, resulting in the excavation featuring in local media including the Offaly Express, Offaly Independent, Midland Tribune and Midlands 103 Radio. The excavation also featured in national media, including the Irish Times, Irish Independent, Irish Examiner, Radio One and several other media outlets. Notably the excavation also appeared on RTE news, across their platforms. This news coverage included a celebration of St Manchán's Day on January 24th 2026, itself also the one year anniversary of Storm Eowyn in 2025. On this day over 50 locals gathered at Mella's Cell for a ceremony, but also to contribute to the RTE news piece, with the IHS also making a contribution on the excavation findings.

Aside from news coverage, dissemination of the project has also begun. On the 9th of February a talk on the Monastic Midlands, featuring Lemanaghan, was presented to community members in Dooly's Hotel in Birr Town. A more expansive talk is being planned with the local community, now that analyses are concluded. They will also be consulted as to how they would like to disseminate the results and memorialise the excavation more generally, with the IHS hoping to contribute to both if possible. One notable project that is already started is the production of an educational video funded by the Heritage Office of OCC. Production company Crannog Media have been commissioned to prepare a short film on the significance of the excavation at Lemanaghan focusing on both the scientific results and their importance to the local community. This video will include contributions by the NMS and IHS, as well as the local community, and will be incorporated into the existing Lemanaghan Monastic Site Video Series (see https://www.youtube.com/playlist?list=PLSQVCCvVVKfY3Kae_gLKWIxMeRebCYrZA). This is one of hopefully many innovative ways in which the excavation will be promoted in partnership with the local community.

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APPENDIX 1 - CATALOGUE OF PRIMARY DATA

Appendix 1.1 Feature Register

Feature No.	Type	Period	Length (m)	Width (m)	Depth (m)	Description	Interpretation	Fill of Cut	Finds	Samples
1001	Deposit	Modern	3.6	3.1	0.3	Dark brown friable and loose humus-rich topsoil.	Topsoil in Tree Bole 1.	-	Metal (1)	-
1002	Deposit/ Fill	Early medieval	3.6	3.1	0.6	Compacted yellow clay containing frequent large stones and heavily disturbed by roots. Burials 1 and 2 were cut through (and probably also filled with) this layer.	Deposit Burial 1 and Burial 2 were cut through and filled by. F1002.	-	--	-
1003	Natural	-	-	-	-	Indurate 'sterile' grey and yellow gravelly clay with large stone inclusions, representing subsoil disturbed by the falling trees.	Natural subsoil/gravel.	-	-	-
1004	Fill	Early Medieval	1.3(?)	0.6(?)	0.1(?)	Compacted yellow silty clay, with slight fawn hue, containing small stone inclusions and heavily disturbed by roots.	Possible fill for Burial 1, representing F1002, which was cut through and then filled back in.	1005	-	-
1005	Cut	Early Medieval	1.3(?)	0.6(?)	0.1(?)	Possible U-shaped cut, only partly discernible on the western side, with an imperceptible break of slope at the top, sloping sides and imperceptible break of slope at the base, which was flat.	Ephemeral shadow of a possible cut.	-	-	-
1006	Fill	Early Medieval	1.6(?)	0.7(?)	0.1(?)	Compacted fine yellow clay containing small stones and heavily disturbed by roots.	Possible fill for Burial 2, representing F1002, which was cut through and then filled back in.	1007	-	-

Feature No.	Type	Period	Length (m)	Width (m)	Depth (m)	Description	Interpretation	Fill of Cut	Finds	Samples
1007	Cut	Early Medieval	1.6(?)	0.7(?)	0.1(?)	Possible U-shaped cut, only partly discernible on the eastern side, with an imperceptible break of slope at the top, sloping sides and imperceptible break of slope at the base, which was flat.	Ephemeral shadow of a possible cut.	-	-	-
3001	Deposit	Modern	2.6	1.3	0.3	Dark brown friable and loose humus-rich topsoil.	Topsoil in Tree Bole 3.	-	-	-
3002	Deposit/ Fill	Early medieval	2.6.	1.3	0.4	Friable yellow silty clay containing frequent small to large stones.	Deposit Burial 3 and Burial 4 were presumably cut through and were filled by – although no cuts were discernible.	-	-	-
3003	Natural	-	-	-	-	Indurate 'sterile' grey and yellow gravelly clay representing subsoil disturbed by the falling trees.	Natural subsoil/gravel.	-	-	-

Appendix 1.2 Catalogue of artefacts

Artefact No.	Feature No.	Item No.	Simple Name	Full Name	Material	Description	Dimensions (mm)
25E0558:1001:1	1001	1	Knife	Iron knife blade	Iron	Iron knife blade, with triangular cross-section; straight back which curves upwards towards the tip, the cutting edge is convex, also curving up towards the tip. No tang survives, and the point of break is on the blade itself, with no shoulder or choil.	L 10.4, W 1.49, T 0.61

Appendix 1.3 DHB Register

DHB No.	Feature No.	Possible burial No.	Location	No. bags/size	Date	Initials	Comments	Weight (g)
1001	1001		Top 10 cm of layer.	1 SM	14/10/2025	AD	Cranial and long bone fragments; 2 permanent teeth.	27
1002	1001		Middle part of layer.	1 SM 1 MD	17/10/2025	AD	Cranial and post-cranial poorly preserved fragments of various sizes; 4 permanent and 1 deciduous tooth.	178
1003	1002		East side of tree plate, yellow clay base.	1 SM	17/10/2025	AD	Cranial and post-cranial fragments; 2 permanent teeth.	38
1004	1002	Skull fragments moved to Burial 1.	East side of tree plate, from area just on and around Burial 1.	2 SM 1 MD	17/10/2025	AD	Cranial and post-cranial fragments; 4 permanent teeth; Juvenile bone fragments and epiphyseal immature flakes.	65
1005	Ex situ		Collected by NMI.	1 SM	Collected by NMI	AD	Cranial and long bone fragments.	10
1006	Ex situ		Collected by NMI.	1 SM	Collected by NMI	AD	Very small cranial fragments.	5
1007	Sieving		From sieving.	2 SM	15/10/2025	AD	Long bone and cranial fragments; 2 permanent teeth.	16
1008	1001		East side of tree plate, at bottom of brown deposit F1001.	1 MD	20/10/2025	AD	Two large femoral shaft fragments and other small long bone fragments.	70
1009	1001		East side of tree plate, at bottom of brown deposit F1001.	1 SM	20/10/2025	AD	One femoral proximal shaft fragment.	38
1010	1001		West side of tree plate, just above and around Burial 2.	1 MD	20/10/2025	AD	Large amount of small cranial and post-cranial fragments; 9 permanent teeth; 1 deciduous; 1 permanent crown.	140
2001	Ex situ		Inside tree plate pit.	2 SM	Collected by NMI	AD	One cranium fragment collected by NMI; 1 rib fragment returned by radiocarbon dating lab.	7
3001	Ex situ	Moved to Burial 3	-	-	-	AD	-	-
3002	Ex situ	Moved to Burial 3	-	-	-	AD	-	-
3003	3001		East side of tree bole.	1 SM	20/10/2025	AD	Cranial fragments – some attach, possibly all from same cranium.	41
3004	3001	Some fragments belong and were	Cluster #12 on drawing 3.	1 SM	21/10/2025	AD	Rib, scapula, hand bone fragments.	21

DHB No.	Feature No.	Possible burial No.	Location	No. bags/size	Date	Initials	Comments	Weight (g)
		moved to Burial 3						
3005	Ex situ/3002	Some fragments belong and were moved to Burial 3	Bone clusters from across the deposit and ex situ bones.	3 SM	11/03/2026	AD	Ribs possibly from Burial 3 and Burial 4; hand bones from Burial 4 and other individuals.	70

Appendix 1.4 Drawing Register

Drawing No.	Scale	Location (Grid Refs)	Description	Features	Date	Initials	Sheet No.	Notes	Adjoins
1	1:10	Local Grid	Plan of Tree Bole 1 showing Burial 1's first exposure.	Burial 1	13/10/2025	AD	1	-	-
2	1:10	Local Grid	Plan of Tree Bole 1 showing Burial 1 fully exposed.	Burial 1	14/10/2025	AD	2	-	-
3	1:10	Local Grid	Plan of Tree Bole 3 showing DHB and ex situ bone clusters.	F3001	14/10/2025	AD	3	-	-
4	1:20	Local Grid	Working plan of Tree Bole 1 with Burials 1 and 2, mid excavation.	Burial 2 and Burial 1	15/10/2025	AD	4	-	-
5	1:10	Local Grid	Plan of Tree Bole 3 showing Burial's 3 and 4 first exposure.	Burial 3 and Burial 4	15/10/2025	AD	5	-	-
6	1:10	Local Grid	Plan of Tree Bole 3 with Burial 4's left leg fully exposed.	Burial 4	15/10/2025	RR	6	-	-

Appendix 1.6 Photograph Register

Image No.	Feature No. / Artefact No.	Description	Direction facing	Initials	Date	Notes
100-8609	TB1	Pre-ex.	Northeast	DOM	12/10/2025	
100-8609	TB1 AB	Pre-ex.	Northeast	DOM	12/10/2025	
100-8610	TB1	Pre-ex.	Northeast	DOM	12/10/2025	
100-8611	TB1	Pre-ex.	East	DOM	12/10/2025	
100-8612	TB1	Pre-ex.	East	DOM	12/10/2025	
100-8613	TB2	Pre-ex.	Northeast	DOM	12/10/2025	
100-8614	TB2	Pre-ex.	Northeast	DOM	12/10/2025	
100-8615	TB2	Pre-ex.	Southeast	DOM	12/10/2025	
100-8616	TB2	Pre-ex.	Southeast	DOM	12/10/2025	
100-8617	TB3	Pre-ex.	North	DOM	12/10/2025	
100-8618	TB3	Pre-ex.	North	DOM	12/10/2025	
100-8619	TB3	Pre-ex.	Northwest	DOM	12/10/2025	
100-8620	TB3	Pre-ex.	Northwest	DOM	12/10/2025	
100-8621		VOID				
100-8622	TB3	Close-up of hand bones	North	DOM	12/10/2025	
100-8623	TB3	Close-up of hand bones	North	DOM	12/10/2025	
100-8624	TB3	Close-up of hand bones	North	DOM	12/10/2025	
100-8625	TB3	Close-up of hand bones	North	DOM	12/10/2025	
100-8626	TB3	Close-up of cranium	West	DOM	12/10/2025	
100-8627	TB3	Close-up of cranium	West	DOM	12/10/2025	
100-8628	TB3	Mid-ex	North	DOM	12/10/2025	
100-8629	TB3	Mid-ex	North	DOM	12/10/2025	
100-8630	TB3	Mid-ex	East	DOM	12/10/2025	

Image No.	Feature No. / Artefact No.	Description	Direction facing	Initials	Date	Notes
100-8631	TB3	Mid-ex	East	DOM	12/10/2025	
100-8632	TB3	Mid-ex	West	DOM	12/10/2025	
100-8633	TB1	Mid-ex	Northeast	DOM	12/10/2025	
100-8634	TB1	Mid-ex	Northeast	DOM	12/10/2025	
100-8635	TB1	Mid-ex	Northeast	DOM	12/10/2025	
100-8636	TB3	Mid-ex with blue and yellow tags showing bone locations	North	DOM	12/10/2025	
100-8637	TB3	Mid-ex with blue and yellow tags showing bone locations	North	DOM	12/10/2025	
100-8638	TB1	Working shot	Northeast	DOM	13/10/2025	
100-8639	TB1	Working shot	Northwest	DOM	13/10/2025	
100-8640	TB1	Working shot	Southeast	DOM	13/10/2025	
100-8641	TB3	Working shot	North	DOM	13/10/2025	
100-8642	TB3	Working shot	North	DOM	13/10/2025	
100-8643	TB3	Working shot	South	DOM	13/10/2025	
100-8644	TB1	Burial 1	East	DOM	13/10/2025	

Appendix 1.7 Archive Register

Field records	Items (quantity)	Comments
Site drawing sheets (plans/sections/profiles)	6	IHS digital archive
Site registers (folders)	1	IHS digital archive
Feature sheets	10	IHS digital archive
Digital survey data, including pre-excavation and post-excavation plans	1	IHS digital archive
Security copy of archive	1	IHS digital archive

APPENDIX 2 – EXCAVATION DATABASES

Appendix 2.1 Database of Irish Excavation Reports Submission

DIER Field	DIER Detail
Excavation Completion Date	October
Year	2025
County	Offaly
Author	Denis Shine
Author's Address	Irish Heritage School, Birr, Offaly
Site Number	2025:513
Site Name	Churchlands, Lemanaghan
Site Type	Multi-period complex
ITM Coordinates	E 617507m, N 726933m
Site and Monuments Record No.	OF015-004006- (and associated complex)
Excavation Licence No.	25E0558
Description	Archaeological monitoring and subsequent rescue excavation was undertaken on behalf of Offaly County Council (OCC) and the National Monuments Service (NMS) within the enclosure surrounding the site of site of Mella's Cell (SMR OF015-004014), at Lemanaghan monastery, County Offaly. The enclosure around Mella's cell is planted with several mature trees, including several large Scots pine. Storm Eowyn felled four of these trees on site on January 24, 2025. Three trees fell internally in a north-east direction, whilst a further tree fell across the associated enclosure. Their uprooting resulted in significant disturbance to the inside of the enclosure, with human remains exposed in the three internal root plates. These remains were assessed on several occasions by the NMS, including by Dr Linda Lynch, NMS archaeologist and osteoarchaeologist, who confirmed the remains of multiple individuals within the internal tree boles. The site was also visited by the National Museum of Ireland (NMI) on a number of occasions, who removed some loose bone from the site before subsequently returning them to the IHS for analyses. Following initial site inspections a successful grant application was made to the Community Monuments Fund 2025 (CMF25) to cover the costs of archaeological monitoring and tree surgery at the site, to redress the storm damage. These works were to include a visual examination of the exposed human remains and reinstatement of the tree root systems to as level a surface as was practicable. Aside from the recovery of three suitable pieces of bone for C14 dating, all human remains were to be preserved in situ. These works commenced on 26 and 27 of June 2025, with monitoring of tree surgery also occurring on 21 and 22 July. Whilst the tree surgery was completed, with no damage to the site, the root plates unfortunately could not be levelled without excavation (which was not permitted under the terms of the licence). The failure to level the root plates was due to significant 'bedding' of the root plates as well as erosion of sediment from the tree root systems into the underlying cavities in the months since Storm Eowyn. At the conclusion of the works the site was left safe and as level as possible and discussions were held with OCC, NMS, the NMI and the local community on the best strategy to deal with the remaining root plates and the human

DIER Field	DIER Detail
	remains they still contained. On balance, it was decided to hand excavate the root plates in full to the level of the ground surface, fully removing and documenting any burials. These works were done under an extension to the existing licence, which was issued on October 10; this stage of excavation was not funded by CMF2025, instead being financed as a rescue excavation by the NMS, which was also awarded to the IHS. Considering the long time period between the exposure of the remains and their excavation, rescue excavations were expedited and commenced on October 16. The works were undertaken by an experienced team, including Dr Denis Shine (licensed Director), Dr Annamaria Diana (bioarchaeologist), two supervisors and two site assistants. During the works the remains of four articulated burials were exposed, recorded and excavated. A considerable amount of disarticulated human bone, much of it eroded from the burials in the period between January and October, was also recovered. In total the skeletal collection contained the remains of a minimum of 13 individuals, including nine adults (of which one young adult, one middle-young adult and one old adult are represented by Burials 1, 2 and 3 respectively), three juveniles and one adolescent (Burial 4). Whilst a summary of the osteological analyses is beyond the scope of a bulletin it is important to say that two of the burials were successfully dated. Burial 1 was dated to 662-817 cal AD, whilst Burial 3 was dated to 707-939 cal AD, clearly indicating a burial ground was in use on the site from at least the seventh to tenth centuries. No record or knowledge of this burial ground existed before the storm damage, with burial at the site thought to have been restricted to the main monastic complex c. 400m to the west. A single ferrous blade, namely a 'Type J' tanged knife with regrettably broad dating values from c. the ninth to fifteenth centuries, was the only recovered artefact.

Appendix 2.2 Record of Monuments and Places

SMR No **OF015-004----**
County OFFALY
Townland LEMANAGHAN
Classification Settlement deserted - medieval
ITM 617057m, 727028m
Description Situated on a slight rise in poorly drained flat land. Archaeological complex consists of an early christian ecclesiastical enclosure (OF015-004008-), tower house (OF015-004001-), multi-period church (OF015-004003-) dating from the romanesque and late medieval date with several early christian cross-slabs (OF015-004005-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Holy well (OF015-004007-) and possible oratory or hermitage (OF015-004006-) and togher (OF015-004011-) located to the southeast of the main church.
No surface remains visible of any clustered settlement in the area around Lemanaghan church and graveyard. A group of dwellings and Lemanaghan Castle (OF015-004001-) are depicted standing in close proximity to Lemanaghan church on the 1655 Down Survey map of Garrycastle barony.
Monitoring under licence no. 02E1437 was required as part of the planning permission for a house on a greenfield site. The development was near the Early Christian enclosure of Lemanaghan (OF015-004008-). No features or finds of archaeological significance were revealed.
John Purcell, Ballinvalley, Killeigh, Co. Offaly.
The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.
Date of upload 23 May 2011

SMR No **OF015-004001-**
County OFFALY
Townland LEMANAGHAN
Classification Castle - tower house
ITM 617025m, 727065m
Description Located on an island of well drained land surrounded on three sides by bog with the ruins of Lemanaghan church (OF015-004003-) 85m to SE. Mac Coghlan tower house located inside an archaeological complex consisting of an early Christian monastery founded by St. Manchán in the 7th century, a multi-period church (OF015-004003-) dating from the Romanesque and late medieval date with several early Christian cross-slabs (OF015-004005-) and architectural fragments in the interior of the church. To the NW of the church there is a rectangular building (OF015-004009-) possibly of late medieval date. Holy well (OF015-004007-) and possible oratory or hermitage (OF015-004006-) and togher (OF015-004011-) located to the SE of the main church.
Lemanaghan Castle was mainly demolished in 1959. Old black and white photographs of the castle in the Magan Collection of Offaly County Council show that it was a square shaped tower of late 15th or early 16th century date similar to nearby Coole Castle (OF015-017----). The castle was probably a lobby entrance type tower house with a main chamber at each floor level with spiral stairs giving access to upper floor levels. The main chambers were lit by single light ogee-headed windows with stepped recessed spandrels. A double garderobe opening at ground floor level served two toilet shafts at first and second floor levels similar to nearby Togher Castle at Doon cross-roads. Mural passage at second floor level probably lead to garderobe in the angle of the castle which were lit by angle loops similar to Coole Castle. A sheela-na-gig (OF015-004002-) from Lemanaghan Castle was drawn in 1870, by Thomas Cooke of Birr, neither drawing nor stone can now be found (Weir 1980, 62; Freitag 2004, 145).
Present remains consist of only the ivy-covered SW angle which survives standing to a height of approx. 2.5m with the W wall standing 5.8m long and the S wall for a length of 4.3m. The wall thickness measures 0.96m with evidence of a slight base batter. Half of a two centred doorway with punch dressing lies scattered on the ground to the S of the castle. This doorway gives the building a late medieval date possibly 16th-century.
It was one of 28 castles located in Mac Coghlan's Country (Mac Cuarta 1987, 177). In 1621 as part of Plantation of Delvin Mac Coghlan, the Gaelic estate of Lemanaghan Castle was granted to Oliver St. John, Lord Deputy of Ireland (Griffith 1966, 515). It was in Lemanaghan that Conell Mageoghagan of Lismoyny, Co. Westmeath wrote the English translation of the Annals of Clonmacnoise in 1627 under the patronage of his brother-in-law Terence Coghlan of nearby Kilcolgan Castle (OF015-011----) (Nicholls 1983, 452).
(Cooke 1875, 343-4; O' Flanagan 1933, vol. 1, 85)
The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.
Compiled by: Caimin O'Brien

Date of upload:14 September 2018

SMR No **OF015-004002-**
County OFFALY
Townland LEMANAGHAN
Classification Sheela-na-gig
ITM 617028m, 727062m
Description No evidence of any sheela-na-gig listed by Andersen (1977, 92) in the vicinity of the destroyed tower house (OF015-004001-) that was mostly demolished in the 1950s (OF015-004001-) (Weir 1980, 62). This sheela-na-gig was drawn in 1870 by Thomas Cooke of Birr, neither drawing nor stone can now be found (Freitag 2004, 145).

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.
Date of upload 23 May 2011

SMR No **OF015-004003-**
County OFFALY
Townland LEMANAGHAN
Classification Church
ITM 617089m, 726993m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). The ruins of Lemanaghan Castle (OF015-004001-) stand 85m to the NW. In centre of the graveyard (OF015-004004-) are the ruins of a multi-period rectangular church (ext. dims. 19.4m E-W x 7.5m N-S) which can be seen from different wall construction and straight joint visible at the W and E end of the N wall. Conservation works were carried out on the church between 2002-06 by Margaret Quinlan Architects (Quinlan and Moss 2007).

The first stone church was built around the 10th / 11th century as a small single cell structure (dims. c. 9m by 7.5m). In the 12th century the church was extended by 3.4m to the west and a Romanesque doorway was constructed. The W gable has a partially destroyed triple ordered Romanesque doorway consisting of three rounded columns of limestone with scalloped capitals and simple decorated round bases with leaf shaped spurs. Only one column on the S side survives to full height with scalloped capital on top (recently destroyed). The later E end measures externally 5.5m E-W by 7.5m N-S and is constructed with roughly coursed limestone rubble and probably dates to the 15th-century (Joseph 1930, 60).

Single light ogee headed window at the E end of S wall, with simple round headed Romanesque window to the W also on S wall, with a third destroyed twin light window in between both windows. Romanesque window with jambs displaying diagonal stone dressing has been reset in S wall probably a result of extending the E gable in the medieval period. Earlier W splay of window embrasure filled in when window was moved westwards. Single piece of vine-leaf decorated stone visible in E splay of embrasure of single light ogee window on S wall, probably from earlier Romanesque phase. The twin light window in the centre of E gable also dates from the late medieval period. On either side of the window in the S wall are two finely carved hood moulding terminals decorated with religious imagery. On the right hand side is a carving of the 3rd century figure of St. Margaret of Antioch and the dragon (Newman Johnson 1987, 239). The Christian legend of Margaret's martyrdom recalls how she battled the Devil in the form of a fire-breathing dragon who swallowed her whole while she was on her knees praying and making the sign of the Cross upon her breast. While inside the dragon the cross on her breast grew larger and larger eventually splitting the dragon in two and allowing Margaret to emerge unharmed from the jaws of the beast. Margaret's story was used to show how belief in the Christian faith could overcome the power of evil. She later became the patron saint of women in childbirth (Ferguson 1961, 131). On the left hand side the terminal is decorated with the vine leaf and rose motifs.

Two centred piscina with punch dressed jambs and central drain hole located at E end of S wall, aumbry at S end of E wall and a second aumbry directly under the twin light ogee headed E window. No windows on the N wall.

Several architectural fragments lie scattered around the interior of the church such as a portion of a destroyed octagonal shaped font (OF015-004010-) now housed in schoolhouse, window jambs, spandrels etc. Large breach in centre of S wall has been stabilised during conservation works. An early Christian cross-slab (OF015-004018-) is attached to the E wall of church with a second slab (OF015-004019-) attached to the S wall close to the SE angle of the church. 12 more early Christian slabs (OF015-004016-/032-) are located in the nearby disused schoolhouse and one decorated stone (OF015-004005-) possibly reused as a headstone in the graveyard (OF015-004004-) is located to the SW of the church. Medieval font (OF015-004010-) has been moved from the church to the disused schoolhouse located 35m NW of the church.

In 1205 the Annals of Clonmacnoise recorded the death of Gillebrenyn O'Bichollye [O'Buachalla], cowarb of Lemanaghan (Murphy 1993, 220). In 1302-06 the ecclesiastical taxation of the Diocese of Clonmacnois

[Cluanensis] recorded that 'The Vicar de Leith' [Lemanaghan] returned 'Nothing, because the vicarage is devastated by war' (Cal. doc. Ire., 216).

In 1400 AD a papal letter was sent to the archdeacon of Clonmacnoise requesting the removal of Magonius Offlani and any other, and to collate and assign to John Onniyl, clerk, of the diocese of Ardagh - who is in his fifteenth year, and has had papal dispensation, as the son of a priest religious and an unmarried woman, to be promoted to all, even holy orders, and holda benefice even with cure - if found fit in Latin, the vicarage, value not exceeding 8 marks, of Lecmankan [Lemanaghan], in the diocese of Clonmacnoise, void by the death of Cristinus Obuachala' (Cal. papal letters, 365).

In 1410 AD the Vicarage of 'Lyachmanachan' was granted to Donatus Odubnarla, Augustinian prior of the priory of St Mary Galynne [Gallen], as it was long void by the death of Malachy Oflanni'(Cal. papal letters, 201). A second papal letter from 1410 AD recorded that the parish church of Lemanaghan had been under the patronage of Richard de Tuite who had bestowed this church on the Cistercian convent of St. Mary's in Granard, Co. Longford (Cal. papal letters, 234).

The church was probably abandoned during the Irish Confederate Wars of 1641-53. A Visitation Report compiled in 1693 described the building as in a ruinous condition, with church services being held once a fortnight in a nearby house (Ellison 1971-3, 13).

(Cooke 1875, 343; Crawford 1911, 151-6; O' Flanagan 1933, vol. 1, 82-3; Lionard 1961, 141-5)

The church is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-), a tower house (OF015-004001-), graveyard (OF015-004004-), several early christian cross-slabs (OF015-004005-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Holy well (OF015-004007-) and possible oratory or hermitage (OF015-004006-) and togher (OF015-004011) located to the SE of the main church.

To see a 3D model of the piscina in Lemanaghan Church, visit; https://skfb.ly/ox9FR

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004004-**
County OFFALY
Townland LEMANAGHAN
Classification Graveyard
ITM 617098m, 726983m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Lemanaghan Castle (OF015-004001-) located 35m to NW.

In centre of Lemanaghan graveyard are the ruins of a multi-period rectangular church (OF015-004003-) with medieval building known as St Managhan's House (OF015-004005-) in NW quadrant. The graveyard (approx. dims. 54m N-S x 65m E-W) is enclosed by a polygonal shaped stone wall of post-1700 date with entrance gate and stile in W wall. Second stile in SE wall gives access to the holy well (OF015-004007-) and St. Mella's Cell (OF015-004006-) 350m to the E. The memorials in the graveyard date from the 18th century to modern times.

One early Christian cross-slab is now attached to the E wall of the church and a second slab is attached to the S wall close to the SE angle. 12 early Christian cross-slabs (OF015-004016-/032-) are now located inside the disused schoolhouse 30m NW of the graveyard. A single erect stone (OF015-004005-) decorated with spiral and fret motif with possible maze pattern is located in the graveyard to the SW of the church (OF015-004003-). (Cooke 1875, 343; Crawford 1911, 151-6; O' Flanagan 1933, vol. 1, 82-3; Lionard 1961, 141-5)

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004005-**
County OFFALY
Townland LEMANAGHAN
Classification Decorated stone
ITM 617083m, 726980m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian decorated stone erected as a headstone in Lemanaghan graveyard (OF015-004004-) SW of the church (OF015-004003-).

The surface of this stone is decorated with a diagonal key-pattern with interlocking spirals or swirling spirals framed within diamond shaped panels, except for a single diamond in the middle of the stone which contains a maze like pattern. The decoration is similar to the key-pattern found on a decorated stone at Gallen (OF014-029006-) and on a panel of the ninth century Pictish cross-slab from Nigg Church in Ross and Cromarty Scotland. This key-pattern was also used as a decorative border on early Christian illuminated manuscripts. The swirling spirals can also be compared with a ninth century Pictish cross-slab known as the Shandwick Stone also located in the county of Ross and Cromarty, Scotland.

Described by Crawford (1911, 155-6) as 'a stone which differs entirely from the others, and is not, perhaps, a sepulchral monument at all. It is a thick slab of fine, brown sandstone, 17 inches (0.43m) wide, 8 inches (0.2m) thick, and standing 30 inches (0.76m) above ground. The back is rough and the edges and front squared; the latter being covered entirely by a rectangular panel containing a continuous diagonal key pattern, which goes below the present ground-level. The centres of all the keys are modified into spirals, a procedure of which there are many instances. There is a panel carved with a similar design on the western cross-shaft at Kells, a cast of which is in the National Museum; but there the band is double and the spirals raised to form small bosses. The carving, in fact, resembles a panel from one of the high crosses, and suggests a specimen of work or trial piece more than any thing else. The stone is placed at the head of a modern grave some distance south of the western doorway of the church (OF015-004003-). See attached image of stone taken from Crawford 1911.

To see a 3D model of this decorated-slab, visit https://skfb.ly/owEvZ

Compiled by Caimin O'Brien
Date of upload 28 April 2014

SMR No **OF015-004006-**
County OFFALY
Townland LEMANAGHAN
Classification Hermitage
ITM 617510m, 726930m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Situated on a slight rise of ground with stone lined causeway (OF015-004011-), church (OF015-004003-) and tower house (OF015-004001-) to the W.

A 10th / 11th century oratory named after St. Manchan's mother stands inside a rectangular shaped monastic cashel (dims. 41.7m by 30.7m) with walls measuring 1.6m thick. Small rectangular shaped oratory (dims. 4.8m N-S; 7.3m E-W; wall T 0.8m) built from large uncoursed limestone boulders with lintelled trabeate door (H 1.75m; Wth 0.75m) at centre of W gable illustrated by Graves (1874, 140). According to Graves (1874, 141) there were no windows on the side walls. The oratory is situated in the centre of a large rectangular-shaped enclosure/cashel (43m E-W; 35.5m N-S) defined by large upright boulders (1.6m x 1m x 0.5m) of varying size and shape which gives the appearance of megalithic construction indicative of Early Christian architecture. The stone lined causeway connects the oratory to the main ecclesiastical remains located to the W.

This structure may have served as a small nunnery church (Ó Carragáin 2010, 223). Local folklore from 1938 recorded that 'St. Mella's house is about a quarter of a mile from the church on the east side in a place called Kell. It is connected with the church by St. Manchan's Tochar. The four walls are standing but the roof is gone. On one of the steps going into the cell there are marks of a heel. There are also the print of toes on two stones in the cell' (The Schools' Collection, Vol. 0810, 134; www.duchas.ie).

(Cooke 1875, 343; Crawford 1911, 151-6; O' Flanagan 1933, vol. 1, 82-3; Lionard 1961, 141-5)

The hermitage is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-),a tower house (OF015-004001-), church (OF015-004003-), several early christian cross-slabs (OF015-004005-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Holy well (OF015-004007-) togher (OF015-004011) located to the SE of the main church.

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004007-**
County OFFALY
Townland LEMANAGHAN
Classification Ritual site - holy well
ITM 617156m, 726970m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). In pasture, with early Christian oratory (OF015-

004006-) and Romanesque church (OF015-004003-) nearby. Recently restored well housed in modern stone surround with steps leading down to well. Large bullaun stone (OF015-004012-) located at entrance with deep central depression (diam 0.35m; D 0.2m). According to Rev. Monahan (1886, 353) there were three holy wells located at Lemanaghan which held its annual pattern day on January 24th.

When it was renovated during the 1930s, four cross-slabs in upright positions were revealed, set out in a cruciform pattern (Quinlan and Moss 2007, 29). In 1838 the antiquarian George Petrie recorded the presence of three holy wells 'to which the blind, lame, and persons afflicted with other chronic diseases, come on the anniversary of the patron saint's death (the 24th January) (Monahan 1886, 24). In 1938 the following folklore was recorded; 'There is an old ash tree beside it which is supposed to have been cut at one time and grown up again in a night. People still visit the well on Fridays to get cured for warts and any other disease. They take a bit of the tree home with them. They also visit the well and do rounds at the church on the Saints feast day 24th January which is a local holiday' (The Schools' Collection, Vol. 0810, 138-9). In 1937 local folklore recorded that 'Toothache is cured by going to St. Manchan's Well and praying at it and by putting some of the water in the tooth' (The Schools' Collection, Vol. 0810, 47). Headaches were cure by praying to Saint Manchan and placing your head in a certain part of St Manchan's Church (The Schools' Collection, Vol. 0810, 121). People go to Saint Manchan's Well on a Friday and rub a bit of the ash tree on the wart' (The Schools' Collection, Vol. 0810, 119).

The holy well is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-),a tower house (OF015-004001-), church (OF015-004003-), several early christian cross-slabs (OF015-004005-/032-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Possible oratory or hermitage (OF015-004006-) and togher (OF015-004011) located to the SE of the main church.

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004008-**
County OFFALY
Townland LEMANAGHAN
Classification Ecclesiastical enclosure
ITM 617214m, 727026m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Possible ecclesiastical enclosure identified from results of geophysical survey carried out in the fields to the E and W of the church and graveyard (OF015-004003/004-) (Gibson 2004, 56-7; Quinlan and Moss 2007). A curving linear feature identified by the geophysical survey in the field 75m to the SW of the graveyard boundary wall may represent the ditch of the early Christian monastery (Gibson 2004, 58). A second linear feature identified in the field 90m NE of the graveyard boundary wall may also have formed part of this monastic enclosure.

This possible ecclesiastical enclosure is part of an archaeological complex consisting of a tower house (OF015-004001-), church (OF015-004003-), graveyard (OF015-004004-) several early christian cross-slabs (OF015-004005-/032-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Holy well (OF015-004007-) and possible oratory or hermitage (OF015-004006-) and togher (OF015-004011) located to the SE of the main church.

See attached imageS of magnetic data collection SW, E & SE of church after Gibson 2004.

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004009-**
County OFFALY
Townland LEMANAGHAN
Classification Building
ITM 617078m, 727005m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Located to the NW of Lemanaghan church (OF015-004003-) inside the graveyard (OF015-004004-) there are the remains of a poorly preserved rectangular shaped building (6.8m N-S; 8.4m E-W) with SW angle surviving and wall footings elsewhere. No

other features evident although wall construction is very similar to later part of church. Several architectural fragments lying on NE corner of wall foundations.

This structure is known locally as the 'House of Manchan' (Monahan 1886, 351). Local folklore from 1938 recorded that is was; 'the dwelling house of himself and his mother, still exist in Lemonaghan. The ruins of St. Manchan's house is on the northwest side of the church. There remains of only one wall is left.' (The Schools' Collection, Vol. 0810, 133). It was suggested that this structure may have served as a priest's residence in the late medieval period (Quinlan and Moss 2007, 26). Alternatively it may have served as a shrine chapel which housed the relic known as St. Manchan's Shrine which is now housed in nearby Boher R. C. Church.

This building is part of an archaeological complex consisting of a tower house (OF015-004001-), church (OF015-004003-), graveyard (OF015-004004-) several early christian cross-slabs (OF015-004005-/032-) . Holy well (OF015-004007-) and possible oratory or hermitage (OF015-004006-) and togher (OF015-004011) located to the SE of the church.

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004010-**
County OFFALY
Townland LEMANAGHAN
Classification Font
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Remains of medieval font from Lemanaghan church (OF015-004003-) currently located inside the disused Lemanaghan schoolhouse.

The font is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-),a tower house (OF015-004001-), church (OF015-004003-), several early christian cross-slabs (OF015-004005-/032-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Possible oratory or hermitage (OF015-004006-) and togher (OF015-004011) located to the SE of the church.

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No **OF015-004011-**
County OFFALY
Townland LEMANAGHAN
Classification Road - road/trackway
ITM 617269m, 726938m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). The length of the roadway measures 249m with an average width of 3m. The road is made up of large boulders and natural bedrock. The togher appears to connect Lemanaghan church (OF015-004003-) with the oratory known as St. Mella's Cell (OF015-004006-) which is located to the SE of the church and graveyard.

The togher is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-),a tower house (OF015-004001-), church (OF015-004003-), several early christian cross-slabs (OF015-004005-/032-) and architectural fragments in the interior of the church. To the NW there is a rectangular building (OF015-004009-) possibly of late medieval date. Possible oratory or hermitage (OF015-004006-) located to the SE of the church.

See attached geophysical image of section through togher by Gibson 2004

The above description is derived from the published 'Archaeological Inventory of County Offaly' (Dublin: Stationery Office, 1997). In certain instances the entries have been revised and updated in the light of recent research.

Compiled by Caimin O'Brien
Date of upload 14 September 2018

SMR No **OF015-004012-**
County OFFALY
Townland LEMANAGHAN

Classification Bullaun stone
ITM 617060m, 727024m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Bullaun stone located on the public road from Ballycumber to Ferbane beneath a tree opposite the disused schoolhouse at Lemanaghan. Roughly rectangular-shaped sandstone slab (dims. 0.98m L x 0.44m Wth x 0.22m T) with hollow (top diam. 0.36-0.3m; base diam. 0.11m; D 0.15m) in centre. Lemanaghan church (OF015-004003-) and graveyard (OF015-004004-) 13m to SSE, Lemanaghan Castle (OF015-004001-) 50m to NNW.
The bullaun stone is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-), a tower house (OF015-004001-), church (OF015-004003-), 18 early christian cross-slabs (OF015-004005-/032-), graveyard (OF015-004004-),a rectangular building (OF015-004009-) possibly of late medieval date. Possible oratory or hermitage (OF015-004006-) and togher (OF015-004011) located SE of Lemanaghan church.
Compiled by Caimin O'Brien.
Date of upload 23 May 2011

SMR No OF015-004013-
County OFFALY
Townland LEMANAGHAN
Classification Bullaun stone
ITM 617159m, 726967m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Bullaun stone located in front of St. Manchan's Well (OF015-004007-). Roughly sub-circular shaped sandstone slab (0.92m L x 0.62m Wth x 0.23m T) with water-filled hollow (top diam. 0.45m; D 0.18m) in centre. Lemanaghan Church (OF015-004003-) and graveyard (OF015-004004-) 30m to W. Medieval paved roadway known as the 'Togher' located immediately to E which gives access to St. Mella's Cell (OF015-004006-) 335m to E.
The bullaun stone is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-), a tower house (OF015-004001-), church (OF015-004003-), several early christian cross-slabs (OF015-004005-/032-), a rectangular building (OF015-004009-) possibly of late medieval date. Possible oratory or hermitage (OF015-004006-) and togher (OF015-004011-) located to the SE of Lemanaghan Church.
Compiled by Caimin O'Brien.
Date of upload 23 May 2011

SMR No OF015-004014-
County OFFALY
Townland LEMANAGHAN
Classification Ecclesiastical enclosure
ITM 617516m, 726925m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). A 10th / 11th century oratory named after St. Manchan's mother stands inside a rectangular shaped cashel (dims. 41.7m by 30.7m) with walls measuring 1.6m thick. Described in 1838 as 'an old cyclopean building, surrounded by an ancient Mur or wall of earth faced with stonework' (Monahan 1886, 24).
Remains consists of a square-shaped area (approx. dims. 30m N-S; 40m E-W) defined by a cashel which encloses a small oratory or hermitage known as St. Mella's Cell (OF015-004006-).
The cashel around the hermitage is part of an archaeological complex consisting of an ecclesiastical enclosure (OF015-004008-), a tower house (OF015-004001-), church (OF015-004003-), several early Christian cross-slabs (OF015-004005-/032-), a rectangular building (OF015-004009-) possibly of late medieval date and a togher (OF015-004011).
See attached drawings of monastic cashel drawn by Graves in 1874.
Compiled by Caimin O'Brien.
Date of upload 23 May 2011

SMR No OF015-004015-
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617107m, 726988m
Description The cross-slab from Lemanaghan was described by Petrie in 1872, the precise location of this cross-slab cannot be identified and it is possible that the slab has been removed from Lemanaghan. Described by Petrie in 1872 as 'The design of the very beautiful ornament upon this stone...was formed of a band so

interlaced as to make a large cross of the Maltese pattern, with a smaller cross at the centre: and the angles are filled in with four larger and four smaller triquetra knots, all flowing from the graceful interweaving of a single band' (Petrie and Stokes 1872, 60). In 1913 Crawford (1913, 264) described this which measured 'about 1ft. 3 in. (0.3m), carved with a rectangular panel containing an interlaced cross in relief. This cross is made up of triquetras joined by their angles and showing the unusual feature of pairs of bands uniting in one. Above is the word retar and below a word not deciphered'. In 1911 Crawford (1911, 151) suggested that that this word 'may be a mistake for [O][ROITAR; but Miss Stokes remarks that the name may be RETARA, or, perhaps, RETAR, which is mentioned in the Annals of Ulster as the name of the father of an abbot of Clonmacnois'. Crawford states that by this time the stone was then missing from Lemanaghan (ibid.). In 1949 it was described by Macalister as an `Equal-armed cross in cave rilievo in a square panel, made up of elaborate interlacing' (Macalister 1949, 77). The slab bears an inscription RETA[R]. According to Petrie `This name may perhaps be read as Retara. It is also possible that it may have been Retan, or Redan, a name which occurs in the Annals of the Four Masters at the year 954' (Petrie and Stokes 1872, 60). See attached image taken from Petrie and Stokes 1872.

Compiled by Caimin O'Brien.
Date of upload 24 April 2014

SMR No **OF015-004016-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-slab currently located inside the disused Lemanaghan schoolhouse. Recorded by Petrie in 1872 as `This stone was found in the churchyard of Lemanaghan, in the Clonmacnois district. Drawn by Miss Boxwell from a rubbing made of the stone by the Rev. James Graves and Mr. William M. Hennessy, in the year 1869' (Petrie and Stokes 1872, 18). Described by Crawford (1913, 264) as 'a slab about 3ft. 3in. (1m) by 2ft. (0.6m), incised with a double-lined ringed cross and the name Clonlarat, which reads down the sinister side'. According to Crawford this slab was missing from Lemanaghan at that time. Macalister (1949, 77) recorded that this cross-slab 'was decorated with a wheel-cross bore an inscription which reads CONLARAT'. See attached image of slab taken from Petrie and Stokes 1872.
Compiled by Caimin O'Brien.
Date of upload 24 April 2014

SMR No **OF015-004017-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Cross-inscribed slab with Goidelic inscription now located inside the disused school house at Lemanaghan. Described by Crawford (1913, 265; Crawford 1911, 154) as a 'thin slab of sandstone, broken and wanting one corner. It is 3 ft. 6 in. (1.06m) long by 2 ft. 4 in. (0.71m) wide, and bears a ringed cross of two lines incised, and having the sectors of the ring recessed. The base of the shaft is stepped and pointed, and the cross is surrounded at the upper end and sides by a rectangular incised line. Above the line and inverted is the inscription bendact for a[nma]in ailbertig'. At the time this inscribed slab was located leaning up against the wall NW of the church. Described by Macalister (1949, 78) as a sandstone cross-slab (dims. 1.07m x 0.71m x 0.05m) which is broken into three pieces and is decorated with a wheel-cross fitchée and which contained an inscription which reads BENDACT (sic) FOR AN [MA]IN AILBERTIG that can be expanded to BENDACHT FOR AN[MA]IN AILBERTIG. See attached image of slab taken from Macalister 1949, plate VIII.
Compiled by Caimin O'Brien.
Date of upload 24 April 2014

SMR No **OF015-004018-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617098m, 726996m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-slab mounted on the W face of the E wall of Lemanaghan church (OF015-004003-) located off centre to the N. Described by Crawford

(1911, 152) as a 'stone 26 inches (0.66m) by 20 inches (0.5m) by 4 inches (0.1m) thick, similar to the last, but having the unusual feature of a ringed Latin cross incised in a circle. There seems to be no other example of this combination. The sectors of the ring are hollowed, and the intersection of the cross is 1½ inches (0.03m) above the centre of the surrounding circle, which is 16 inches (0.4m) in diameter. This, like the last-mentioned, is placed on a grave west of the church'.
To see a 3D model of this cross-slab, visit https://skfb.ly/owEtp
Compiled by Caimin O'Brien
Date of upload 24 April 2014

SMR No **OF015-004019-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617098m, 726991m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Lower fragment of cross-inscribed slab that has been mounted on the N face of the S wall of Lemanaghan church (OF015-004003-) located close to the SE angle and immediately E of the church piscina. Only the incised outline of the lower part of the shaft of a possible cross survives.
To see a 3D model of this cross-slab, visit https://skfb.ly/owEq8
Compiled by Caimin O'Brien
Date of upload 24 April 2014

SMR No **OF015-004020-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab (present location)
ITM 617052m, 727042m
Description Broken slab (dims. L 0.64m x H 0.25-0.31m x T 0.13-0.15m) the surface of which bears an encircled equal-armed cross with slightly expanded terminals carved in false relief. The arms of the cross are formed by broad bands with recessed triangular shaped centres and by pecking the marks of which are visible in the lines of the cross.
Compiled by Caimin O'Brien
Date of upload 7 August 2018

SMR No **OF015-004021-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse. Described by Crawford (1911, 152-3) as a 'sandstone slab of irregular shape, fine in grain and yellow-brown in colour. The dimensions are 23 inches (0.58m) by 15 inches (0.38m) by 4½ inches (0.11m) thick. The carving takes the form of a ringed cross of two lines, incised and filling the entire length of the stone. The lower end of the shaft is pointed and the top furnished with loops. The arm may have had similar loops, but they cannot now be made out with any certainty. The stone is lying against the boundary-wall in the north west corner of the graveyard (OF015-004004-)'.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No **OF015-004022-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse. A sixth/seventh century date for this slab was suggested by Kelly who described the stone in 1988 as following; 'Lemanaghan 2: broken and very worn slab, maximum dimensions 46.5 by 29.5cm and 5cm thick, with design of an encircled cross carved in false relief on one broad surface. The cross, surrounded by two concentric circles, 29cm and 24cm in maximum

diameter, is equal-armed with broad expanded terminals, the carving of the terminals creating bell-shaped areas in the quadrants. A shallow, almost circular depression has been worked at the centre of the cross' (Kelly 1988, 93). Kelly (1988, 97) recorded that this cross-inscribed stone is not the same slab as the stone (OF015-004033-) described by Crawford (1911, 152-3) which is very similar but a bit larger. The stone described by Crawford is now missing.
Compiled by Caimin O'Brien
Date of upload 17 August 2018

SMR No **OF015-004024-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian slab decorated with a cross-potent carved in relief which was discovered during conservation works on the church between 2002-06 (Quinlan and Moss 2007, 68). Cross-slab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No **OF015-004025-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No **OF015-004026-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse.
A sixth/seventh century date for this slab was suggested by Kelly who described the stone in 1988 as following; 'Lemanaghan 1: sub-rectangular slab, maximum dimensions 35 by 31.5cm and up to 8cm thick, with design of an encircled cross carved in false relief. The cross, surrounded by a single circle 29cm in maximum diameter, is roughly equal-armed, 22 by 23cm, with parallel-sided arms, the angles at the crossing slightly curved. A shallow circular depression has been worked at the heart of the cross. The quadrants left in relief by the cutting of the cross and the inner line of the circle have been similarly ornamented with shallow circular depressions, three in the top left-hand and two lower quadrants, four in the top right-hand quadrant' (Kelly 1988, 93).
Compiled by Caimin O'Brien
Date of upload 17 August 2018

SMR No **OF015-004027-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No **OF015-004028-**
County OFFALY

Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No OF015-004029-
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian slab decorated with an incised ringed cross which was discovered during conservation works on the church between 2002-06 (Quinlan and Moss 2007, 68). Cross-slab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No OF015-004030-
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No OF015-004031-
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed slab with traces of an Irish inscription currently located in disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No OF015-004032-
County OFFALY
Townland LEMANAGHAN
Classification Graveslab
ITM 617050m, 727041m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Medieval graveslab currently located inside the disused Lemanaghan schoolhouse.
Compiled by Caimin O'Brien
Date of upload 25 April 2014

SMR No OF015-004033-
County OFFALY
Townland LEMANAGHAN
Classification Cross-inscribed stone
ITM 617071m, 726996m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Early Christian cross-inscribed stone the location of which is now lost. Described by Crawford (1911, 152-3) as a 'rough piece of reddish sandstone, 27 inches (0.68m) by 20 inches (0.5m) by 4 inches (0.1m) thick, having a Greek cross, with almost square expanded

ends, and centre bounded by curved lines, incised in a circle 14½ inches (0.37m) in diameter, and surrounded by a second circle 2 inches (0.05m) larger. The centre contains an irregular hollow or cup, which seems to have been smaller originally and to have formed the centre of a crosslet. The latter is now almost obliterated by the flaking away of the stone. This slab is lying on a grave west of the church (OF015-004003-) and close to the stile in the boundary-wall (OF015-004004-)'. This cross-inscribed stone is remarkably similar to a cross-inscribed stone (OF015-004022-) recorded in 1988 (Kelly 1998, 97).

Compiled by Caimin O'Brien
Date of upload 17 August 2018

SMR No **OF015-004034-**
County OFFALY
Townland LEMANAGHAN
Classification Cross-slab
ITM 617071m, 726996m
Description A monastery at Lemanaghan (Liath Manchán) was founded in the 7th century by Manchán whose feastday is celebrated on the 24th of January (Ó Riain 2011, 429). Fragment of an early Christian sandstone cross-slab with rounded edge bearing the lower part or base of a cross carved in false relief with what appears to be a stepped base. Recovered from Lemanaghan by Con Manning and now housed in the National Museum of Ireland.
Cross reference with DU018-467----
See attached photograph courtesy of Ed Bourke
Compiled by Caimin O'Brien
Date of upload 29 March 2023

SMR No **OF015-497----**
County OFFALY
Townland LEMANAGHAN
Classification Enclosure
ITM 617212m, 726845m
Description Situated on flat partially reclaimed grassland 85m S of the 'Togher' (OF015-004011-) connecting St. Managhan's church (OF015-004003-) located 170m to NW with St Mella's Cell (OF015-004006-) located 275m to ENE. Outline of slightly raised sub-circular shaped area (approx. diam. 37m N-S) defined by a shallow fosse visible on Digital Globe aerial photograph. The W quadrant of the enclosure is transected by a field boundary running N-S. The faint cropmark of the enclosing element is visible on the W side of the field boundary.
Compiled by Caimin O'Brien based on details kindly provided by John Purcell
Date of upload 3 May 2018

Appendix 2.3 Archaeological Excavations

The excavation bulletin website (www.excavations.ie) was consulted to identify previous excavations that have been carried out in the vicinity of the site. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2023.

Excavation No.: **1998:553**
County: Offaly
Site name: LEMANAGHAN
SMR No.: N/A
Licence No.: **98E0464**
Author: Conor McDermott, Irish Archaeological Wetland Unit, Department of Archaeology, University College Dublin
Site type: Road - class 1 togher
Period/Dating: Medieval (AD 400-AD 1600)
ITM: E 616588m, N 728129m
Lat, Long: 53.303190, -7.751128
Description: An excavation was carried out as part of an assessment and mitigation project in Bord na Móna's Lemanaghan Bog, Boora Works, Co. Offaly. The work was carried out between 13 October and 5 November 1998 and concentrated on a single-plank walkway and three lesser structures.

The plank walkway was first identified in 1993 during field survey carried out by the Irish Archaeological Wetland Unit, when it was traced for 454m. During the 1998 assessment the site was traced further and was finally identified as surviving intermittently over a length of 870m. The site runs in a north-south direction, and at its northern end is a zone of 25 other smaller sites to the east and west. The excavations were concentrated along a 360m length at the southernmost end of the site.

The assessment recorded visible traces of the site at fourteen locations, and nine cuttings were established. On excavation the wood in the three most southerly cuttings (Nos 1–3) proved to have been redeposited by heavy machinery. This wood was roughly aligned on the projected line of the site and represented its former presence in the general area. Cuttings 4 and 5 each produced a single in situ peg indicating the line of the site, as well as fragments of disturbed and redeposited wood. Cuttings 6–8 produced the best surviving evidence of the structure of the sites.

In each cutting the site had been truncated by Bord na Móna drains and severely damaged and partly removed by surface milling. The general pattern of construction revealed in these cuttings showed an upper surface of single longitudinal planks laid end to end supported two layers of substructure. None of the upper planks survived intact, but the excavated evidence indicates that they ranged from c. 4m to 6m long, with mortises cut through the ends, through which pegs were driven. Supporting each end of the planks was an upper substructure of single transverse roundwoods or split timbers c. 1.1m long. The lower substructure consisted of pairs of longitudinally laid timbers c. 1.5m long set c. 0.5m apart, supporting each of the upper substructural timbers. The end of each of the superstructure planks was therefore supported by three timbers and additional lesser timbers as well as supporting pegs.

Cutting 9 produced no surviving horizontally laid timbers; however, a number of pegs survived indicating a continuation of the pattern of construction identified in other cuttings.

This form of trackway construction has not been excavated before and samples submitted for dendrochronological dating provided a date of after AD 590.

Excavation No.: **2000:0817**
County: Offaly
Site name: DERRYNAGUN BOG, Leabeg
SMR No.: N/A
Licence No.: **00E0493**
Author: Jane Whitaker, ADS Ltd.
Site type: Road - class 3 togher
Period/Dating: Undetermined
ITM: E 618435m, N 727673m
Lat, Long: 53.299032, -7.723435
Description: This excavation was carried out in Derrynagun Bog, Co. Offaly, as part of the 2000 Bord na Móna Archaeological Mitigation Project. It was located at the north-eastern extent of Derrynagun Bog close to the adjoining reclaimed farmland. The site was recorded in 1998 on the field surface, and it was

noted that it was either a single-layered structure or the surviving bottom layer of a togher. At that time it was described as being composed of horizontally laid rods located on the field surface. Excavation this season revealed that it was a fragmentary site that had become very dried out in the eighteen months between its primary recording and subsequent excavation.

There was very little peat cover over the site (0–20mm), and many elements were partially exposed on the field surface. It had a high fibrous matter content that also included ericaceous roots, eriophorum and wood fragments. The excavated cutting revealed five longitudinal roundwoods ranging from 50mm to 60mm in diameter and from 0.3m to 0.78m in length and orientated north-east/south-west. The remainder of the material exposed consisted of a transverse and irregular scatter of fragmentary brushwood rods. The brushwood ranged from 9mm to 47mm in diameter and from 0.12m to 0.45m in length. This site was most likely the fragmentary remains of a small togher. The longitudinal roundwoods may originally have supported transverse brushwood rods, as indicated by the brushwood remains excavated. Sites of this construction type have been recorded and excavated within the Lemanaghan complex of bogs. Several were excavated this season by the author in the nearby Corrhill Bog (see Excavations 2000, Nos 829–40). It is proposed to date as many of these small sites as possible and to compare the environmental results as well as their locations within the whole Lemanaghan complex in an attempt to gain a better understanding of their function.

Excavation No.: **2000:0818**
County: Offaly
Site name: DERRYNAGUN BOG, LEABEG
SMR No.: N/A
Licence No.: **00E0494**
Author: Jane Whitaker, ADS Ltd, Windsor House, 11 Fairview Strand, Fairview, Dublin 3.
Site type: Plank trackway
Period/Dating: —
ITM: E 618262m, N 727632m
Lat, Long: 53.298670, -7.726032
Description: This excavation was carried out in Derrynagun Bog, Co. Offaly, as part of the 2000 Bord na Móna Archaeological Mitigation Project. It was located at the north-eastern extent of Derrynagun Bog close to the adjoining reclaimed farmland. The site was sampled and dated, after the field survey in 1998, to 1547 BC (QUB-9255). The site was in the process of being destroyed. Very little substantial in situ remains survived, but from this material it was possible to trace the site for a length of over 224m.

A single 2m x 2m cutting was recommended in the mitigation strategy document laid down by Dúchas The Heritage Service and the National Museum. It was established that the only surviving in situ remains of the site were where the site was exposed in section in the drain face. A single plank was visible, in both sides of the drain, 0.31m below the field surface. The cutting was extended to 4m x 2m along the length of the site to facilitate the investigation of the presence or absence of substructural elements.

The peat directly overlying the site was very dark in colour, and, while it was physically very wet, it was crumbly in texture. This crumbly texture is indicative of redeposited or disturbed peats. Prior to commercial development this part of Derrynagun Bog contained turbary plots that were subsequently levelled out. This side of the bog has not been as extensively milled as has the south-western extent. The sighting chosen for excavation, as mentioned above, was the only in situ remains of the site. The other four sightings were fragmentary, dried out and disturbed planks, all of which were located on the field surface.

Although the cutting size was extended to 4m x 2m, only a single plank placed north-east/south-west was revealed. This plank was a squared, radial split, known as a secondary conversion radial split. It measured 0.16m in width and between 70mm and 100mm in depth. The area beyond the north-eastern cutting edge was probed to establish the extent of the plank, which would appear to have been at least 5.5m long. The plank visible in the opposing drain face was very similar in size and conversion and was most likely to have been the same timber. It was in moderate to poor condition, splitting and disintegrating when sampled. The peat onto which that plank had been placed was mainly sphagnum-rich, bright orange in colour when first trowelled and turning darker as it oxidised. There were patches of eriophorum, mainly along the northern cutting edge and directly along the sides of the plank itself. There was no evidence for substructural supports of any sort. It may be the case that there never were any supporting timbers. The excavation of a Bronze Age plank trackway in the neighbouring bog of Killaghintober by Ellen OCarroll in 1999 (Excavations 1999, 263, 99E0447)

also revealed an apparent lack of substructure. In both cases the underlying ground conditions of sphagnum-rich peats would appear to indicate that the sites were constructed across particularly wet stretches of bogland. The lack of substructure may indicate that the planks were actually placed across the driest parts of these very wet areas. It is hoped that this may be resolved by specialist analysis of the environmental remains.

Excavation No.: **2000:0819**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0495**
Author: Jane Whitaker, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Undetermined
ITM: E 618349m, N 727200m
Lat, Long: 53.294785, -7.724753
Description: This excavation was carried out in Derrynagun Bog, Co. Offaly, as part of the 2000 Bord na Móna Archaeological Mitigation Project. This site was recorded in 1998 by the IAWU during a reassessment survey carried out on behalf of Bord na Móna. It was located at the centre of Derrynagun Bog on the field surface, 0.4m from the drain edge. The site was thought to be a hurdle, because the small area investigated revealed two transverse elements underlain by compactly laid, longitudinal brushwood. Excavation revealed that the site was not a hurdle but a small brushwood deposit similar to several others first identified within Derrynagun Bog as puddle toghers. While the small area investigated in 1998 (0.74–1m) was somewhat hurdle-like in appearance, the remainder of the site was insubstantial. The whole site was contained within an area measuring 0.9m x 1m. The site was composed of fifteen brushwood rods, ranging from 4mm to 16mm in diameter, laid in a north-east/south-west direction. These were overlain by a single transverse brushwood 29mm in diameter. This transverse was held in place by two small pegs, 50mm and 90mm in diameter. Many of the elements had bark intact, and four had simple, flat-faceted, chisel-point toolmarks. There are several enigmatic sites within this particular zone of activity in Derrynagun Bog. Rather than being a hurdle panel it is more likely that this site is associated with the dense spread of similarly constructed sites 15m to the east, which were excavated by Ellen OCarroll this season (see Excavations 2000, Nos 820–6).

Excavation No.: **2000:0820**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0496**
Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Medieval (AD 400-AD 1600)
ITM: E 618286m, N 727309m
Lat, Long: 53.295767, -7.725691
Description: Excavations were carried out in Derrynagun Bog, Co. Offaly, as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Derrynagun Bog is to the north-east of Lemanaghan dryland island, where the site of the monastic establishment of St Manchan of Liath is reputed to have been founded in the middle of the 7th century. This excavation exposed a brushwood platform, which was one of a series of sites excavated alongside a Bord na Móna drain edge (see Excavations 2000, Nos 819, 821–6). The sites ran from the north-west to the south-east, were all quite similar in construction type and form, and were very close together.

Between 0.01m and 0.3m of peat was removed from over the site, comprising of three layers. Part of the site lay underneath yellow, sphagnum pool peat with inclusions of Menyanthas trifoliata (bog bean). The yellow/orange sphagnum peat and the bog bean indicate that there was an area of open water located over the site. The site was composed of approximately 120 brushwood rods, four roundwoods and some twigs and pegs. The brushwoods ranged in length from 1.14m to 0.09m and averaged 0.02m in diameter. The roundwoods measured between 0.92m and 0.27m in length and

averaged 0.06m in diameter. They were arranged in a haphazard fashion, and the wood did not appear to form any coherent structure. A substantial number of pegs were found throughout the structure, particularly at the north-western end of the cutting. The roundwood elements were on the top layer of the structure, while the preponderance of the brushwood appears to lie at the lower levels of the structure. The site measured 4.55m by 3.5m in total area and was 0.47m in depth.

All of the worked ends recorded were chisel-pointed, and some were multi-faceted. There were also some tears noted on the end of some of the brushwood where the branch/stem had been torn from the main trunk. The facets had been cut with a metal axe.

Results here suggest that part of the site was located underneath an open area of water. It is not clear whether the pool was a consequence of the construction of this site or whether the site was a consequence of the pool, and this is an area that needs to be investigated further. It is doubtful that the people who constructed this small platform were covering a very wet area when instead they could walk around the wet pool to avoid it. It is possible that the wood was intended to serve as a small, dry platform for hunting or other such activities; this hopefully will be ascertained through the analysis of the peat and further research into the area during the post-excavation stage.

Excavation No.: **2000:0821**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0497**
Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Late Medieval (AD 1100-AD 1599)
ITM: E 618306m, N 727287m
Lat, Long: 53.295568, -7.725392
Description: Excavations were carried out in Derrynagun Bog, Co. Offaly, as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Derrynagun Bog is to the north-east of Lemanaghan dryland island, where the site of the monastic establishment of St Manchan of Liath is reputed to have been founded in the middle of the 7th century. This excavation exposed a brushwood platform, which was one of a series of sites excavated alongside a Bord na Móna drain edge (see Excavations 2000 Nos 819–20, 821–6). The wood associated with the site had been milled on the north-western side of the cutting. It was composed of approximately 200 brushwood elements, some pegs and some interspersed twigs. The site was 2.1m wide, 3.5m long and 0.5m in depth. Most of the brushwood rods were concentrated in the centre of the cutting, arranged longitudinally, and were very straight in nature. The brushwood elements dipped towards the centre of the site and were up to three layers deep in places. To either side of the concentration, the brushwood was haphazardly placed with no particular orientation. There were four transversely placed brushwood rods; these ran underneath the longitudinal brushwood to provide support. The twigs were interspersed between the brushwood and would have filled in the gaps between the wood, providing stability to the wooden structure.

There were 36 worked ends recorded from this site. Most were chisel-pointed and single-faceted. The facets appear to have been cut with a metal axe. There were some tears recorded above the worked facets, which may indicate that the builders first tried to axe the branches off, and when this was not successful they tore the branch from the tree.

It is clear from the excavations that this site was a small, compactly lain platform, held in place with pegs and further compacted by the use of twigs within the structure. This site has been radiocarbon dated at University College Dublin to cal. AD 1332–1625 (UCD-0103). It is possible that the wood was intended to serve as a small, dry platform for hunting or other such activities. The relationship between this site and the sites located in the near vicinity will be ascertained in the post-excavation stage.

Excavation No.: **2000:0822**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0498**

Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Medieval (AD 400-AD 1600)
ITM: E 618330m, N 727262m
Lat, Long: 53.295343, -7.725034
Description: Excavations were carried out in Derrynagun Bog, Co. Offaly, as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Derrynagun Bog is to the north-east of Lemanaghan dryland island, where the site of the monastic establishment of St Manchan of Liath is reputed to have been founded in the middle of the 7th century. This 17m x 2m cutting revealed the remains of five brushwood sites located close to each other, within an area of small brushwood and roundwood platforms that were excavated alongside a Bord na Móna drain (see Excavations 2000, Nos 819–21, 823–6.)

Site E lay at the north-western end of the cutting. It was excavated in its entirety and was 1.5m long, 1.5m wide and 0.2m deep. It was composed of a dense arrangement of brushwood (65%), averaging 0.02m in diameter. The spaces between the brushwood were infilled with twigs (35%). Most of the brushwood rods were orientated longitudinally and were quite short, averaging 0.4m. The wood was hard and quite gnarly, and there was some bark present. There were some larger brushwood rods excavated from around the edge of the site. There were no pegs excavated within this structure. There were some worked ends recorded from this site. Most of the worked ends recorded were chisel-pointed and single-faceted. The facets appear to have been cut with a metal axe.

Site D was located c. 6m to the south-east of Site E and was similar in structure and type. The site was composed of a linear arrangement of brushwood (80%) and twigs (20%), 1.5m long, 1.3m wide and 0.2m deep, which had been truncated on its northern end by the Bord na Móna drain. The brushwood averaged 15mm in diameter and 0.4m in length, and there was bark present on nearly all of the wood. The brushwood and twigs were three layers deep in places and had been compacted together to form a substantial though small wooden platform. There were some flat metal toolmarks on some of the brushwood.

Site C was located 1.8m from Site D, in pasty, brown, well-humified sphagnum peat. It comprised a narrow spread of longitudinally placed brushwood, one to two layers deep. Outlier wood was spread along the drain face to the north-west of the site. This outlier wood was probably dislodged from the main site during Bord na Móna ditching. The site was 0.6m wide, 1.2m long and 0.2m deep. The brushwood averaged 25mm in diameter, and all the brushwood had bark present. There were some pegs and a small amount of twigs scattered around the structure. A few of the brushwoods had worked ends.

Site B lay 3.5m from the main concentration of wood at Site C and was composed of heavy brushwood distributed over an area measuring 2m x 1m. The brushwoods were between 0.01m and 0.05m in diameter, averaging 0.03m. The length of the brushwoods ranged from 0.1m to 1m. Some of the brushwoods were forked and branched, and the majority had bark still intact. Outlier wood was spread along the drain face to the north-west of the site. There was no specific orientation or structured arrangement to the wood.

Site A was the north-easternmost of the five sites excavated. It was located beside the drain edge and had been cut by the drain; as a result its length on its northern side could not be determined. The site was 1.6m by 1.95m in total area and 0.05m deep, although some pegs were measured to a depth of 0.6m. It was composed of approximately twenty widely spread brushwood rods, between 15mm and 20mm in diameter. The brushwoods ran longitudinally along the line of the site and were flanked on either side by a line of pegs. The pegs, which were up to 0.6m long, were all identified as hazel and were worked to a chisel-point.

Three of these structures may represent small, distinct wooden platforms (Sites B, D and E), which were probably short-lived structures. The two remaining structures, the function of which remains enigmatic, were quite small and constructed of loosely laid brushwood. The platform structures may have been used for hunting or may have been associated with the collection of organic-type material from the surrounding peat.

Excavation No.: **2000:0823**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A

Licence No.: **00E0499**
Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Medieval (AD 400-AD 1600)
ITM: E 618316m, N 727477m
Lat, Long: 53.297275, -7.725231
Description: Excavations were carried out in Derrynagun Bog, Co. Offaly, as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Derrynagun Bog is to the north-east of Lemanaghan dryland island, where the site of the monastic establishment of St Manchan of Liath is reputed to have been founded in the middle of the 7th century. This licence covers the one-week excavation of a brushwood platform. It was located next to Nos 822 and 825 above/below and was one of a series of small brushwood and roundwood platforms excavated alongside a Bord na Móna drain edge (see Nos 819–22 and 824–6 for the other sites).

The site, which was excavated in its entirety, was 3.5m long, 1.5m wide and 0.42m deep. Excavation revealed a three-layered arrangement of brushwoods, which were tightly compacted together. The upper two layers of wood comprised approximately 220 densely compacted brushwoods, twigs and leaves. The main body of the site was constructed of a number of longitudinally placed brushwoods with some transverses woven through them. These transverses may have been laid in this way to create stability for the site. The third layer of wood, which acted as a foundation to the site, consisted of haphazardly lain brushwood. The brushwood associated with this layer averaged 15mm in diameter. There were also some twigs associated with this layer of wood. All of the brushwood had bark remaining, and some of the wood was branched and gnarly. This site may represent a small platform structure used as a hideout for hunting or wild-fowling and may be contemporary with the other sites located in the vicinity.

Excavation No.: **2000:0824**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0500**
Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Medieval (AD 400-AD 1600)
ITM: E 618286m, N 727309m
Lat, Long: 53.295767, -7.725691
Description: Excavations were carried out in Derrynagun Bog, Co. Offaly, as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Derrynagun Bog is to the north-east of Lemanaghan dryland island, where the site of the monastic establishment of St Manchan of Liath is reputed to have been founded in the middle of the 7th century. This cutting (2m x 2.5m) was found beside a Bord na Móna drain, as the wood could be seen protruding from the drain face. Excavation exposed a brushwood and roundwood platform, one of a series of wooden platforms excavated (see Nos 819–23 above and Nos 825–6 Excavations 2000).

This site had been cut by the drain, leaving only the southern side remaining. Between 0.08m and 0.4m of peat was removed from over the site. The peat layer, which lay directly over the wood, consisted of bright yellow sphagnum peat, which was very poorly humified. Within this peat layer were found Menyanthas trifoliata (bog bean) and reeds, which suggests that there was open water present over the site.

The site was composed of approximately 80 brushwood elements and three roundwoods arranged in a linear fashion. The brushwood ranged from 1.31m to 0.06m in length and from 0.42m to 0.01m in diameter. The roundwood was between 1.2m and 0.65m long and between 0.07m and 0.06m in diameter. The wood was up to three layers deep and was slightly disturbed at the drain edge where the ditcher had cut the drain, pushing the wood together in a haphazard fashion. The area of wood within the cutting was 1.67m wide, although the site's true width was 0.85m because much of the wood had been disturbed. The site was 2.3m in length, although it was probably slightly longer, as the drain cut the site on its northern side. The depth of the site was 0.43m.

This site may represent a short-lived platform structure used for certain activities that took place out in the centre of the bog. These activities may include hunting wildfowl or gathering a specific organic type of material that grew on the raised bog peat.

Excavation No.: **2000:0825**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0501**
Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Medieval (AD 400-AD 1600)
ITM: E 618311m, N 727281m
Lat, Long: 53.295514, -7.725318
Description: Excavations were carried out in Derrynagun Bog, Co. Offaly, as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Derrynagun Bog is to the north-east of Lemanaghan dryland island, where the site of the monastic establishment of St Manchan of Liath is reputed to have been founded in the middle of the 7th century. This site was located next to Nos 821 and 824 Excavations 2000, at 53.084m OD, and was one of a series of small brushwood and roundwood platforms excavated alongside a Bord na Móna drain edge (see Nos 819–24 and 826 for the other sites).

This site ran up to and abutted a large area of pool peat. This pool peat was very recognisable because of its bright yellow appearance, in contrast to the brown peat located beside it. The pool measured 4m by 1.5m, was 0.4m deep and contained bog bean and reeds. The drain on the north-western side had cut through the site, and there was no indication of the site in the opposite drain face. It was therefore concluded that the north-western end of the site had been destroyed when the Bord na Móna drains were cut. The site was composed of approximately 50 densely compacted brushwood, twigs and leaves. There were some large transverses recorded within the layer, while the remaining brushwood elements ran in a longitudinal fashion. The transverses averaged 35mm in diameter, while the longitudinals averaged 20mm in diameter. The brushwood was between 0.1m and 0.7m in length. All of the elements had bark remaining on them. The leaves and twigs were in the upper layers of the structure. It was difficult to tell whether these leaves and twigs were attached to the wood when they were cut down or whether they were thrown into the site as packing material. There were no pegs associated with this site. Most of the worked ends recorded were chisel-pointed and single-faceted. The facets appear to have been cut with a metal axe.

It was concluded that this site is a small (2m x 1m), compactly lain platform located beside an area of open water. It is difficult to tell whether the pool was a consequence of the construction of the site or whether the site was a consequence of the pool, and this is an area that needs to be investigated further. It is possible that the wood was intended to serve as a small, dry platform for hunting or other such activities.

Excavation No.: **2000:0826**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0580**
Author: Ellen OCarroll, ADS Ltd.
Site type: Platform - peatland
Period/Dating: Undetermined
ITM: E 618300m, N 727294m
Lat, Long: 53.295631, -7.725482
Description: Excavations were carried out in the Lemanaghan area of County Offaly as part of the Bord na Móna Archaeological Mitigation Project. These excavations were undertaken to resolve known archaeological sites so that Bord na Móna could resume peat production in areas that had been cleared of archaeology. Eleven of the excavations were carried out in Derrynagun Bog (see Excavations 2000, Nos 817–25 and 827–8), which is situated directly south of the Ferbane to Ballycumber road.

Excavations here exposed a small wooden platform similar in size and form to comparable structures excavated in the surrounding vicinity. There was 0.18m of peat removed from over the site, which comprised two layers. The uppermost layer, 0.15m deep, consisted of laminated, bright yellow, poorly humified sphagnum peat within which bog bean and reeds were found, suggesting that open water was present over the site. The peat underneath the yellow pool peat was also sphagnum peat but was a lot more decomposed and had inclusions of eriophorum. The site was located within this peat.

The site was composed of approximately 160 brushwood elements, two small planks and some pegs. It was 1.11m wide, 0.4m deep and 3.1m in length. The brushwoods were flanked by two roundwoods arranged in a linear fashion. The brushwoods ranged from 0.32m to 0.16m in length and from 0.02m to 0.03m in diameter. The two roundwoods were 1.85m and 2.85m long and 0.1m and 0.09m in diameter and were both broken along their length. The brushwood was longitudinally placed in a north–south direction towards the back of the cutting but had been disturbed towards the front, probably by the ditch-cutting by Bord na Móna. Some of the ends of the brushwoods were torn, which may indicate that the wood was hastily gathered and collected for construction or use in the site. It is possible that the wood was intended to serve as a small, dry platform for hunting or other such activities, which hopefully will be ascertained through the analysis of the peat and further research into the area during the post-excavation stage.

Excavation No.: **2000:0828**
County: Offaly
Site name: DERRYNAGUN BOG, Lemanaghan
SMR No.: N/A
Licence No.: **00E0582**
Author: Jane Whitaker, ADS Ltd.
Site type: Structure - peatland
Period/Dating: Undetermined
ITM: E 618315m, N 727235m
Lat, Long: 53.295101, -7.725260
Description: This excavation was carried out in Derrynagun Bog, Co. Offaly, as part of the 2000 Bord na Móna Archaeological Mitigation Project. Two stake rows were identified during the 1998 IAWU reassessment survey in Derrynagun Bog, Co. Offaly. 98DNG 0008a–b consisted of two sightings 30m apart that were in line with 98DNG 0048a, which was 30m south of 98DNG 0008b. The sites were recorded as stake rows because all of the elements exposed in the 1998 survey were small, upright brushwood rods. Excavation this season proved inconclusive because the sightings were so fragmentary. However, it is possible that these may be the last remains of either small brushwood platforms or toghers. The mitigation strategy document prepared by Dúchas The Heritage Service and the National Museum recommended that the extent of these sites be traced, surveyed and sampled. It was recommended that a number of the stakes be investigated to establish the relationship between them and to check for possible associated features between them. Three small cuttings were excavated, as well as several slot-trenches between the known sightings. The first of these cuttings, Cutting 1, was placed at 98DNG 0048a, while Cuttings 3 and 4 were placed at 98DNG 0008a and 0008b respectively.

The first cutting was located alongside the drain edge at the site identified as 98DNG 0048a. An area measuring 1.8m x 1m was trowelled at this location, and a maximum of 20–40mm of peat was removed. This peat was very dried out and contained a large amount of fibrous matter, the majority of which was ericaceous roots that were most likely from the recent plant cover. In addition to the original three to four stakes recorded in 1998, a further eleven brushwood rods were exposed. Most of these were irregularly placed, some in semi-upright positions. The brushwood elements ranged from 6mm to 24mm in diameter, and none was over 0.26m in length. The peat into which these elements were set was slightly greenish in colour and pasty in texture. Directly alongside the wood, the peat had a high eriophorum content, while the remainder of the cutting was high in sphagnum.

The second cutting was also placed directly at the location investigated in 1998 (98DNG 0008b), at which time eleven small stakes were identified. As with the first cutting, the upper peat was very dried out and consisted of sphagnum-rich peat with a large amount of modern fibrous matter inclusions, mainly ericaceous roots. An area measuring 1.3m x 1.4m was trowelled and revealed that only three of the original eleven posts remained in situ. These ranged from 16mm to 19mm in diameter and from 0.28m to 0.31m in length. Two of the posts had simple, single-faceted, chisel-point

toolmarks. The peat into which these posts were set was mottled in appearance. It was all sphagnum-rich, the darker peat having a pasty texture.

The final cutting was located at the sighting recorded in 1998 as 98DNG 0008a. Five of the small stakes were visible through the shallow peat cover. This was similar to the peat exposed in Cutting 2. Eight upright stakes were revealed after the removal of this upper peat. These were set at angles of 45–85° and varied in diameter from 12mm to 17mm. There were some dried-out brushwood fragments with no discernible context scattered around the area of the cutting. The peat into which the stakes were set was also similar to that in Cutting 2. It was mottled in appearance but was also very dried out, with several large cracks in places. This last cutting was extended, and several slot-trenches were also investigated on the adjoining fields between the cuttings, but no additional trace of the site was found.

There are several enigmatic sites within this particular zone of activity in Derrynagun Bog. Where there was more peat cover over Cuttings 2 and 3, there was a small amount of additional brushwood rods noted. These were very fragmentary in nature but may mean that these sites represent the last remains of another site type altogether. While they may have formed part of a linear togher running east–west across the bog, they may also be similar to the small platform-like structures that were excavated by Ellen OCarroll this season (see Excavations 2000, Nos 820–6 and Excavations 2000, Nos 833–6).

APPENDIX 3 – SPECIALIST REPORTS

Appendix 3.1 Metal

Introduction

The excavation yielded a single metal artefact, an iron knife blade [25E558:1:1], retrieved from Tree Bole number 1. It is examined, measured (in cm) and described in the abridged catalogue herein. The full catalogue is supplied to the client to accompany the artefact to the National Museum.

The Knife

The iron knife [25E558:1001:1] is from a layer of soil associated with the root of a fallen tree (Tree Bole 1) which was uprooted by a storm, exposing human remains in its root system.

The knife has a has a straight back which curves upwards towards the tip. The cutting edge is convex, also curving up towards the tip. No tang survives, and the point of break is on the blade itself, with no shoulder or choil (the slope or drop between the tang and the cutting edge), nor is there any reduction in width to indicate a whittle tang. That said, the closest parallel in Goodall's typology is to Type J, a whittle tanged knife with a concave back, of which Goodall says 'none are particularly closely dated' (Goodall 2011, 107). The three examples of Type J illustrated by him have broad dating values from the Late Saxon to late 14th or early 15th century. No scale tang knives in Goodall's typology have this type of blade back, nor are there parallels with Ottaway's Anglo-Scandinavian typology (Ottaway 1992, 561-72). A single example of a knife with a blade-back turning up towards the tip from London is dated to the 14th century (Cowgill et al. 2000 89, fig. 60, no. 86). It is not identical, but the blade in that example is 109mm long with a width of 16mm compared with the Lemanaghan blade which is 104mm and 14.9mm wide. The example from London has a very short whittle tang.

Figure A3.1.1 Iron knife blade [25E558:1:1]

Given that the blade has no tang, it is quite a long blade. de Neergaard refers to an 'increased number of longer, more elegant blades in the 14th century (Ibid, 51). In conclusion, the knife is certainly medieval, though most probably later in the site's long history.

Recommendations

The artefact is unusual and should be forwarded to the National Museum. It first would benefit from conservation prior to deposition.

Bibliography

Cowgill, J. de Neergaard, M. & Griffiths, N. 2000. Knives and Scabbards. Medieval Finds from Excavations in London: 1 Museum of London. (1st edition 1987).

Goodall, I. H. 2011 Ironwork in Medieval Britain; An Archaeological Study. The Society for Medieval Archaeology Monograph 31 London.

Ottaway, P. 1992. Anglo-Scandinavian Ironwork from Coppergate. The Archaeology of York. The Small Finds. 17/6. York Archaeological Trust/ Council for British Archaeology.

Appendix 3.2 Radiocarbon date results and certificates

14CHRONO Centre, Queen's University Belfast

The 'Measured radiocarbon age' is quoted in conventional years BP (before AD 1950). The error is expressed at the 1 sigma level of confidence.

The 'Calibrated date range' is equivalent to the probable calendrical age of the sample material and is expressed at the 1 sigma (1σ) (68.3% probability) and 2 sigma (2σ) (95.4% probability) level of confidence.

Calibration dataset: intcal20.14c

Radiocarbon calibration programme: CALIB REV8.2 (Copyright 1986–2020 M Stuiver and PJ Reimer).

Table A3.2.1: Radiocarbon Dates (CALIB Rev8.2 programme with calibration curve of intcal20.14c).

Lab. code	Material type	Sample No.	14C age (BP)	Calibrated age (95.4% prob. (cal. BC/AD)
UBA- 58889	Human bone	Sample 1/TB 1	1283	AD 662-817
UBA- 58890	Failed	Sample 2/TB 2	Failed	Failed
UBA- 58891	Human bone	Sample 3/TB 3	1200	AD 707-939

Denis shine
Irish Archaeology Field School/Irish Heritage Sc
Number 2, Saint Brendan Street, Birr
Birr
Birr, Offaly R42HX54
Ireland

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-58889
Date of Measurement:	2025-12-17
Site:	Lemanaghan
Sample ID:	Sample 1/TB 1
Material Dated:	bone, antler or tooth root
Pretreatment:	Collagen
mg Graphite:	0.983
Submitted by:	Denis Shine

Conventional ^{14}C Age:	1283±28 BP
Fraction corrected	using AMS $\delta^{13}C$

Denis shine
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Number 2, Saint Brendan Street, Birr
Birr
Birr, Offaly R42HX54
Ireland

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

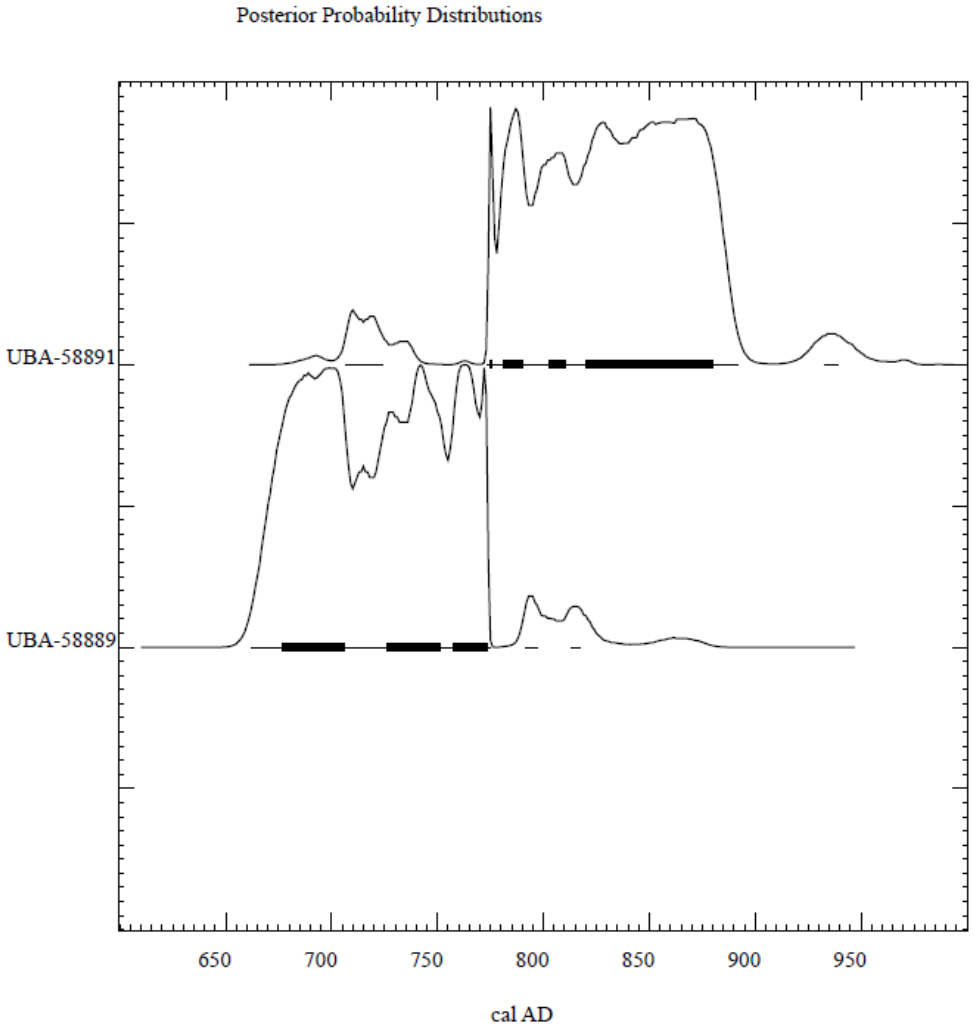
Radiocarbon Date Certificate

Laboratory Identification:	UBA-58891
Date of Measurement:	2025-12-17
Site:	Lemanaghan
Sample ID:	Sample 3/TB 3
Material Dated:	bone, antler or tooth root
Pretreatment:	Collagen
mg Graphite:	0.983
Submitted by:	Denis Shine

Conventional ^{14}C Age:	1200±27 BP
Fraction corrected	using AMS $\delta^{13}C$

Marine samples will require re-calibration with the marine calibration curve

```
 2
                RADIOCARBON CALIBRATION PROGRAM*
                            CALIB REV8.2
          Copyright 1986-2020 M Stuiver and PJ Reimer
        *To be used in conjunction with:
        Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

UBA-58889
58889
Radiocarbon Age BP   1283 +/-   28
Calibration data set: intcal20.14c                # Reimer et al. 2020
  % area enclosed       cal AD age ranges             relative area under
                                                   probability distribution
  68.3 (1 sigma)     cal AD 677- 706                        0.423
                            726- 751                        0.349
                            757- 773                        0.228
  95.4 (2 sigma)     cal AD 662- 775                        0.984
                            791- 797                        0.011
                            813- 817                        0.005
  Median Probability:   725

UBA-58891
58891
Radiocarbon Age BP   1200 +/-   27
Calibration data set: intcal20.14c                # Reimer et al. 2020
  % area enclosed       cal AD age ranges             relative area under
                                                   probability distribution
  68.3 (1 sigma)     cal AD 775- 776                        0.006
                            781- 790                        0.119
                            803- 810                        0.082
                            820- 880                        0.793
  95.4 (2 sigma)     cal AD 707- 724                        0.031
                            773- 892                        0.963
                            933- 939                        0.006
  Median Probability:   832

 References for calibration datasets:
Reimer P, Austin WEN, Bard E, Bayliss A, Blackwell PG, Bronk Ramsey C, Butzin M
Edwards RL, Friedrich M, Grootes PM, Guilderson TP, Hajdas I, Heaton TJ, Hogg A
Kromer B, Manning SW, Muscheler R, Palmer JG, Pearson C, van der Plicht J, Reim
Richards DA, Scott EM, Southon JR, Turney CSM, Wacker L, Adolphi F, BÃ¼ntgen U,
Fahrni S, Fogtmann-Schulz A, Friedrich R, KÃ¶hler P, Kudsk S, Miyake F, Olsen J
Sakamoto M, Sookdeo A, Talamo S. 2020.
The IntCal20 Northern Hemisphere radiocarbon age calibration curve (0-55 cal kB
Radiocarbon 62. doi: 10.1017/RDC.2020.41.


Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated range impinges on end of calibration data set
0* represents a "negative" age BP
1955* or 1960* denote influence of nuclear testing C-14

NOTE:  Cal ages and ranges are rounded to the nearest year which
       may be too precise in many instances.  Users are advised to
       round results to the nearest 10 yr for samples with standard
       deviation in the radiocarbon age greater than 50 yr.
```


Posterior Probability Distributions
UBA-58891
UBA-58889
650
700
750
800
850
900
950
cal AD

APPENDIX 4 – SKELETAL DATA

Appendix 4.A - Articulated Skeletons Catalogue

SKELETON 1 [TB1, BURIAL 1]

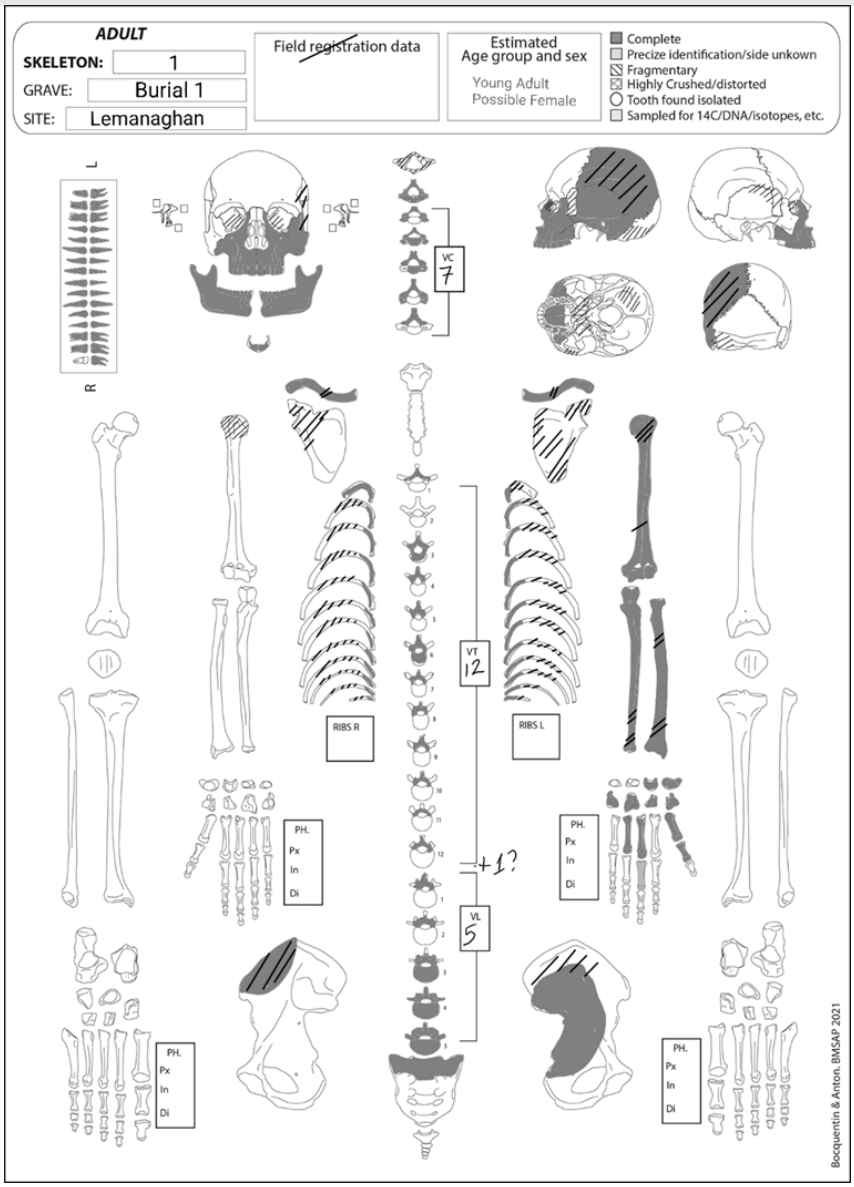
Age: 18-25 years

Sex: Female?

Stature: 163.00 +/- 4.24cm (radius)

Condition: Fair

Completeness: 45%



Skeletal inventory: Skeleton 1 was highly fragmented at the level of the skull, shoulders, spine, left arm and pelvis; the right arm and lower limbs were missing. As previously stated, femur shaft fragments exposed on the north-east end of the tree bole lined up with the burial but might have been associated with another disturbed burial, albeit it is not possible to ascertain this observation. Despite the poor condition due to post-depositional and taphonomic processes, some elements could be temporarily reconstructed – i.e. the cranium, mandible, maxillae, left humerus, radius and ulna. The mandible was fractured at the symphysis, left ramus, right condyle as a whole, and a small fragment of the

left condyle; the maxillae were damaged at the level of both zygomatic and frontal process but the shape of the nasal aperture was preserved. The left side of the cranium was temporarily reconstructed to facilitate morphological observations and the inspection for potential traumatic injuries or abnormalities. The frontal bone was entirely missing, while the occipital consisted of only a fragment of the occipital planum at the deltoid suture and two associated fragments of the cerebellar fossa at the articulation with the left temporal. Of note, the latter fragments presented significant thinning of the cortex, which consisted of a lamina below one millimetre in thickness (3.80 mm where thicker, 0.89mm to 0.33mm where thinner). On the endocranial surface, the temporal squama and parietal bone exhibited taphonomic dark red staining and the meningeal groove was enlarged and deep. Cranial sutures, as far as observed on the surviving fragments, were all open, indicating a young adult. From the facial area, the maxillae, left zygomatic and sphenoidal fragments were present. The left temporal bone was complete, while only a few fragments of the right temporal were recovered. A fragment of the body of the hyoid was also present. Extremely fragile facial and endocranial bones were present but unidentifiable among the 30+ remaining fragments below 10mm in size.

From the postcranial skeleton, the right side had been truncated and damaged by the fallen tree, resulting in the dispersion of fragments of humeral head, scapula, clavicle and ribs ex-situ – all collected by the NMI surveyors, these were identified by the author of this report as certainly belonging to Burial 1, and added to the present inventory. The left humerus was present but broken at midshaft – with the lateral distal condyle and head also present as separated fragments; cortical surface was eroded and whitened across the diaphysis. The radius was fragmented at the midshaft and distal end in several small, very thin and fragile fragments. A temporary reconstruction was carried out to measure its approximate maximum length. The ulna shaft was also broken at its distal end, which was completely missing. The left hand was represented by the presence of six carpal bones, the first, third, fourth and (possibly) fifth metacarpals, and two middle phalanges. Both clavicles were present but broken at midshaft and missing both lateral ends; the right clavicle had part of the medial end showing possible ongoing fusion, while the left medial clavicle was broken, exposing the thin cortical layer also observed on the upper limb bones. Similarly, both scapulae were present but incomplete and fragmented, particularly the right scapula. Of the left scapula, the coracoid process, spine base, glenoid cavity, fragments of the blade and the lateral body survived, while the right was recovered as fragments of spine, coracoid process and glenoid cavity. The thoracic cage was represented by most left and right ribs as fragments of heads and partial bodies – no rib ends survived. One of the (possibly) lower right ribs presented an epiphyseal flake, indicating ongoing fusion and allowing to further narrow down the possible age bracket for this individual. Although heavily damaged and fragmented, the spine was virtually complete, with all vertebrae represented either by the complete bone or fragments of body or neural

arch elements. The atlas was broken into three fragments, while the axis was complete. Thoracic vertebrae survived as mostly spinous processes, as well as L1-3. One additional right thoracic lamina fragment complicated identification of the lower part of the spine, with the possibility there might be a supernumerary lumbar vertebra. Only the first element of the sacrum – S1 – survived, while the left pelvis was missing the superior part of the ilium, most of the ischium and the pubis and only the superior part of the right ilium survived. The lower limbs were missing.

Dental inventory: Dentition, all permanent, could still be associated with the alveolar sockets, with all teeth present except for the maxillary right third molar, which had not erupted.

Right maxilla **Left maxilla**

Attrition	0	1	3	3	3	2	2	3	3	2	2	3	3	3	1	1
Caries																
Calculus			1CEJ Lg					1CEJ Lg	1CEJ Lg	1CEJ Lg				1CEJ Bc/Lg	1CEJ Bc	
Enamel Hypoplasia																
Periodontitis																
Abscess																
	18 U	**17 P**	**16 P**	**15 P**	**14 P**	**13 P**	**12 P**	**11 P**	**21 P**	**22 P**	**23 P**	**24 P**	**25 P**	**26 P**	**27 P**	**28 P**
	48 P	**47 P**	**46 P**	**45 P**	**44 P**	**43 P**	**42 P**	**41 P**	**31 P**	**32 P**	**33 P**	**34 P**	**35 P**	**36 P**	**37 P**	**38 P**
Attrition	1	2	3	2	2	2	2	2	2	2	2	2	2	3	2	1
Caries		1 Lg	1 Lg		1 Lg	1 Lg	1 Lg	1 Lg	1 Lg							
Calculus																
Enamel Hypoplasia						1					1					
Periodontitis																
Abscess																

Right mandible **Left mandible**

Inventory Key:	Pathology Key:
P - Tooth present; L - Tooth lost post-mortem/not present; B - Tooth broken post-mortem; A - Tooth lost ante-mortem; U - Tooth unerupted	Empty cell - No lesions; Attrition: Smith 1984 scores; Other lesions: 1 - Mild 2 - Moderate; 3 - Severe; CEJ – cemento-enamel junction; Bc – Buccal; Lg – Lingual; Oc- Occlusal; In-Interstitial; Cr – Crown; MB - Mesiobuccal

Age: Based on the observation of cranial sutures closure, dental attrition, stage of fusion of the medial clavicle and S1, and auricular surface aspect, Skeleton 1 was a young adult in their early 20s.

Sex: This individual presented mixed features, with the skull mostly indeterminate but possibly showing more female characteristics, and the pelvis indeterminate but some metrics pointing towards a possible female. It could be assigned to the possibly female category.

Pathology: Skeleton 1's bones presented general thinning cortical bone and they were light and gracile. On the lower spine, asymmetric spondylolysis of the fifth lumbar vertebra's body with the neural arch – i.e. non-union observed between the right superior articular facet and the body and the left superior articular facet and spinous process – was observed. All lumbar articular facets displayed osteophytosis and lipping of their margins. The sacrum also exhibited an antemortem lesion, expressed by a fracture of the sacral spine, the corresponding fragment inferior to which survives. Some of the long bones, namely clavicles and humerus, displayed hollow medullary cavities, with the trabecular bone completely eroded; additionally, the radius distal end, completely fragmented, showed black discolouration of the trabecular bone. Difficult to establish whether these changes were taphonomic or pathological, especially given the poor condition of the cortical bone on some skeletal fragments. Apart from the lower spinal pathology and trauma, the rest of the joints did not show signs of degeneration. However, some torsion of the left clavicle and metatarsals was also observed.

Non-metric traits: a variant was present on the left mandibular foramen, which was slightly obliterated by a bony bridge, and an additional very small foramen also on the right side.

SKELETON 2 [TB1, BURIAL 2]

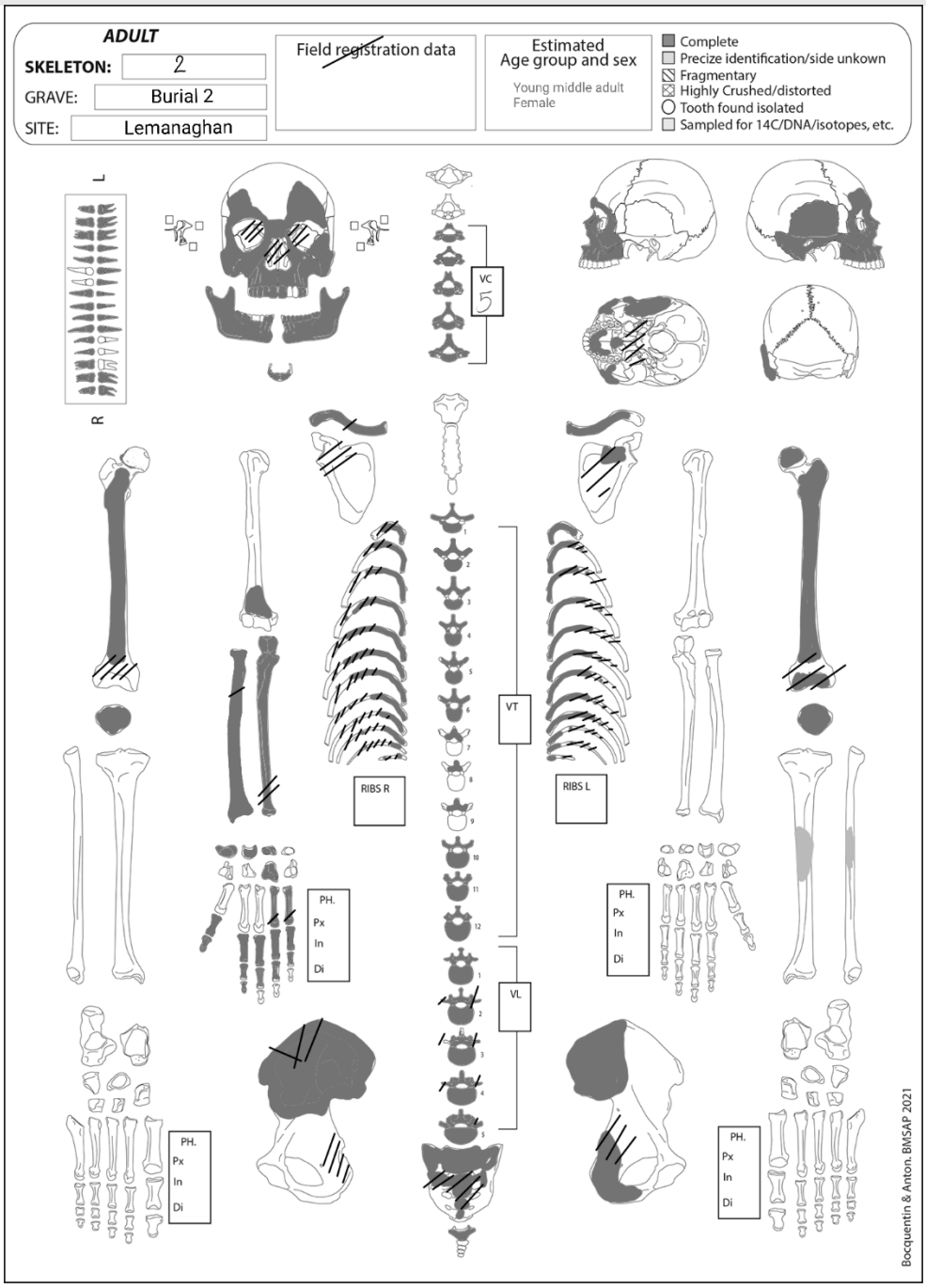
Age: 30-35 years

Sex: Female

Stature: 164.93 +/-4.30cm (ulna) 161.58 +/- 4.24cm (radius)

Condition: Good

Completeness: 60%



Skeletal inventory*:* From the skull, most of the cranial vault and the left temporal were missing (most likely reburied and/or fallen into the tree bole pit, dispersed by the storm); the frontal and facial bones were present but fragmented – in fact, an attempt to reconstruct them was made in order to carry out visual observation and measurements. The right parietal was represented by a fragment of its anterior portion; the right temporal was almost complete but missing part of the anterior squama; both zygomatics were complete, and nasals were also present, with the right complete and the left one missing

the inferior portion; maxillae were also reconstructed and both missed the sinus, lacrimal and infraorbital foramen areas, while the left side also missed the anterior portion – the naso-alveolar clivus – meaning the maxillary left first incisor was loose and left second incisor and canine were missing. From the viscerocranium, the ethmoid was represented by fragments of the cribriform and perpendicular plates while the sphenoid was present as several small fragments, the largest being the left lesser wing. The mandible was reconstructed at the symphysis and at the right condyle but was missing the left posterior side of the ramus and condyle. The hyoid body and its unfused right greater horn were also present. Both clavicles were present – the right one reconstructed at midshaft, while the left one missing its lateral half. Spinal fragments of both scapulae were present, together with several fragments of blade and lateral border – the latter possibly from the right scapula. From the upper limbs, only the right side survived, with a fragment of the distal humeral end (missing all condyles), reconstructed and complete ulna and radius, four carpals (the scaphoid, capitate, lunate and triquetral), fourth (reconstructed at the head) and fifth metacarpals, all proximal phalanges (possibly all from the right hand), four intermediate phalanges and two distal phalanges. The spine was in relatively good condition despite fragmentation and damage caused by roots growing through it. The axis and atlas were missing, most likely dispersed and remaining obliterated in the unexcavated part of the pit, while the other cervical vertebrae were all present; thoracic vertebrae (T1-6) were present and slightly damaged in various degrees, while of vertebrae T7-9 only the spinous processes and a few body/articular facet/transverse processes fragments survived; T10-12 were mostly complete, and so were all lumbar vertebrae, presenting taphonomic damage on the anterior part of the bodies and at the level of the spinous/transverse processes. Ribs were also mostly present given that in situ they were perfectly articulated, although crushed, which resulted in heavy fragmentation at lifting. They were mostly identified through reconstruction, with ten and thirteen fragments, respectively from the left and right side, and two unsided bodies included in the counts. It seems that this individual might have had an additional rib on their left side. From the pelvic girdle, the fragmentary superior part of the sacrum (plus around 20 fragments), the superior part of the coccyx, fragments of right and left ilium and ischium, left inferior ischiopubic ramus and possibly right superior iliopubic ramus were present. Both femora were fragmentary and the cortical bone severely weathered as roots had grown in and around them – the right one broken at the head and distal end, while the left one missing its head, broken at midshaft and at its distal end. Overall, their cortical surface was extremely weathered and eroded, particularly on the left femur's lateral midshaft. Both patellae were present, the right one reconstructed from three fragments, and also one tibia and one fibula proximal shaft fragments were recovered. Several fragments of trabecular bone and other small fragments were recovered but were very fragile and breaking further when handled.

Dental inventory: Dentition was all permanent and present except for the maxillary left second incisor and canine and the mandibular right premolars, all lost post-depositional; the right lower canine, however, might have been recovered from DHB 1010 and it was kept separately with Skeleton 2's dentition.

Right maxilla **Left maxilla**

Attrition	1	2	2	1	1	1	3	5	5	0	0	3	3	3	2	1
Caries			1Cr MB			2Cr ML										
Calculus	CEJ 1Bc 1 In	CEJ 1In	CEJ 2Bc 1In	CEJ 2Bc 1Lg	CEJ 1Bc	CEJ 1Bc	CEJ 1Bc 1Lg	CEJ 1Bc 1Lg	CEJ 1Bc 1Lg				CEJ 1Bc 1Lg	CEJ 1Bc 2Lg	CEJ 1Bc 2Lg	
Enamel Hypoplasia						2L	2L	2L	2L							
Periodontitis	3	3	3	3	3	3	3	3	3							
Abscess													3	3	3	3
	18 P	**17 P**	**16 P**	**15 P**	**14 P**	**13 P**	**12 P**	**11 P**	**21 P**	**22 L**	**23 L**	**24 P**	**25 P**	**26 P**	**27 P**	**28 P**
	48 P	**47 P**	**46 A**	**45 L**	**44 L**	**43 P**	**42 P**	**41 P**	**31 P**	**32 P**	**33 P**	**34 P**	**35 P**	**36 P**	**37 P**	**38 P**
Attrition	2	3	0	0	0	3	4	4	4	4	2	3	4	4	3	2
Caries	1Oc 1CEJ Lg															
Calculus							CEJ 3Lg 2Bc	CEJ 3Lg 2Bc	CEJ 3Lg 2Bc	CEJ 3Lg 2Bc	CEJ 1Lg 1Bc	CEJ 1Lg 1Bc	CEJ 1Lg 1Bc	CEJ 1Lg 1Bc	CEJ 1Lg 1Bc	CEJ 1Lg 1Bc
Enamel Hypoplasia																
Periodontitis	3	3					3	3	3	3	3	3	3	3	3	2
Abscess																

Right mandible **Left mandible**

Inventory Key:	Pathology Key:
P - Tooth present (P) recovered from DHB; L - Tooth lost post-mortem/not present ; B - Tooth broken post-mortem ; A - Tooth lost ante-mortem U - Tooth unerupted	Empty cell - No lesions; Attrition: Smith 1984 scores; Other lesions: 1 - Mild; 2 - Moderate; 3 - Severe CEJ – cemento-enamel junction; Bc – Buccal; Lg – Lingual; Oc- Occlusal; In-Interstitial Cr – Crown; MB - Mesiobuccal; ML- Mesiolingual

Age: Skeleton 2's age could be assessed using several diagnostic elements. Dentition was permanent and, although it displayed a specific wear pattern most likely linked with malocclusion – thus ideally not to be used for age assessment – attrition of the molars could indicate someone at least in their mid-30s. Furthermore, the left side showed more wear than the right side. Both the medial clavicle and S1-S2, fused, also confirmed an age of over 30 years. Rib ends, although poorly preserved, presented a morphology consistent with a mature, but not old, adult. The best-preserved diagnostic feature were both auricular surfaces – the left one particularly presenting striation and coarsening of

granularity consistent with phase 3 of Lovejoy et al 1985's method, consistent with an age of 30-34 years.

Sex: Establishing biological sex for this individual was not straightforward, even though a few diagnostic elements were preserved and allowed an overall attribution to a female. The general shape of the frontal would be most indicative of a female, but the orbital margins were quite rounded and thick; similarly, the mandible's body was quite robust (although possibly because of the occlusal issue) but the gonial angle was more indicative of a female given wide angle and subtle sloping; the mastoid process was indeterminate while the zygomatic root possibly more feminine. Greater sciatic notch was wide and with a pre-auricular sulcus and the sacrum not very curving – at least from the fragments preserved. The pelvis looked quite wide when articulated in situ, consistent with female hips. Furthermore, metrics also indicated a possible female.

Pathology: Several pathological lesions could be observed on this individual's bones and teeth. On dentition, severe periodontal disease, calculus depositions, significant wear patterns (indicating masticatory issues and deep bite), hypoplastic defects on upper incisors, cavities (on the maxillary second right molar and possibly on the occlusal surface of the mandibular third right molar and on the right maxillary canine and first molar) and antemortem loss (AMTL) of the mandibular first right molar. The mandibular condyle, damaged, was wider than 'normal' and flat and crossed by a concave lesion with slight pitting on its posterior view, as well as an osteophyte on its infero-lateral view. On skeletal remains, morphological and metric anomalies could be recorded. The right mental foramen was slightly enlarged in comparison to the left one – several reasons can lead to this abnormal change. The right orbital roof presented some pitting, while the maxillary sinus exhibited more prominent spicules, lamellar remodelled bone depositions and an enlarged vessel groove across the anterior view of the palatine process inside the sinus.

On the spine, bone spurs and spicules were recorded on thoracic and lumbar vertebrae, as well as degeneration of the costal articular joints with the same vertebrae. A number of enlarged nutrient pits could also be observed on the surface of thoracic and lumbar vertebral bodies. The upper articular facets of the sacrum also displayed medium to large osteophytes on their margins.

Non metric traits: Not observed.

SKELETON 3 [TB3, BURIAL 3]

Age: 45-50 years

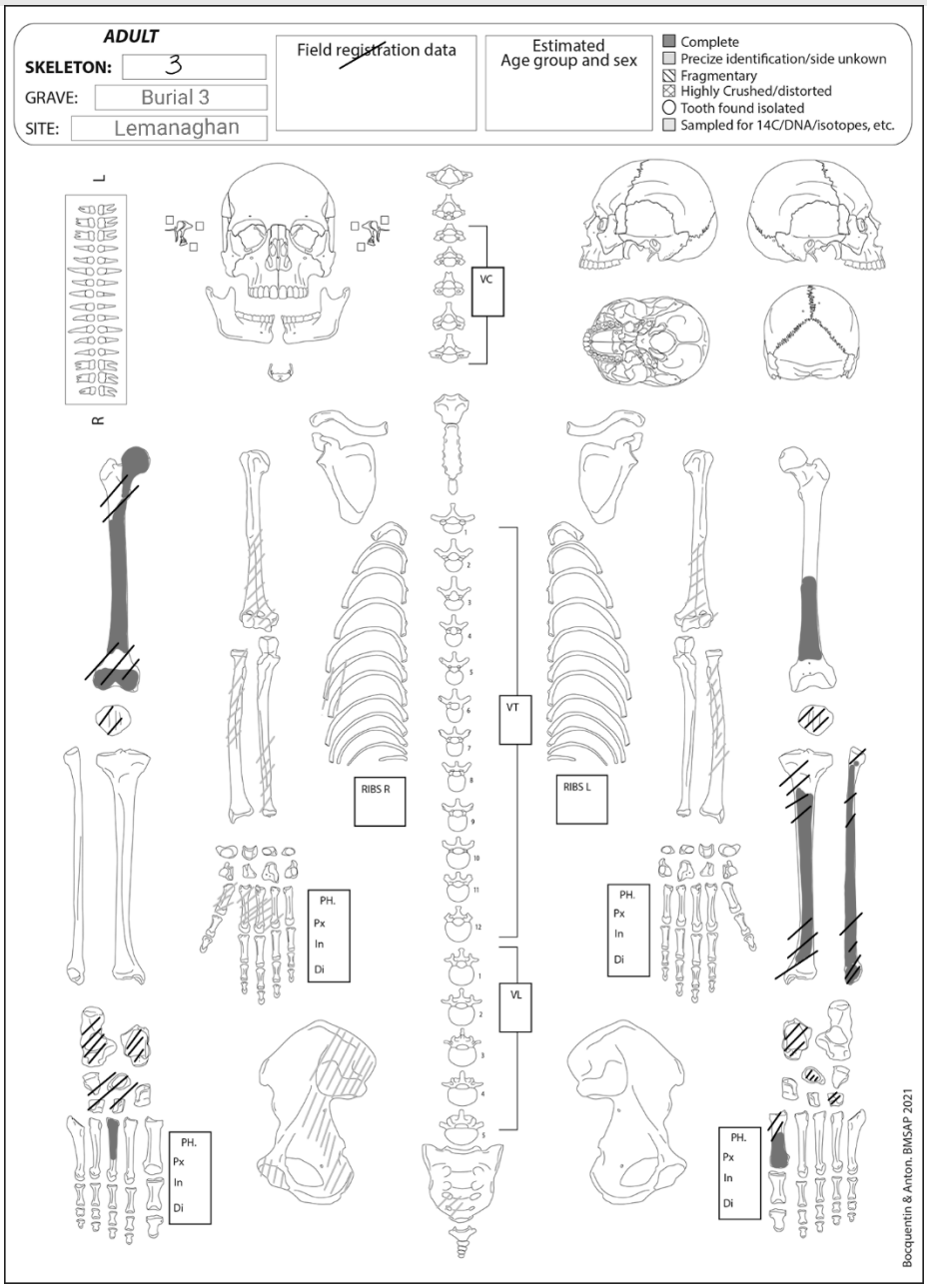
Sex: Female?

Stature: Not assessed

Condition: Poor

Completeness: 25%

*Bones highlighted with light grey lines represent skeletal remains recovered ex situ and associated with this skeleton



Skeletal inventory: Included in Skeleton 3's inventory were the right femur, almost complete but very poorly preserved and fractured at its distal end and left femur, consisting of diaphysis and distal end fragments, both patellae, while from the right foot fragments of calcaneus, talus, cuneiforms and the third metatarsal, left tibia and fibula in extremely fragmentary condition, the left talus, navicular, lateral cuneiform and 1st metatarsal and proximal end of the 1st proximal phalanx. A high number (50+) of very small fragments could be added to these counts. Bones from the upper limbs mainly belonging to Skeleton 3 and Skeleton 4 were recovered ex situ on the west side of the plate. Based on morphometric and visual observations, right and left humeri missing the proximal end, right and left radii

missing the distal ends, and the distal end of the right ulna; from the hands, possibly the right 1-4 metacarpals were identified as Skeleton 3, while it was not possible to link other hand bones to this individual and they were therefore recorded in the DHB database. Additional metacarpals and phalanges could possibly be associated with one older individual – perhaps another disturbed burial.

Age: From the surviving lower limbs it was only possible to establish Skeleton 3 was an adult. According to survey and fieldwork records, pelvic bones recovered by the NMI might belong to this individual, in which case they would identify Skeleton 3 as an older adult – on the auricular surface of the ilium, complete loss of granularity on inferior demiface, but still some granularity on the superior one (Phase 5/6, Lovejoy et al. 1985 or Phase XI, Todd 1920, corresponding with 40-45 and 45-50 years of age).

Sex: The greater sciatic notch is wide and presents a pre-auricular sulcus. Although morphometrics provide a mixed estimation, of both male and female, the pelvis allows leaning towards the female category.

Pathology: Pathological anomalies were mostly concentrated on the cortical surface of both femora and the tibial shaft. The diaphyseal cross-section showed increased porosity where the tissue is normally thick and dense, in addition to lamellar and pitted depositions on the diaphyseal surface and some torsion of the distal end of femora. The shape of the distal fibular end was also anomalous, more triangular than elongated, and with a shallow malleolar fossa; some remodelling visible on the medial view of the proximal fibula. The upper limbs recovered ex-situ and associated to this individual displayed musculo-skeletal markers at the level of the right radial tuberosity and a pronounced pronator ridge of the right ulna.

Non metric traits: Not assessed.

SKELETON 4 [TB3, BURIAL 4]

Age: 15-19 years

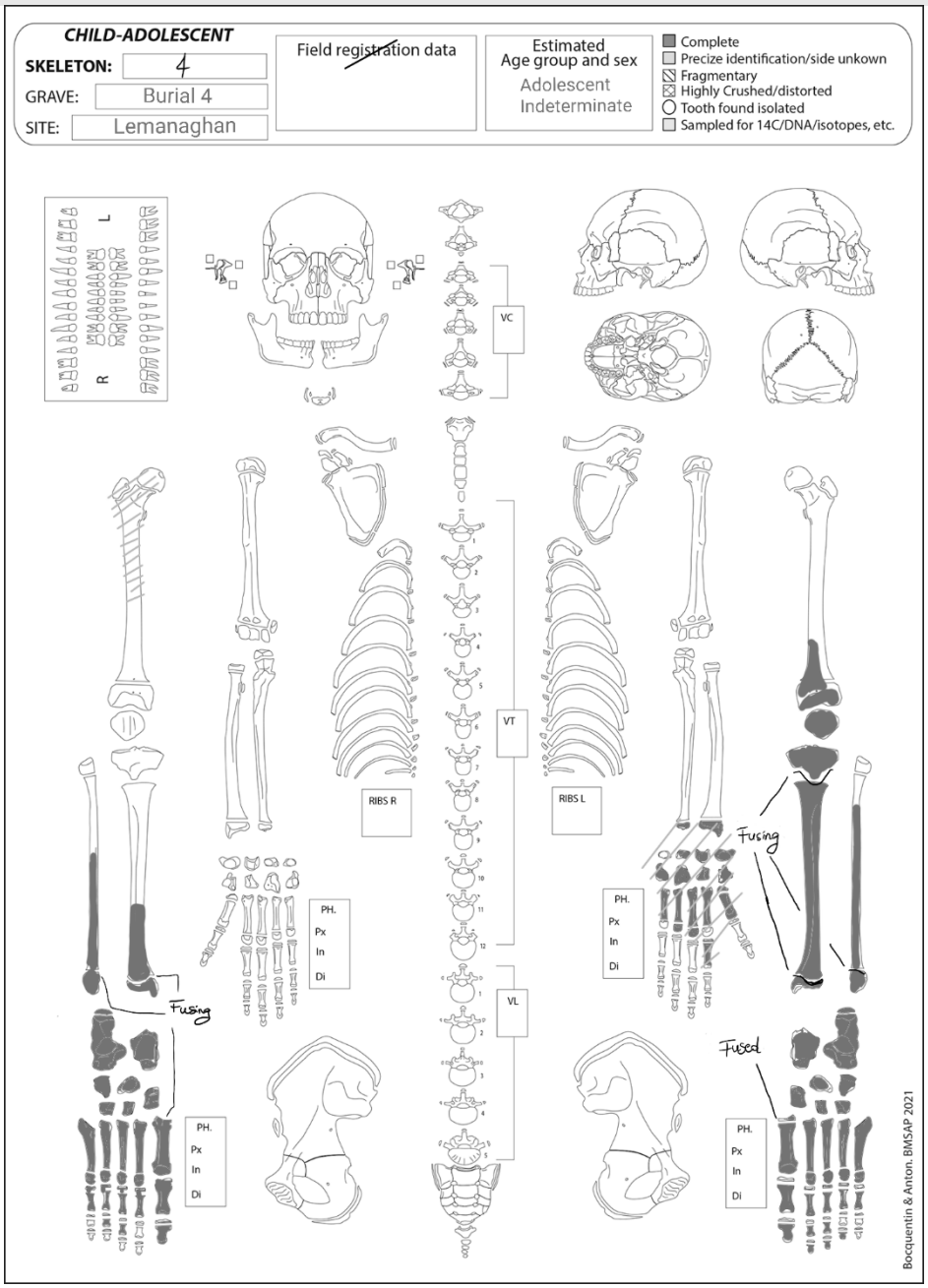
Sex: Indeterminate

Stature: 163.32cm (approximation)

Condition: Good

Completeness: 20%

*Bones highlighted with light grey lines represent skeletal remains recovered ex situ and associated with this skeleton



Skeletal inventory: Articulated and in situ bones: from the right leg, the distal end of the tibia, the fibula in three fragments and missing the proximal end, the calcaneus, talus, cuboid, navicular in three fragments, all cuneiforms, metatarsals, proximal phalanges and first distal phalanx; from the left leg, the distal end of the femur (with associated unfused epiphyseal plate), left patella, complete tibia broken at midshaft, fibula broken at midshaft and distal end and missing proximal end, calcaneus, talus, llycucuboid, navicular, cuneiforms, metatarsals, all proximal phalanges and the first distal phalanx. Most taphonomic damage was concentrated on the left side of the left knee, with dark discoloration

and the lateral view of both distal femur and proximal tibia missing. From both feet, four intermediate and three distal un-sided phalanges and two sesamoid bones. This individual's left hand bones (including second, third, fourth and fifth metacarpal with two unfused distal epiphyses, hamate, capitate, triquetral, trapezium, trapezoid lunate and scaphoid and one proximal phalanx) were identified among the bones dislocated by the collapse of the root plate, as well as the unfused epiphyses of the left distal radius and ulna. One proximal half of right femur was recovered ex-situ on the ground to the south-east side of the plate – possibly from this individual but with all epiphyses fused, which might mean this bone is from another individual other than Skeleton 3 and Skeleton 4.

Age: Most epiphyses were unfused or fused but retaining the fusing line, indicating an individual between 14-15 and 18 years of age.

Sex: Although this was a very young individual and thus biological sex estimation might not be accurate, diameter of the femoral head and general metrics indicated a possible female.

Paleopathology: The right calcaneus exhibited a pronounced peroneal tubercle – the left one broken and missing post-depositional. A non-specific lytic lesion was observed on the proximal, lateral view of the first right phalanx's shaft. The proximal left tibia exhibited a slight antero-medial torsion of the proximal end and shaft, making the bone look less wide and robust than usual – even considering that the left tibial plateau was severed by the roots and missing. Possibly pseudo-pathological, but worth noting were tubular erosions of the medullary cavity of all metacarpals. An anomaly was also observed between third and fourth metacarpals, which exhibited abnormal articulation.

Non metric traits: Peroneal tubercle.

Appendix 4.B – DHB Catalogue

Tree Bole N	DHB N	Bone ID	Skeletal/anatomical Area	Bone/Tooth I	Tooth FDI	Description	Frgs N	Completeness	Preservation	Sex	Age category	Pathology Code	Non metric traits
1	1001	1001-1	Skull	Cranial vault		Cranial fragments.	9	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1001	1001-2	Post-cranial	Long bones		Long bone small fragments.	8	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1001	1001-3	Post-cranial	All		Two fragments of flat/irregular bone.	2	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1001	1001-4	Arms	Hand		Diaphyseal fragment of metacarpal missing both epiphyses.	1	0-20%	Poor	N/A	Adult?	N/O	N/A
1	1001	1001-5	Spine	Vertebrae		Superior articular facet fragment.	1	0-20%	Poor	N/A	Adult?	N/O	N/A
1	1001	1001-6	Legs	Femur		Fragment of diaphysis including linea aspera.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1001	1001-7	Skull	Dentition	23	Complete maxillary left canine with slight calculus line.	x	100%	Excellent	N/A	Adult	CAL	N/O
1	1001	1001-8	Skull	Dentition	46	Complete mandibular right first molar displaying moderate attrition of all cusps and calculus deposition on buccal side.	x	100%	Good	N/A	Adult	CAL	N/O
1	1002	1002-1	Skull	Cranial vault		Mostly parietal fragments, two attach - possibly more, but too small and damaged to assess.	31	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-2	Skull	Facial bones		Zygomatic bone fragment including part of the frontal process, the area around the zygomaticofacial foramen and the maxillary process.	1	40-60%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-3	Skull	Facial/endocranial bones		Four fragments of sphenoidal elements.	4	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-4	Skull	Mandible		Fragment of mandibular condyle, left and possible fragment of mandibular ramus.	2	0-20%	Poor	N/A	Adult?	N/A	N/A
1	1002	1002-5	Skull	Dentition	15	Complete second right maxillary premolar showing moderate wear of the cusps exposing dentine.	x	100%	Good	N/A	Adult	N/O	N/O
1	1002	1002-6	Skull	Dentition	37	Complete second left mandibular molar with attrition and hypoplasia.	x	80-100%	Good	N/A	Adult	DEH	N/A
1	1002	1002-7	Skull	Dentition	23	Complete maxillary left canine presenting severe attrition -only thin enamel rim left and most of the crown on the lingual, mesio-lingual and disto-lingual views has been worn out.	x	80-100%	Fair	N/A	Adult	N/A	N/A
1	1002	1002-8	Skull	Dentition	15	Damaged maxillary right second premolar with severe attrition and broken	x	60-80%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-9	Skull	Dentition	62	Complete deciduous maxillary left second incisor. The root is incomplete at the very tip and the distal ridge could be	x	100%	Good	N/A	Juvenile	N/O	Possibly
1	1002	1002-10	Arms	Radius		Diaphyseal fragment from un-sided radius, midshaft with interosseous crest.	1	0-20%	Fair	N/A	Adult?	N/A	N/A
1	1002	1002-11	Arms	Radius		Very damaged fragment of distal articular end, possibly from a radius given morphology and size.	1	0-20%	Very poor	N/A	Adult?	N/A	N/A
1	1002	1002-12	Arms	Humerus		Humerus diaphyseal fragment, possibly from the distal midshaft considering a ridge that might be the deltoid tuberosity. Cortical surface displaying weathering and pitting.	1	0-20%	Poor	N/A	Adult	N/A	N/A

Tree Bole N	DHB N	Bone ID	Skeletal/anatomical Area	Bone/Tooth I	Tooth FDI	Description	Frgs N	Completeness	Preservation	Sex	Age category	Pathology Code	Non metric traits
1	1002	1002-13	Arms	Hands, Carpals		Capitate, right; the base is partially missing and the view from hamate is particularly damaged.	1	60-80%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-14	Arms	Hands, Phalanges		Complete proximal phalanx with some damage on the proximal end.	1	80-100%	Fair	N/A	Adult	N/O	N/O
1	1002	1002-15	Arms	Hands, Phalanges		First proximal phalanx missing proximal end and with taphonomic/pathological damage on distal articular surface.	1	60-80%	Poor	N/A	Adult	DJD	N/A
1	1002	1002-16	Shoulder girdle	Scapula		Fragments of scapular body, possibly from around the area of the neck/spine attachment to the body.	2	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-17	Spine	Thoracic vertebrae		Fragment of thoracic spinous process.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-18	Pelvic girdle	Os coxae		Fragment of ilium at the greater sciatic notch.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-19	Legs	Femur		Femur fragments, all poorly preserved. Only one from the posterior distal end, the rest shaft fragments.	6	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-20	Legs	Tibia		Tibia fragments of anterior crest - two attach.	7	0-20%	Poor	N/A	Adult	N/A	N/A
1	1002	1002-21	Legs	Fibula		Fibula fragment at the interosseous crest.	1	0-20%	Fair	N/A	Adult	N/O	N/A
1	1002	1002-22	Post-cranial	Long bones		Unidentifiable long bone fragments, mostly from legs but possibly also from arms.	26	0-20%	Poor	N/A	N/A	N/A	N/A
1	1002	1002-23	Thorax	Ribs		Body rib fragments.	4	0-20%	Poor	N/A	N/A	N/A	N/A
1	1002	1002-24	Post-cranial	All		Small fragments, unidentifiable.	40+	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1003	1003-1	Skull	Cranial vault		Various cranial vault fragments.	6	0-20%	Poor	N/A	Adult	N/A	N/A
1	1003	1003-2	Skull	Dentition	46	Almost complete mandibular right first molar, distal root broken.	x	80-100%	Fair	N/A	Adolescent/young adult	DEH + CAR	N/O
1	1003	1003-3	Skull	Dentition	44/45/34/35	Complete but damaged mandibular premolar, crown flaked and mostly missing, making it difficult to establish whether it's first or second and siding. Attrition indicates a mature adult.	x	80-100%	Fair	N/A	Adult	N/A	N/A
1	1003	1003-4	Arms	Radius		Radial head fragment, very small.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1003	1003-5	Arms	Hands, Carpals		Hamate fragments damaged on the medial view and hamulus.	1	40-60%	Poor	N/A	Adult?	DJD	N/A
1	1003	1003-6	Arms	Hands, Phalanges		First right proximal phalanx, complete.	1	40-60%	Poor	N/A	Adult	N/A	N/A
1	1003	1003-7	Arms	Hands, Metacarpals		First metacarpal, possibly left, missing proximal end and with whitened, damaged cortical surface.	1	80-100%	Good	N/A	Adult	N/O	N/O
1	1003	1003-8	Arms	Hands, Phalanges		Intermediate hand phalanx broken at base.	1	60-80%	Fair	N/A	Adult	N/A	N/A
1	1003	1003-9	Arms	Hands, Phalanges		Distal hand phalanx broken at base and shaft.	1	60-80%	Fair	N/A	Adult	N/A	N/A
1	1003	1003-10	Thorax	Ribs		Right rib body fragment, close to the head but missing it. Possibly 11th or 12th.	1	0-20%	Poor	N/A	N/A	N/A	N/A
1	1003	1003-11	Thorax	Ribs		Left rib fragment, with articular tubercle.	1	0-20%	Poor	N/A	N/A	N/A	N/A
1	1003	1003-12	Thorax	Ribs		Rib shaft fragments.	3	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1003	1003-13	Legs	Femur		Femur shaft fragments, one with linea aspera.	3	0-20%	Poor	N/A	Adult	N/A	N/A
1	1003	1003-14	Legs	Tibia		Distal end fragment with inferior fibular articular surface. Light and porous.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1003	1003-15	Post-cranial	All		Small unidentified fragments, mostly long bones.	22	0-20%	Very poor	N/A	N/A	N/A	N/A

Tree Bole N	DHB N	Bone ID	Skeletal/anatomical Area	Bone/Tooth I	Tooth FDI	Description	Frgs N	Completeness	Preservation	Sex	Age category	Pathology Code	Non metric traits
1	1004	1004-1	Skull	Cranial vault		Cranial fragments, mostly from parietals.	12	0-20%	Very poor	N/A	Adult	N/A	N/A
1	1004	1004-2	Skull	Mandible		Fragment of mandibular symphysis, mental protuberance and spines and alveolar sockets for incisors present.	1	0-20%	Poor	N/A	Adult?	N/A	N/A
1	1004	1004-3	Skull	Dentition	17	Damaged maxillary right second molar, permanent; enamel chipped off lingual side.	x	80-100%	Fair	N/A	Adult	N/O	N/A
1	1004	1004-4	Skull	Dentition	46	Complete mandibular first right molar. Slight attrition on buccal cusps.	x	80-100%	Good	N/A	Adult	N/O	N/O
1	1004	1004-5	Skull	Dentition	12	Complete second right maxillary incisor presenting severely worn occlusal surface and faint hypoplastic lines.	x	80-100%	Good	N/A	Adult	DEH	N/A
1	1004	1004-6	Skull	Dentition	43/33	Complete mandibular (?) canine, extremely worn out in a diagonal pattern. Calculus depositions.	x	80-100%	Good	N/A	Adult	CAL	N/A
1	1004	1004-7	Arms	Humerus		Shaft fragment, broken longitudinally.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1004	1004-8	Arms	Radius		Radius midshaft, pronator teres insertion and curvature allow to establish it might be from the left side.	1	0-20%	Fair	N/A	Adult	N/A	N/A
1	1004	1004-9	Arms	Hands, Phalanges		Fragmentary proximal hand phalanges - one is very long.	4	20-40%	Poor	N/A	N/A	N/A	N/A
1	1004	1004-10	Thorax	Ribs		One right and one left rib fragments, close to the head.	2	0-20%	Fair	N/A	Adult	N/A	N/A
1	1004	1004-11	Spine	Vertebrae		Fragment of inferior articular facet, possibly lumbar.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1004	1004-12	Pelvic girdle	Os coxae		Very small fragment of ilium.	1	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1004	1004-13	Legs	Feet, Phalanges		First foot phalanx, small head fragment.	1	0-20%	Very poor	N/A	Adult	N/A	N/A
1	1004	1004-14	Post-cranial	All		Immature epiphyses, possibly from iliac crest and phalanx.	3	0-20%	Poor	N/A	Juvenile	N/A	N/A
1	1004	1004-15	Spine	Vertebrae		Possible fragment of thoracic vertebra, juvenile.	1	0-20%	Poor	N/A	Juvenile	N/A	N/A
1	1004	1004-16	Arms	Hands, Metacarpals		Possible fragment of metacarpal shaft - juvenile.	1	0-20%	Poor	N/A	Juvenile	N/A	N/A
1	1004	1004-17	Post-cranial	Long bones		Various small fragments, unidentified.	12	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1004	1004-18	Post-cranial	All		Various small fragments, unidentified.	40+	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1004	Moved to Burial 1	Skull										
1	1005	1005-1	Skull	Cranial vault		Cranial vault fragments.	6	0-20%	Poor	N/A	Adult	N/A	N/A
1	1005	1005-2	Post-cranial	Long bones		Two small shaft fragments.	2	0-20%	Poor	N/A	N/A	N/A	N/A
1	1005	1005-3	Post-cranial	All		Very small unidentifiable fragments.	6	0-20%	Poor	N/A	N/A	N/A	N/A
1	1005	1005-4	Legs	Feet, Metatarsals		Fragment of plantar sesamoid grooves of un-sided first metatarsal, adult.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1006	1006-1	Skull	Cranial vault		Small fragment of cranium.	1	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1006	1006-2	Post-cranial	All		Two small unidentifiable fragments.	2	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1007	1007-1	Skull	Cranial vault		Three poorly preserved cranial vault fragments.	3	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1007	1007-2	Skull	Temporal		Fragment of root of zygomatic process.	1	0-20%	Fair	N/A	N/A	N/A	N/A
1	1007	1007-3	Skull	Dentition	28	Complete maxillary left wisdom tooth with diagonal wear of the entoconid cusp.	x	100%	Good	N/A	Adult	N/O	N/O

Tree Bole N	DHB N	Bone ID	Skeletal/anatomical Area	Bone/Tooth I	Tooth FDI	Description	Frgs N	Completeness	Preservation	Sex	Age category	Pathology Code	Non metric traits
1	1007	1007-4	Skull	Dentition	36	Mandibular first permanent molar, left, roots damaged.	x	80-100%	Good		Adolescent/Young adult	N/O	N/O
1	1007	1007-5	Arms	Hands, Phalanges		Intermediate hand phalanx, slightly curved distal end	1	80-100%	Fair	N/A	Adult	N/A	N/A
1	1007	1007-6	Pelvic girdle	Os coxae		Fragment possibly from the ilio-pubic area.	1	0-20%	Fair	N/A	Adult?	N/A	N/A
1	1007	1007-7	Post-cranial	All		Four unidentified fragments.	4	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1008	1008-1	Legs	Femur		Two midshaft fragments, possibly not from the same bone.	2	0-20%	Fair	N/A	Adult	N/A	N/A
1	1008	1008-2	Post-cranial	All		Three fragments of long/trabecular bone.	3	0-20%	Poor	N/A	N/A	N/A	N/A
1	1009	1009	Legs	Femur		Left femur diaphysis fragment - from proximal end, just below lesser trochanter. Strong muscle attachments laterally and at beginning of linea aspera.	1	0-20%	Fair	N/A	Adult	N/A	N/A
1	1010	1010-1	Skull	Cranial vault		Fragments of frontal, occipital and parietal bone.	26	0-20%	Poor	N/A	Adult	N/A	N/A
1	1010	1010-2	Skull	Temporal		Petrous bone fragments.	2	0-20%	Fair	N/A	Adult	N/A	N/A
1	1010	1010-3	Skull	Zygomatic		Zygomatic frontal process and part of the superior maxillary process.	1	40-60%	Good	N/A	Adult	N/O	N/O
1	1010	1010-4	Skull	Dentition	16	Complete permanent right first maxillary molar, severe attrition, dental plaque deposition on lingual, buccal and interstitial aspects.	x	100%	Good	N/A	Middle adult	CAL	N/A
1	1010	1010-5	Skull	Dentition	17	Second right maxillary molar missing the tips of the anterior roots, very little wear.	x	80-100%	Fair	N/A	Young/early middle adult	N/O	N/O
1	1010	1010-6	Skull	Dentition	27	Second left maxillary molar with severe wear of the mesiolingual cusp and possible traumatic fracture of the mesiobuccal cusp. Slight calculus and possible carious pit at mesial ECJ.	x	80-100%	Good	N/A	Middle adult	CAR; CAL; Fracture	N/A
1	1010	1010-7	Skull	Dentition	28	Complete maxillary left third molar, all occlusal surface worn out, calculus on buccal surface; possible antemortem chipping of the buccal side of the cusp.	x	80-100%	Good	N/A	Old adult	CAL; Fracture	N/A
1	1010	1010-8	Skull	Dentition	24	Complete left maxillary first premolar.	x	100%	Good	N/A	Adult	N/O	N/A
1	1010	1010-9	Skull	Dentition	12	Second right maxillary incisor, tip of root broken.	x	80-100%	Good	N/A	Adult	N/O	N/O
1	1010	1010-10	Skull	Dentition	11	Complete right first maxillary incisor, crown completely worn, circular pattern possibly linked with activity/occupation.	x	80-100%	Good	N/A	Adult	N/O	N/O
1	1010	1010-11	Skull	Dentition	21	Complete left maxillary first incisor, unusual severe wear pattern.	x	80-100%	Good	N/A	Adult	N/O	N/O
1	1010	1010-12	Skull	Dentition	43	Complete mandibular right canine with calculus depositions - possibly from Burial 2, thus added to its dentition.	x	80-100%	Good	N/A	Adult	CAL; DEH	N/O
1	1010	1010-13	Skull	Dentition	42	Complete mandibular second right incisor with normal attrition.	x	80-100%	Good	N/A	Adult	CAL	N/O
1	1010	1010-14	Skull	Dentition	75	Mandibular deciduous second molar, mesial roots broken and attrition of the buccal cusps.	x	80-100%	Good	N/A	Juvenile	N/O	N/O
1	1010	1010-15	Skull	Dentition	24	Maxillary left canine crown forming in a juvenile's maxilla.	x	100%	Good	N/A	Juvenile	DEH	N/O

Tree Bole N	DHB N	Bone ID	Skeletal/anatomical Area	Bone/Tooth I	Tooth FDI	Description	Frgs N	Completeness	Preservation	Sex	Age category	Pathology Code	Non metric traits
1	1010	1010-16	Skull	Mandible		Small fragment of mandibular alveolar sockets.	1	0-20%	Poor	N/A	Adult	N/A	N/A
1	1010	1010-17	Spine	Thoracic vertebrae		Small fragment of inferior articular facet.	1	0-20%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-18	Shoulder girdle	Clavicle		Clavicular shaft fragments.	2	0-20%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-19	Arms	Humerus		Small fragment of trochlea?	1	0-20%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-20	Arms	Ulna		Ulnar proximal end associated fragments, olecranon missing.	2	0-20%	Poor	N/A	Adult	N/A	N/A
1	1010	1010-21	Arms	Hands, Metacarpals		Fragments of metacarpal head and shaft.	3	0-20%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-22	Thorax	Ribs		Rib shaft fragments.	4	0-20%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-23	Legs	Femur		Femur shaft fragments, one with linea aspera.	2	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1010	1010-24	Legs	Tibia		Tibia fragments of anterior crest.	3	0-20%	Very poor	N/A	N/A	N/A	N/A
1	1010	1010-25	Legs	Feet, Metatarsals		Fourth metatarsal proximal end and shaft.	1	20-40%	Poor	N/A	Adult	N/O	N/A
1	1010	1010-26	Legs	Feet, Metatarsals		Possible fifth metatarsal proximal end.	1	20-40%	Poor	N/A	Adult	N/A	N/A
1	1010	1010-27	Legs	Feet, Metatarsals		Metatarsal (?) shaft fragment.	1	20-40%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-28	Post-cranial	Long bones		Shaft fragments between 20-40mm in size.	15	0-20%	Poor	N/A	N/A	N/A	N/A
1	1010	1010-29	Post-cranial	All		Fragments less than 10mm in size.	50+	0-20%	Very poor	N/A	N/A	N/A	N/A
2	2001	2001	Skull	Cranial vault		Small fragment of, possibly, parietal/frontal.	1	0-20%	Poor	N/A	N/A	N/A	N/A
2		2002	Thorax	Ribs			2	0-20%					
3	3001	3001 - Burial 3?	Legs	Femur					F?				
3	3002	3002 - 1 Burial 3?	Legs	Feet, Metatarsals									
3	3003	3003	Skull	Parietals/Occipital		Fragments of left parietal (4, attaching), occipital at lambda (2, attaching) and three fragments of right parietal. All from the same skull.	9	20-40%	Good	N/A	Adult	N/O	N/O
3	3004	3004-1	Skull	Dentition	11	Complete very poorly preserved first maxillary permanent incisor, crown almost completely worn out by attrition but also broken post-mortem.	x	20-40%	Very poor	N/A	Adult	N/A	N/A
3	3004	3004-2	Shoulder girdle	Scapula		Fragment of scapular body at the base of the spine.	1	0-20%	Fair	N/A	Adult?	N/O	N/A
3	3004	3004-3	Arms	Hands, Phalanges		Complete hand distal phalanx, possibly second or third given size.	1	100%	Excellent	N/A	Adult	N/O	N/O
3	3004	3004-4	Spine	Vertebrae		Fragment of thoracic or lumbar vertebral neural arch/process.	1	0-20%	Very poor	N/A	N/A	N/A	N/A
3	3004	3004-5	Thorax	Ribs		Rib body fragments.	8	0-20%	Fair	N/A	N/A	N/A	N/A
3	3004	3004-6	Post-cranial	Long bones		Long bone small fragments.	8	0-20%	Poor	N/A	N/A	N/A	N/A
3	3004	3004-7	Post-cranial	All		Several small undiagnostic fragments.	11	0-20%	Poor	N/A	N/A	N/A	N/A
3	3004	3004-9 Burial 3?	Legs	Feet, Tarsals				20-40%	Fair	N/A			
3	3004	3004 -10 Burial 3?	Legs	Feet, Metatarsals		Two metatarsal diaphyses, possibly right?							
3	3005	3005-1 Burial 3?	Pelvic girdle	Os coxae									
3	3005	3005-2 Burial 3?	Pelvic girdle	Os coxae		N/A							

Tree Bole N	DHB N	Bone ID	Skeletal/anatomical Area	Bone/Tooth I	Tooth FDI	Description	Frgs N	Completeness	Preservation	Sex	Age category	Pathology Code	Non metric traits
3	3005	3005-3 Burial 3?	Thorax	Ribs		One body and one sternal end rib fragments		0-20%	Fair	N/A	Old adult? Irregular but not quite clear because of condition and erosion	N/A	N/A
3	3005	3005-4 Burial 3?	Pelvic girdle	Os coxae		0-20% Fair	N/A						
3	3005	3005-5 Burials 3/4	Thorax	Ribs		Rib bodies and two rib end fragments - three attach. Some are very thin and fragile.	10	0-20%	Poor	N/A	N/A	N/A	N/A
3	3005	3005-6	Post-cranial	All		Several fragments of long bones and trabecular bone.	40+	0-20%	Poor	N/A	N/A	N/A	N/A
3	3005	3005-7	Skull	Cranial vault		Cranial vault fragments.	2	0-20%	Poor	N/A	N/A	N/A	N/A
3	3005	3005-8	Skull	Temporal		Petrous bone fragment.	1	0-20%	Very poor	N/A	N/A	N/A	N/A
3	3005	3005-9	Skull	Dentition	12	Maxillary second incisor, poor preservation.	x				Adult	N/A	N/A
3	3005	3005-10	Arms	Hands, Phalanges		Juvenile distal hand phalanx.	1	100%	Excellent		Juvenile	N/O	N/O
3	3005	3005-11 Burial 3?	Arms										
3	3005	3005-12	Arms	Hands, Metacarpals		Very long metacarpal, possibly third but facets are abnormal or damaged and the styloid is missing, which makes it difficult to identify it. The palmar, lateral facet is missing.	2	80-100%	Good		Adult	DJD	N/A
3	3005	3005-13	Arms	Hands, Metacarpals		Proximal end of 4th metacarpal with abnormal facets as previous one - missing facet, specifically.	1	40-60%	Good		Adult		
3	3005	3005-14	Arms	Hands, Metacarpals		Proximal end of 5th metacarpal.	1	40-60%	Good		Adult	N/A	N/A
3	3005	3005-15	Arms	Hands, Metacarpals		Second metacarpal missing head, with anomalous articular areas.	1	60-80%	Good		Adult	DJD	N/A
3	3005	3005-16	Arms	Hands, Metacarpals		Unidentified head fragments - one is a head and shaft fragment, possibly 2nd metacarpal.	4	0-20%	Fair		Adult	N/A	N/A
3	3005	3005-17	Arms	Hands, Phalanges		One long proximal phalanx.	1	100%	Good		Adult	MSM	N/A
3	3005	3005-18	Arms	Hands, Phalanges		Four intermediate hand phalanges, one missing proximal end.	4	80-100%	Good		Adult	MSM	N/A
3	3005	3005-19	Arms	Hands, Phalanges		Three distal hand phalanges, one is the 1st left.	3	100%	Excellent		Adult	N/O	N/A
3	3005	3005-20	Legs	Femur		Fragment of greater trochanter.	1	0-20%	Fair		Adult?	N/A	N/A
3	3005	3005-21	Legs	Fibula?		Shaft fragment, possibly fibula.	1	0-20%	Good		N/A	N/A	N/A

**This is a simplified version; the full dataset is available upon request to the IHS*

Appendix 4.C – Supporting Data

Sex

Diagnostic feature	Burial 1		Burial 2		Burial 3		Burial 4	
	Value/description	Sex	Value/description	Sex	Value/description	Sex	Value/description	Sex
Supraorbital ridge	N/A		No projection at glabella	F?	N/A		N/A	
Orbital margin	N/A		Round, thick	M?	N/A		N/A	
Glabella	N/A		Not too prominent	F?	N/A		N/A	
Mastoid process	Pointy but slightly large; zygomatic root interrupted	F?	Not small or pointy; zygomatic root interrupted	F?	N/A		N/A	
Mandibular ramus	Square	M?	Obtuse, sloping	F?	N/A		N/A	
Mandibular symphysis	Not robust or square	F?	Broken but not square. Mandible generally large	??	N/A		N/A	
Sacrum shape	N/A		Not curving much	F?	N/A		N/A	
Greater sciatic notch	Not too wide, more V-shaped than enlarged	??	Wide, per-auricular sulcus present; composite arch parallel	F	Wide, per-auricular sulcus present; composite arch parallel	F	N/A	
Bicondylar breadth of the humerus	54.00	F	N/A		*61.05	M?	N/A	
Femur head	N/A		43.5	F?	*42.95	F?	N/A	
Femur Max L	N/A		N/A		N/A		N/A	
Midshaft circumference	N/A		80	F	82	M	81	??
Bicondylar width	N/A		N/A		N/A		N/A	

Age

Diagnostic feature	Burial 1		Burial 2		Burial 3		Burial 4	
	Value/description	Age (years)	Value/Description	Age (years)	Value/Description	Age (years)	Value/Description	Age (years)
Cranial sutures closure	Mostly open		N/A		N/A		N/A	
Dental attrition	Attrition only on first molars – Brothwell's chart phase 1	17-25	Attrition on lower first and second molars Brothwell's chart phase 2	25-35	N/A		N/A	
Medial aspect of the clavicle	Possibly fusing	18+	Fused	30+	N/A		N/A	
Rib ends	N/A		V-shaped, rim slightly irregular - between phases 3 and 4 white females Iscan et al. 1984	25-30			N/A	
Epiphyseal fusion (general)	Epiphyseal flake on rib head; scapular medial border fragment, possibly immature; S1 not fused but with evidence of an ongoing process; lower thoracic and lumbar body end plates show slight fusing line	20+	All fused	Mature adult	All fused	Mature adult	Most open or fusing	Adolescent
S1-S2	Not fused/partially fusing	20+	Fused	30+	N/A		N/A	
S2-S3	N/A		Fused	26+	N/A		N/A	
Femur (distal end)	N/A		N/O		N/O		Not fused, epiphysis present	Mid-teens
Femur (proximal end)	N/A		N/O		N/O		Head and trochanters fused	Over 17-19
Tibia (proximal end)	N/A		N/O		N/A		Tuberosity and end plate fused, line still visible	18/20

Diagnostic feature	Burial 1	Burial 2	Burial 3	Burial 4	
Tibia (distal end)	N/A	N/A	N/A	Fusing line still visible on both right and left distal ends	17/18
Fibula (distal end)	N/A	N/A	N/A	Fusing line still visible in both right and left distal ends	17/20
Calcaneus	N/A	N/A	N/A	Tuber fused, line slightly visible	16+/20+
1st Metatarsal	N/A	N/A	N/A	Proximal end fused	15+/18+
Middle and distal foot phalanges	N/A	N/A	N/A	Proximal end fused, line still visible	13/16

Appendix 4.D – Metrics

Skeleton #	Bone	Measurement	Value (mm)	Value R (mm)	Value L (mm)
1	Radius	Max length – approximate, reconstructed **(stature: 163.00 +/- 4.24cm)**			*228
	Humerus	Max length – without head			*280
		Max diameter head		*40.34	*40.00
		Bicondylar breadth			*52.58
	Ulna	Max length – without distal end			*240
	Scapula	Glenoid cavity breadth			23.14
	Clavicle	Max length	*119.27		
	Pelvis	Acetabulum diameter			50.54
	Sacrum	Max width	*107.15		
	Nasal	Nasal breadth	*22.35		
	Zygomatic	Max length			45.50
		Max breadth			45.82
	Mandible	Max ramus width	34.80		
		Min ramus width	31.10		
		Max ramus height	60.54		
		Bigonial width	93.92		
		Symphysis height	25.93		
	Temporal – mastoid process	Max mastoid length			28.88
2	Mandible	Bigonial width	*100.42		
		Max ramus height		47.47	
		Foramen mentalia	43.08		
	Zygomatic	Max height		46.74	44.94
		Max width		50.84	*46.76
	Nasals	Max length		21.63	
		Width	11.77		
	Frontal	Frontal breadth, min	*97.80		
		Upper facial breadth (fmt-fmt)			
	Orbits	Orbital breadth		*38.57	
		Orbital height		*30.86	
	Temporal	Max mastoid length		31.07	
	Clavicle	Max length		*152	
	Ulna	Max length (**stature: 164.93 +/-4.30cm**)		251	
	Radius	Max length (**stature: 161.58 +/- 4.24**)		225.5	
	Metacarpals	Max length, 4th		57.74	
	Sacrum	Max width	119.84		
	Femur	Max length (L no head or distal end)	*430	*390	
		Max diam head		*43.5	
		Midshaft circumference		80	
		Max ant-post diam		24.35	
		Max med-lat diam		24.56	
3	Femur	Max length		*460-470	
		Max diam head		*42.95	
		Max ant-post diam		26.78	
		Max med-lat diam		24.47	
		Midshaft circumference		82.00	
		Bicondylar width		*71.00	
	Tibia	Circumference at nutrient foramen			*80.00

Skeleton #	Bone	Measurement	Value (mm)	Value R (mm)	Value L (mm)
	Fibula	Max length		*370	
Burial 3?	Pelvis	Max height	*195		
	Humerus	Bicondylar width		*61.05	
	Pelvis	Max diam acetabulum		*51.85	
	1st Metacarpal	Max length		49.43	
	2nd Metacarpal	Max length		66.12	
	3rd Metacarpal	Max length		66.30	
	4th Metacarpal	Max length		56.98	
4	Femur (possibly from Burial 4?)	Max diam head		40.00	
		Max ant-post diam		24.60	
		Max med-lat diam		25.63	
		Midshaft circumference		81.00	
	Tibia	Max length			*370
		Circumference at nutrient foramen			82.00
	Calcaneus	Max length		75.14	

Excavations at ‘Mella’s Cell’ Lemanaghan, County Offaly SMR OF015-004006-

Archaeological Report

VOLUME II - FIGURES

Prepared for: National Monuments Service and Offaly County Council

By: Dr Denis Shine and Dr Annamaria Diana

Archaeological Licence Ref.: 25E0558

Townland/Location: Churchlands - Lemanaghan, County Offaly

ITM: 617507, 726933

Monument Name: Mella’s Cell (oratory)

SMR: OF015-004006- (and associated complex)

CMF Reference No: CMF25-3-OF001

Date: April 2026

List of Figures

Figure 1.1: Aerial photograph of Lemanaghan's monastic complex (source: Gibson and George 2004).

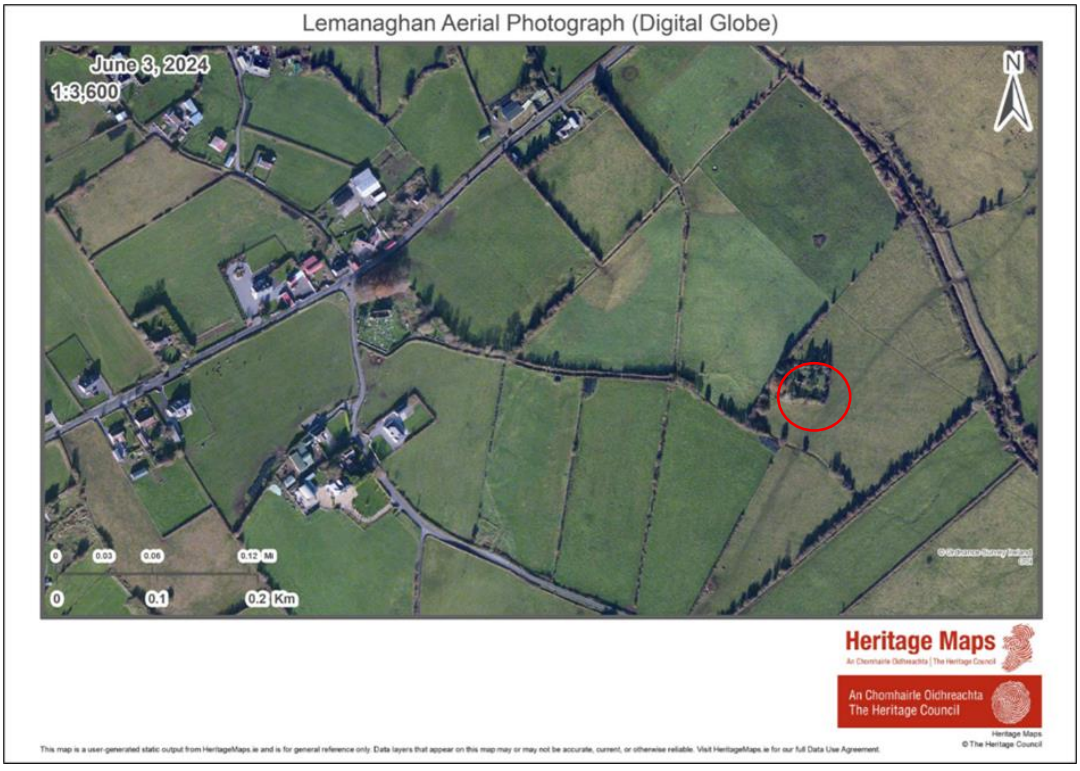


Figure 1.2: Extract from Aerial Photograph (Digital Globe) showing Lemanaghan castle and monastic complex; Mella's Cell is emphasised by the red circle (source www.heritagemaps.ie).

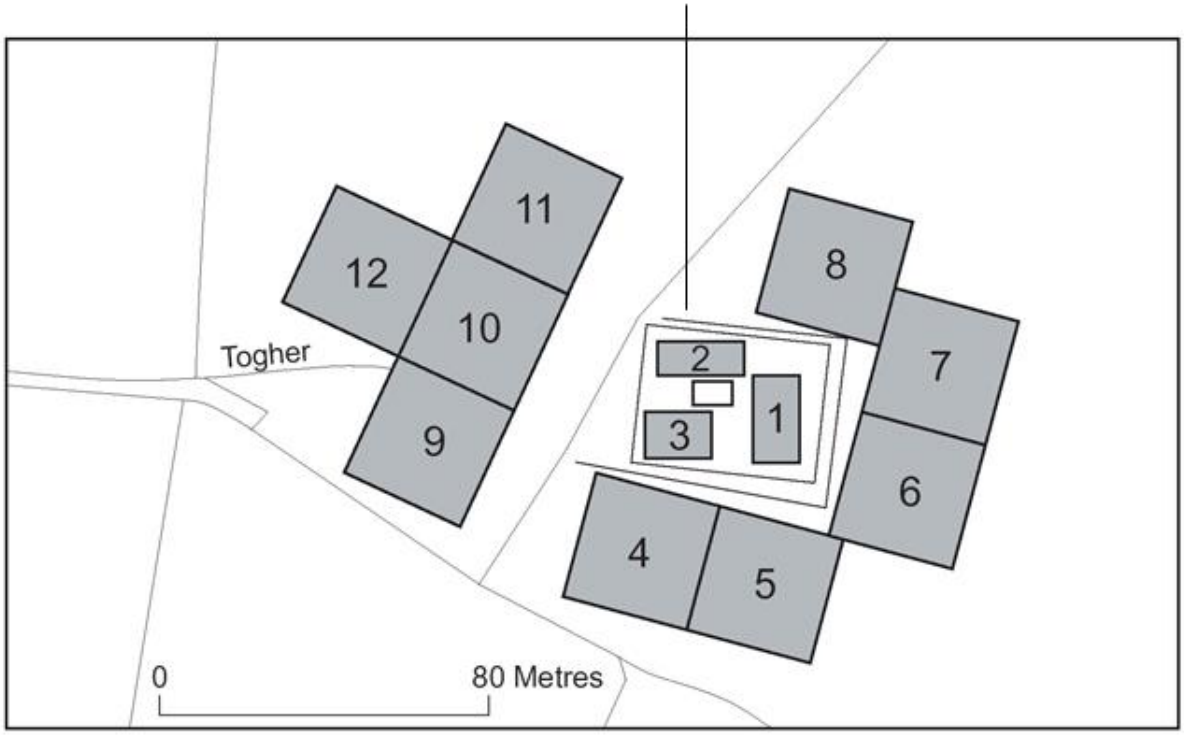


Figure 1.3: Location of grids near St. Mella's enclosure (source: Gibson and George 2004).

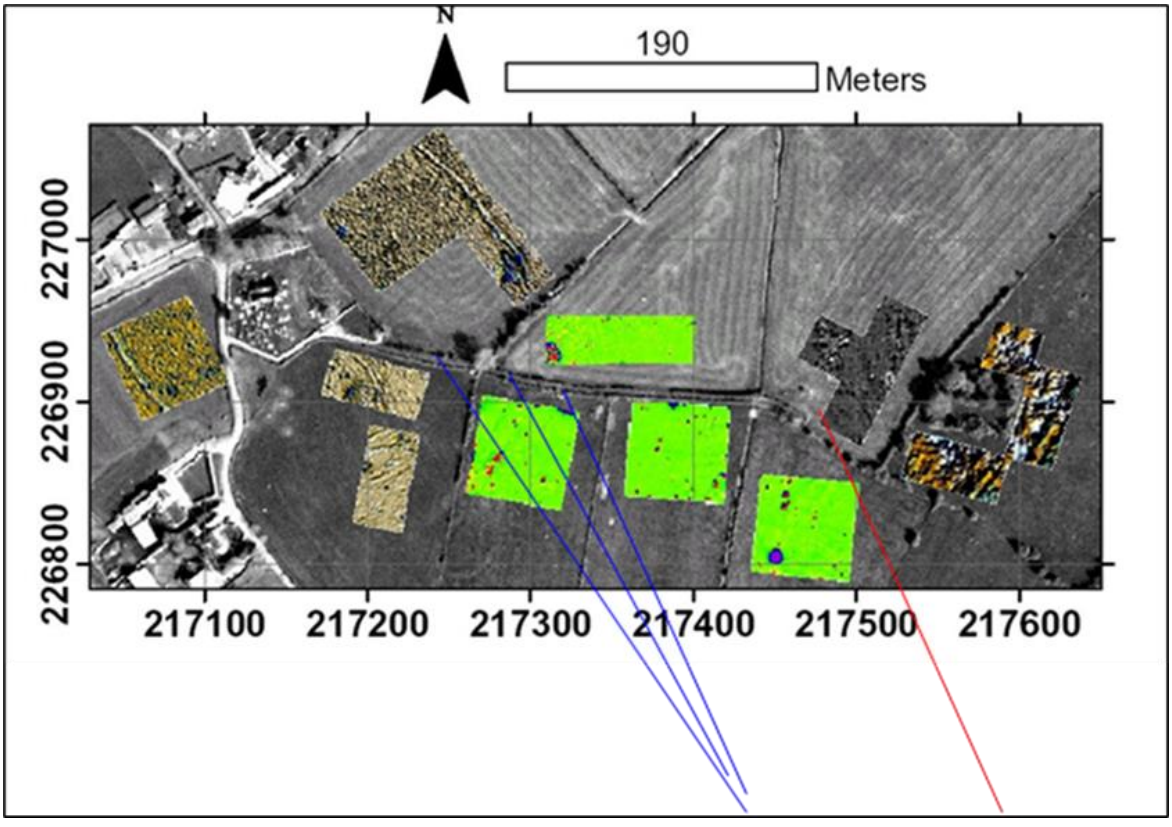


Figure 1.4: Spatial relationships of all geophysical survey areas in 2004. Red line shows where radar and resistivity data were collected across the togher, blue lines show where resistivity data were collected along the togher; Mella's Cell is emphasised by the red circle (source: Gibson and George 2004).

Figure 2.1: Site location map, showing recorded archaeological sites and monuments in Lemanaghan; Mella's Cell is emphasised by the red circle (source: www.archaeology.ie).

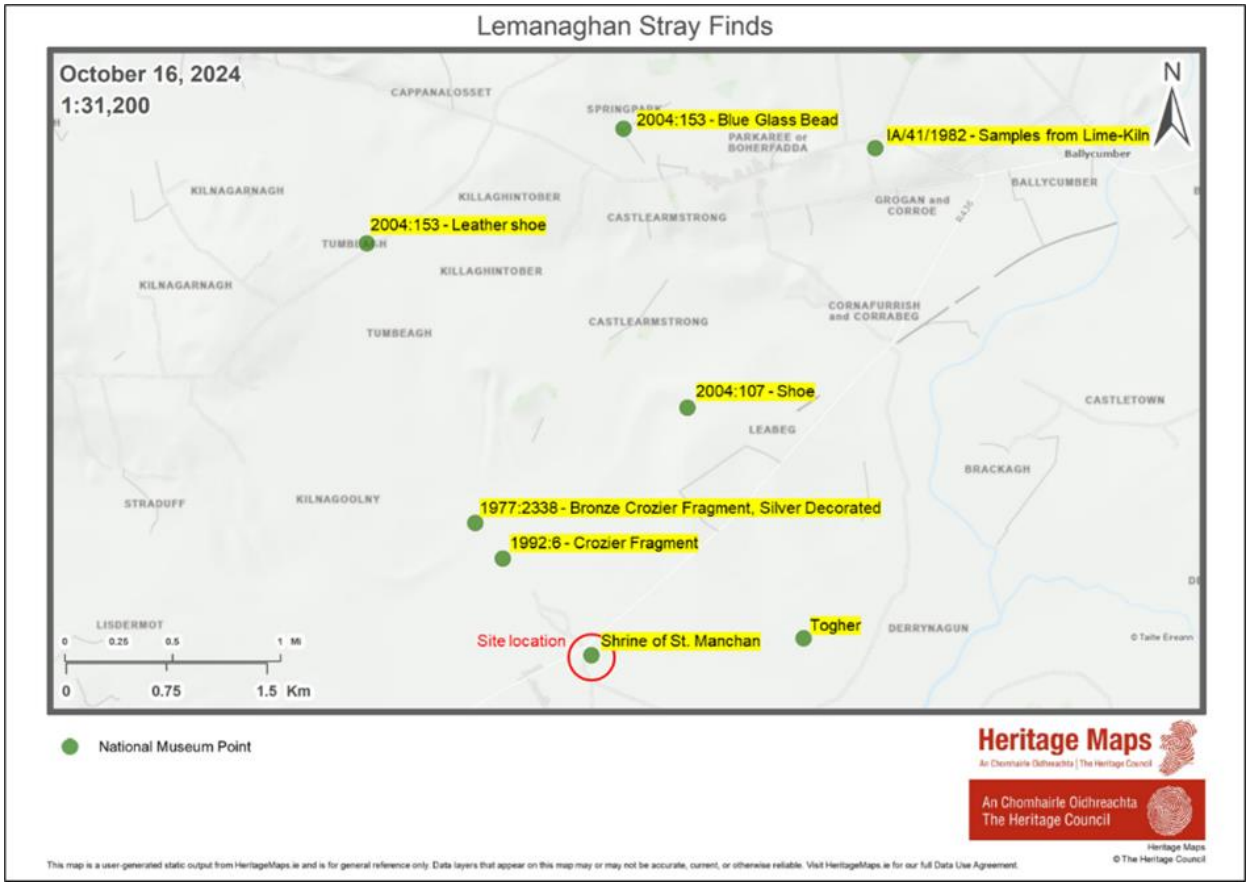


Figure 2.2: Recorded archaeological stray finds from the vicinity of Lemanaghan monastery (source: www.heritagemaps.ie).

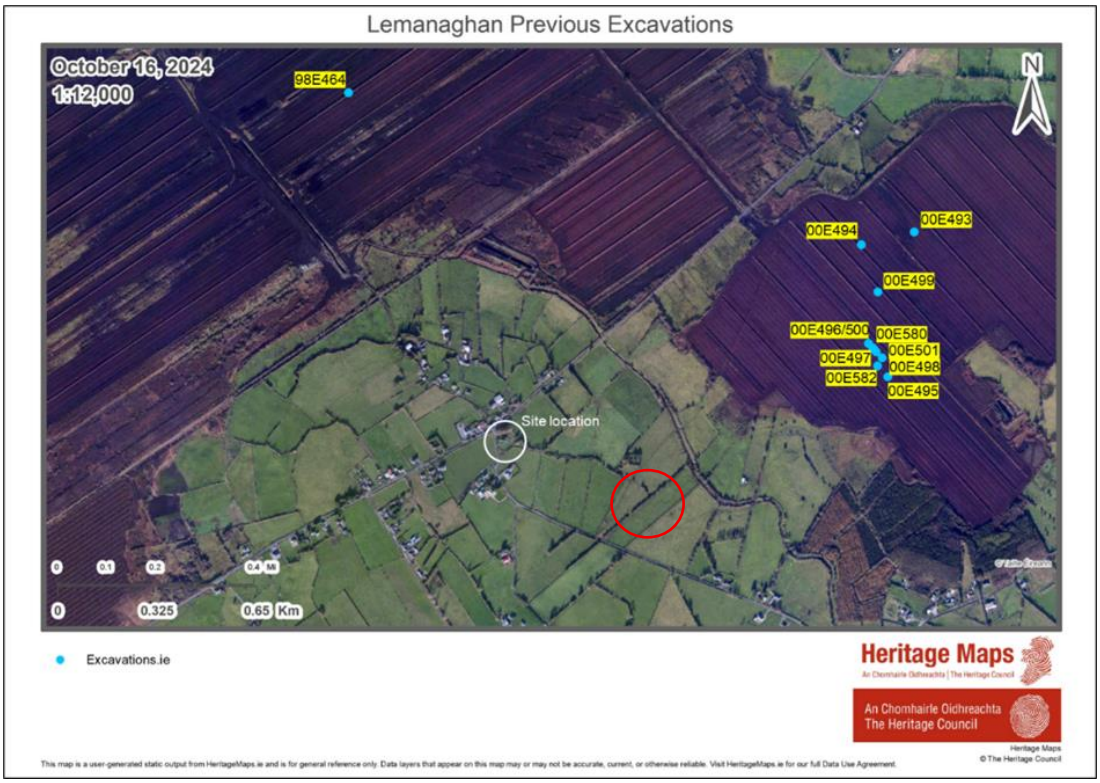


Figure 2.3: Recorded archaeological excavations form the vicinity of the Lemanaghan Monastery (white circle); Mella's Cell is emphasised by the red circle (sources: www.heritagemaps.ie; www.excavations.ie).

Figure 2.4: The Down Survey map of the county of Offaly (King's County) (source: https://downsurvey.tchpc.tcd.ie).

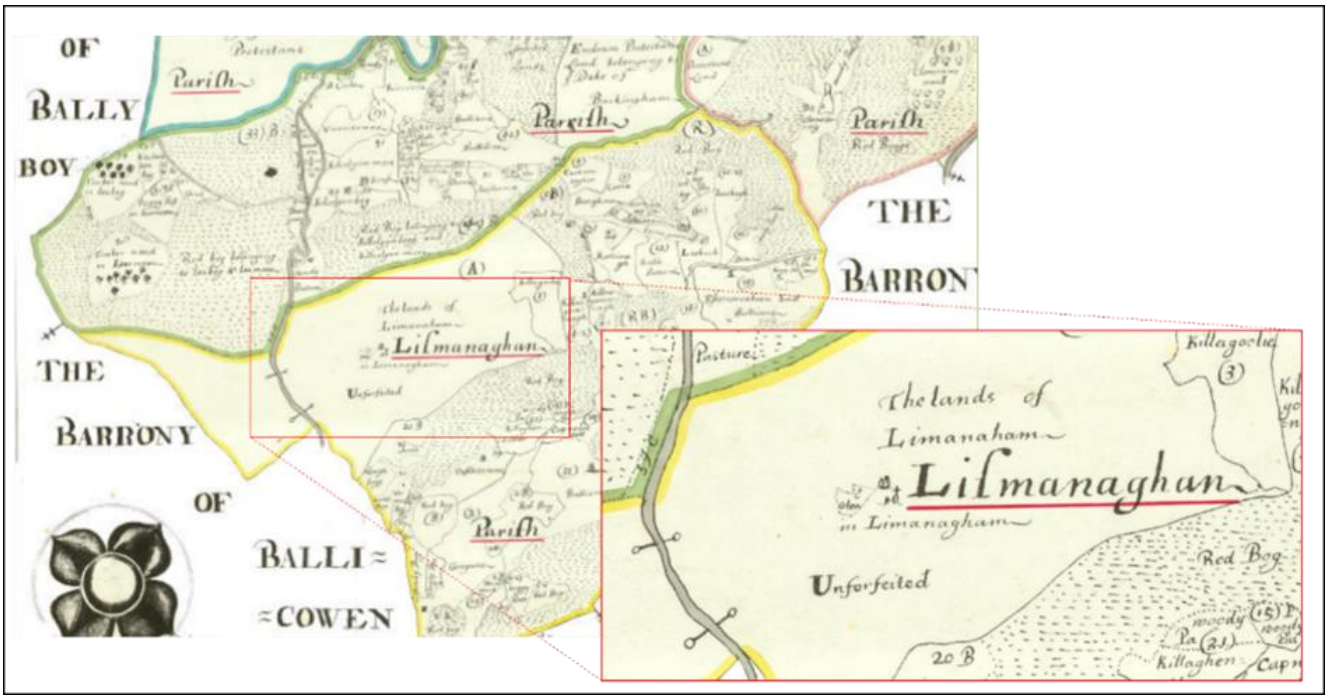


Figure 2.5: The Down Survey map of the 'Barony of Garricastle' (Garrycastle) (source: https://downsurvey.tchpc.tcd.ie).

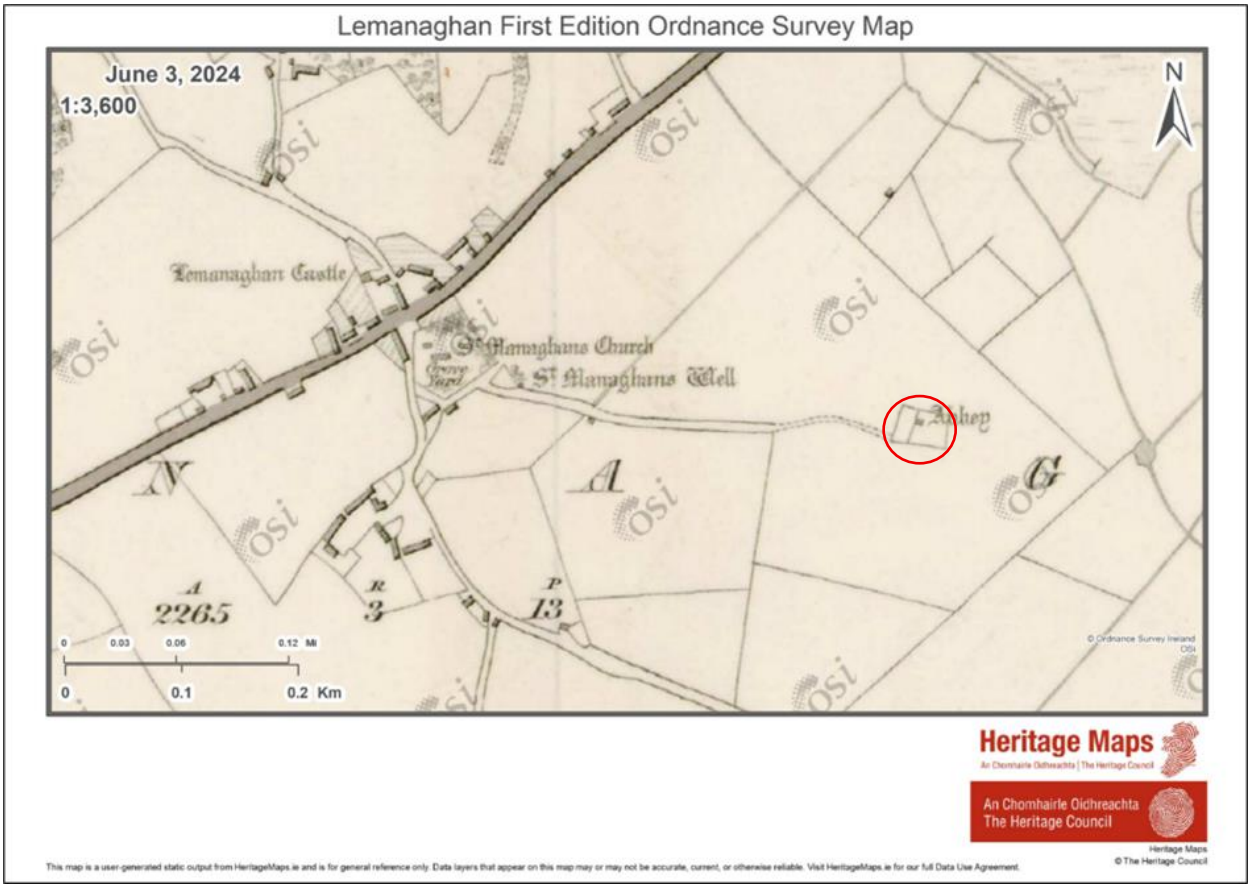


Figure 2.6: Extract from First Edition Ordnance Survey Map showing Lemanaghan monastic complex; Mella's Cell is emphasised by the red circle (source: www.heritagemaps.ie).

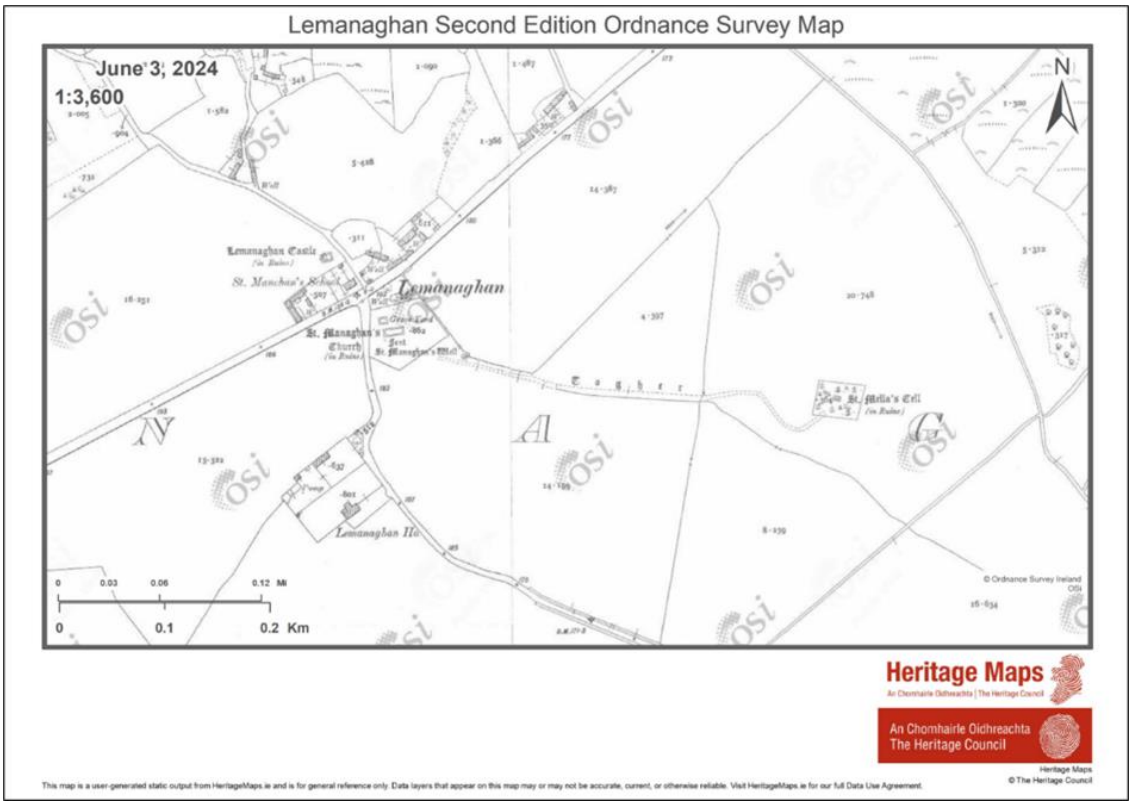


Figure 2.7: Extract from Second Edition Ordnance Survey Map showing Lemanaghan castle and monastic complex; Mella's Cell is emphasised by the red circle (source: www.heritagemaps.ie).

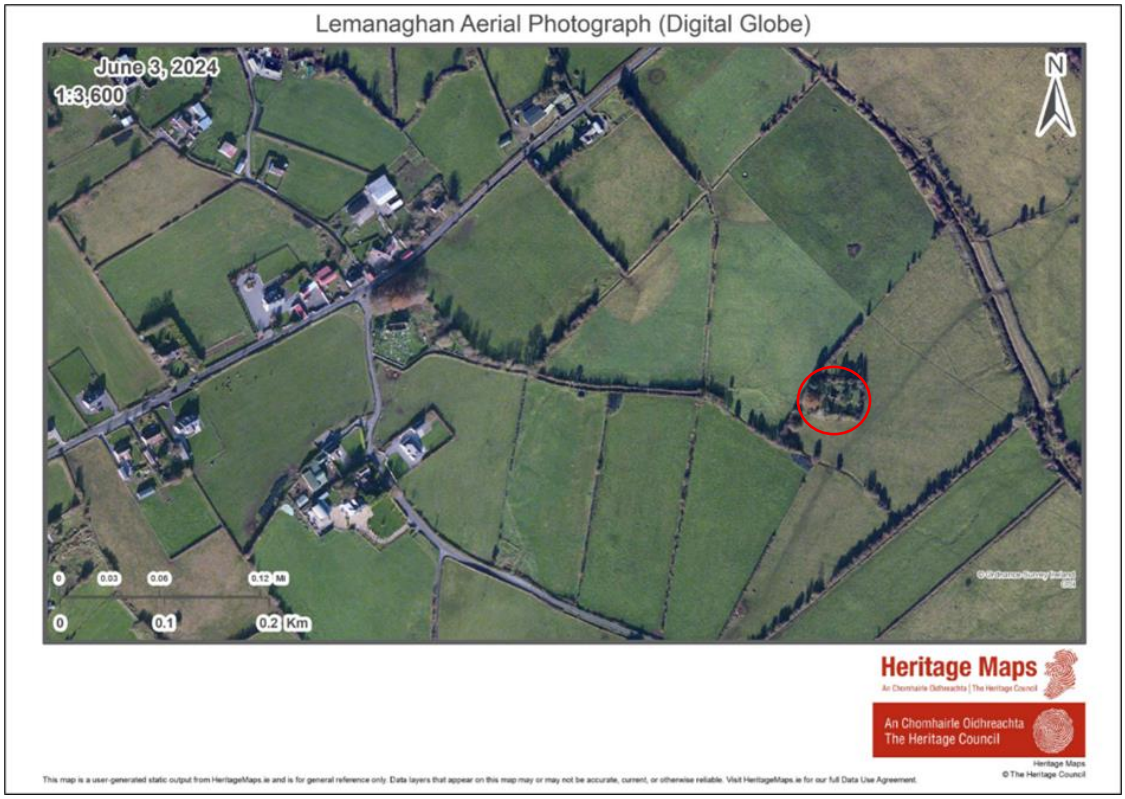


Figure 2.8: Extract from Aerial Photograph (Digital Globe) showing Lemanaghan castle and monastic complex; Mella's Cell is emphasised by the red circle (source: www.heritagemaps.ie).

Figure 5.1: The site, shortly after Storm Eowyn, as reported to the NMS and NMI on 28 January.

Figure 5.2: Tree Bole 2 shortly after Storm Eowyn, as reported to the NMS and NMI on 28 January.

Figure 5.3: Tree Bole 1 shortly after Storm Eowyn, as reported to the NMS and NMI on 28 January.

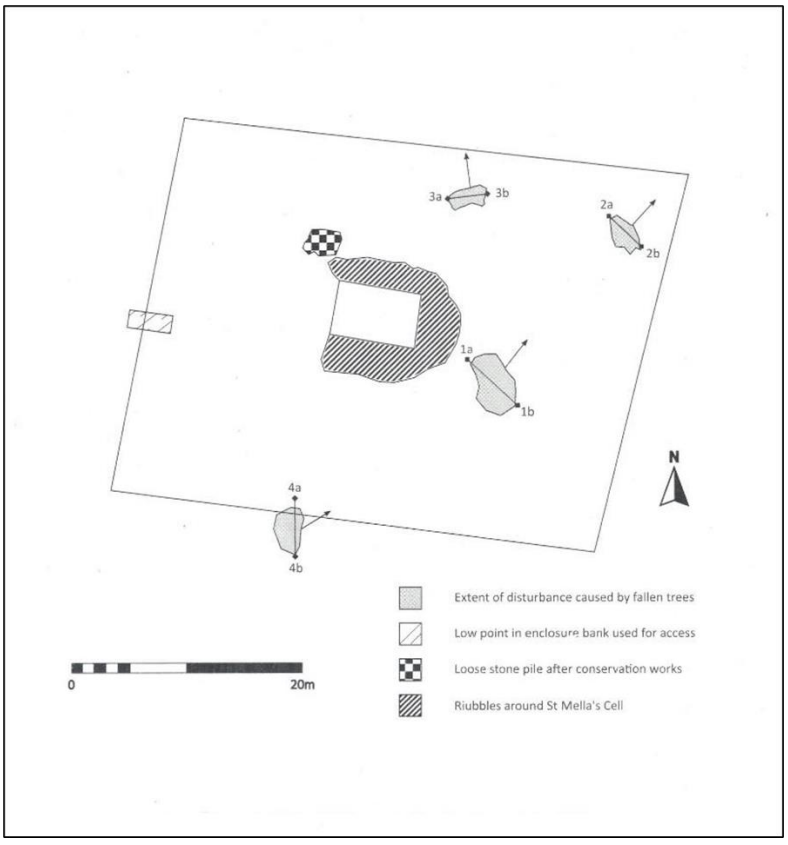


Figure 5.4: IHS survey of tree boles at Lemanghan.

Site: Lemanaghan
Licence No.: 25E0558
Figure credit: © IHS

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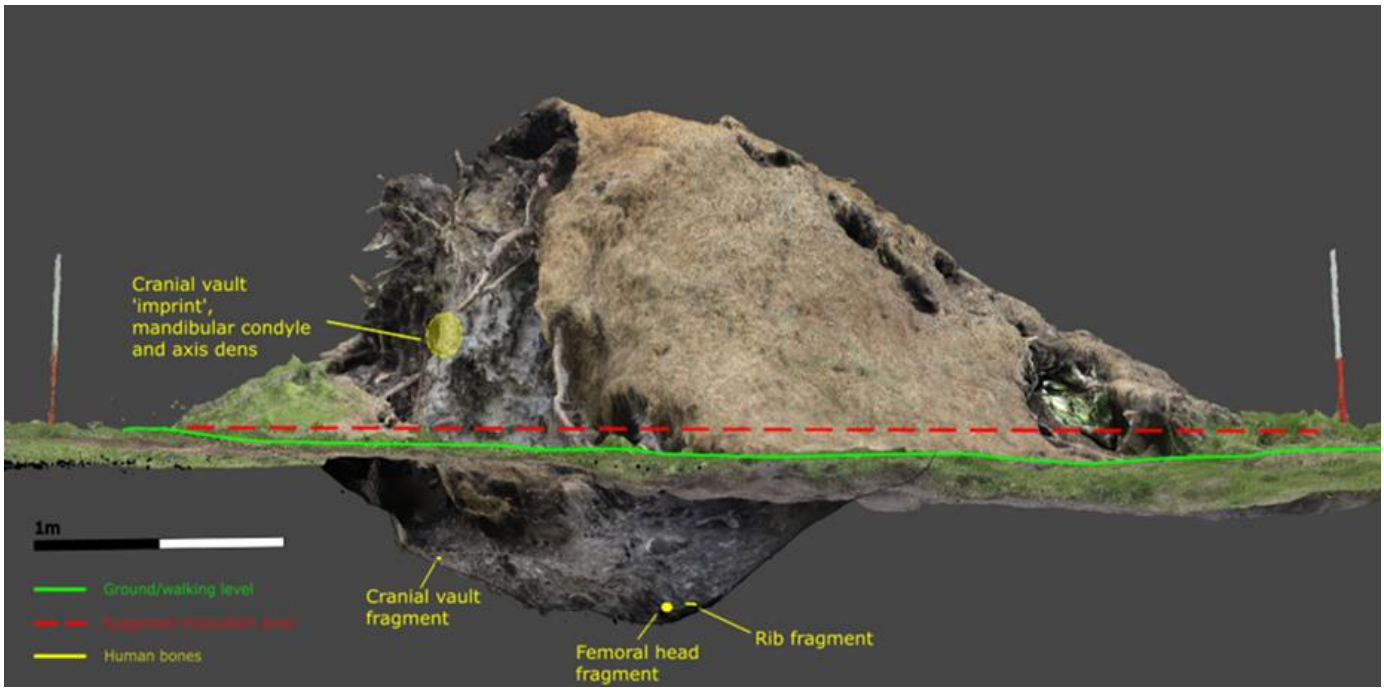

Figure 5.5: Photogrammetric section of Tree Bole 1.

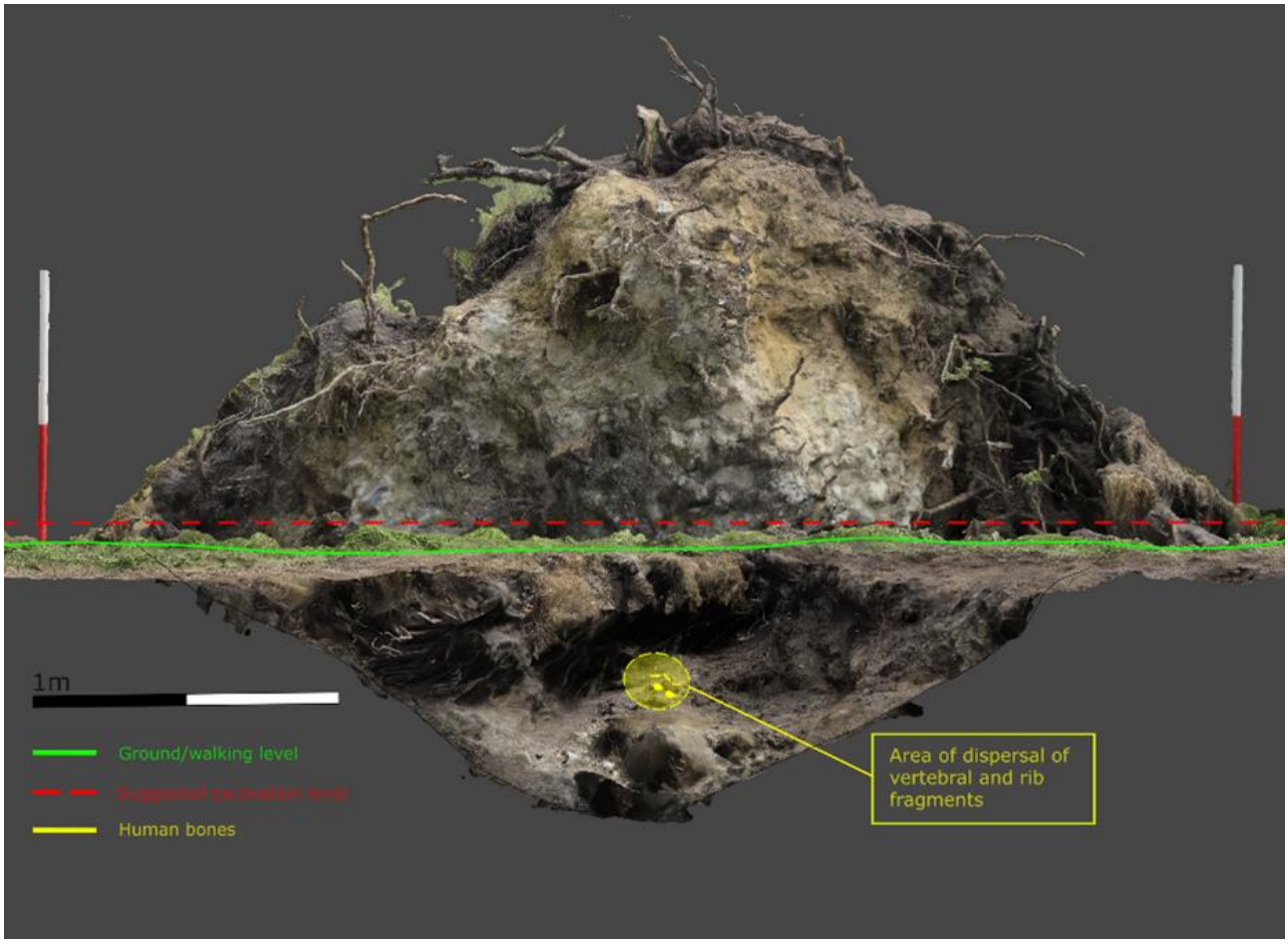

Figure 5.6: Photogrammetric section of Tree Bole 2.

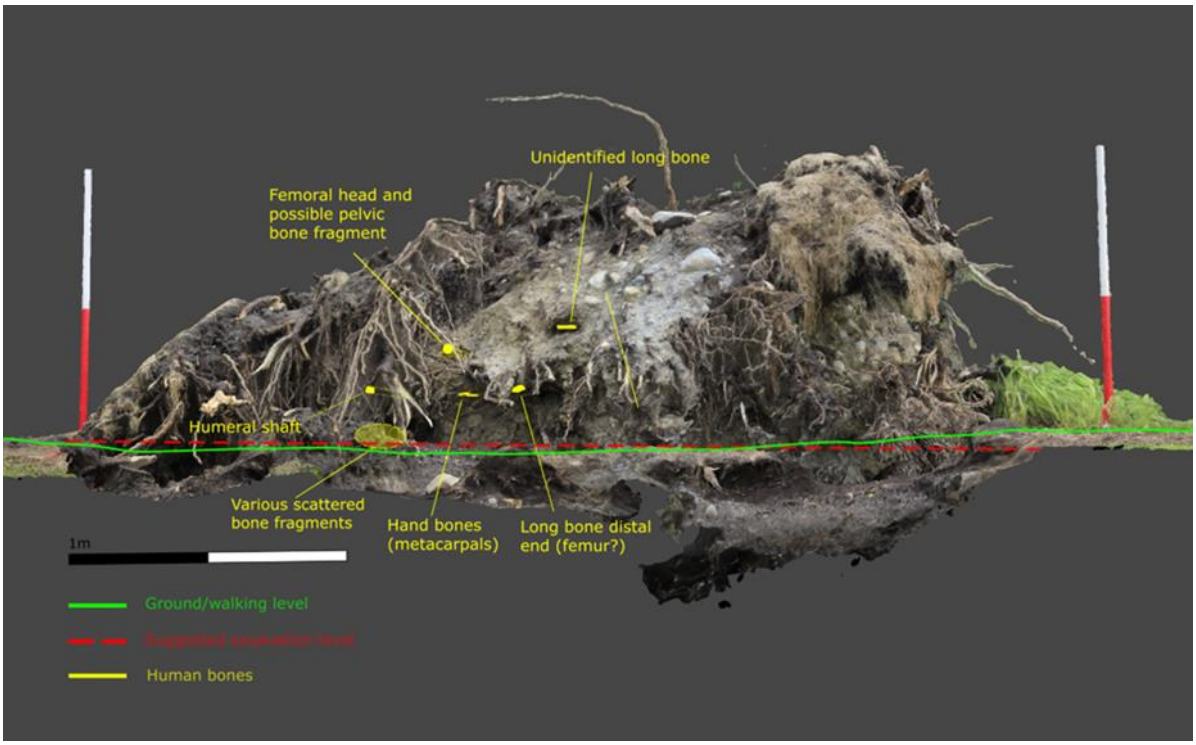

Figure 5.7: Photogrammetric section of Tree Bole 3.

Figure 5.8: Tree Bole 1 shortly prior to CMF2025 works. Looking NE.

Figure 5.9: Tree Bole 2 during CMF2025 works/ Looking E.

Figure 5.10: Tree Bole 3 shortly prior to CMF2025 works. Looking NE.

Figure 5.11: Tree Bole 1 after CMF2025 works Looking NE.

Figure 5.12: Tree Bole 2 after CMF2025 works. Looking E.

Figure 5.13: Tree Bole 3 after CMF2025 works. Looking NE.

Figure 5.14: Plastic matting being placed down in advance of crossing the enclosure bank.

Figure 5.15: Working Shot showing Tree Boles 1-3. Looking SW.

Figure 5.16: Tree Bole 1 on first day of works in October. Looking NE.

Figure 5.17: Tree Bole 2 on first day of works in October. Looking NE.

Figure 5.18: Tree Bole 1 on first day of works in October. Looking NE. Tree Bole 3 on first day of works in October. Looking N.

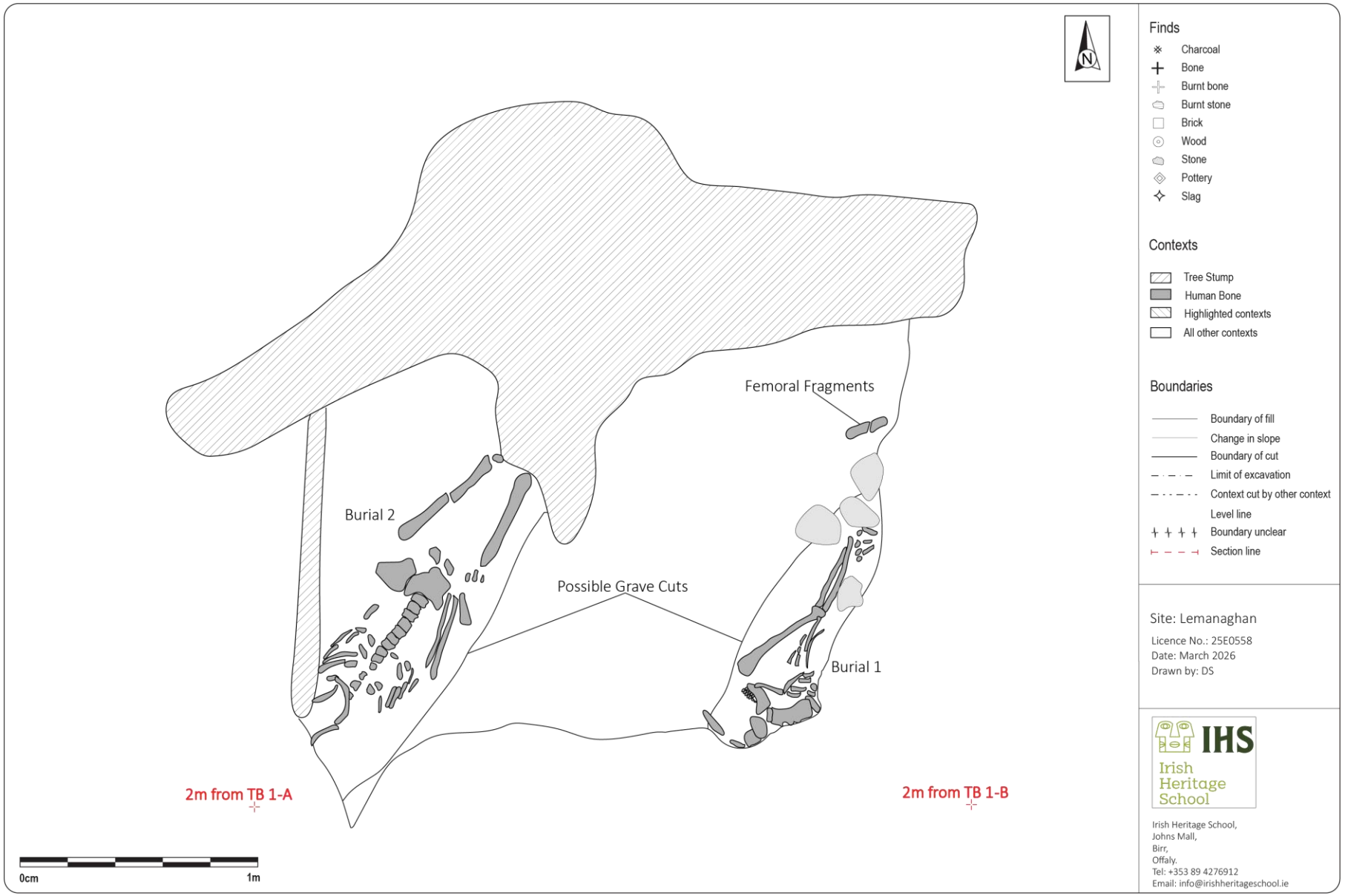

Figure 5.19: Tree Bole 1 with locations of Burial 1 and Burial 2.

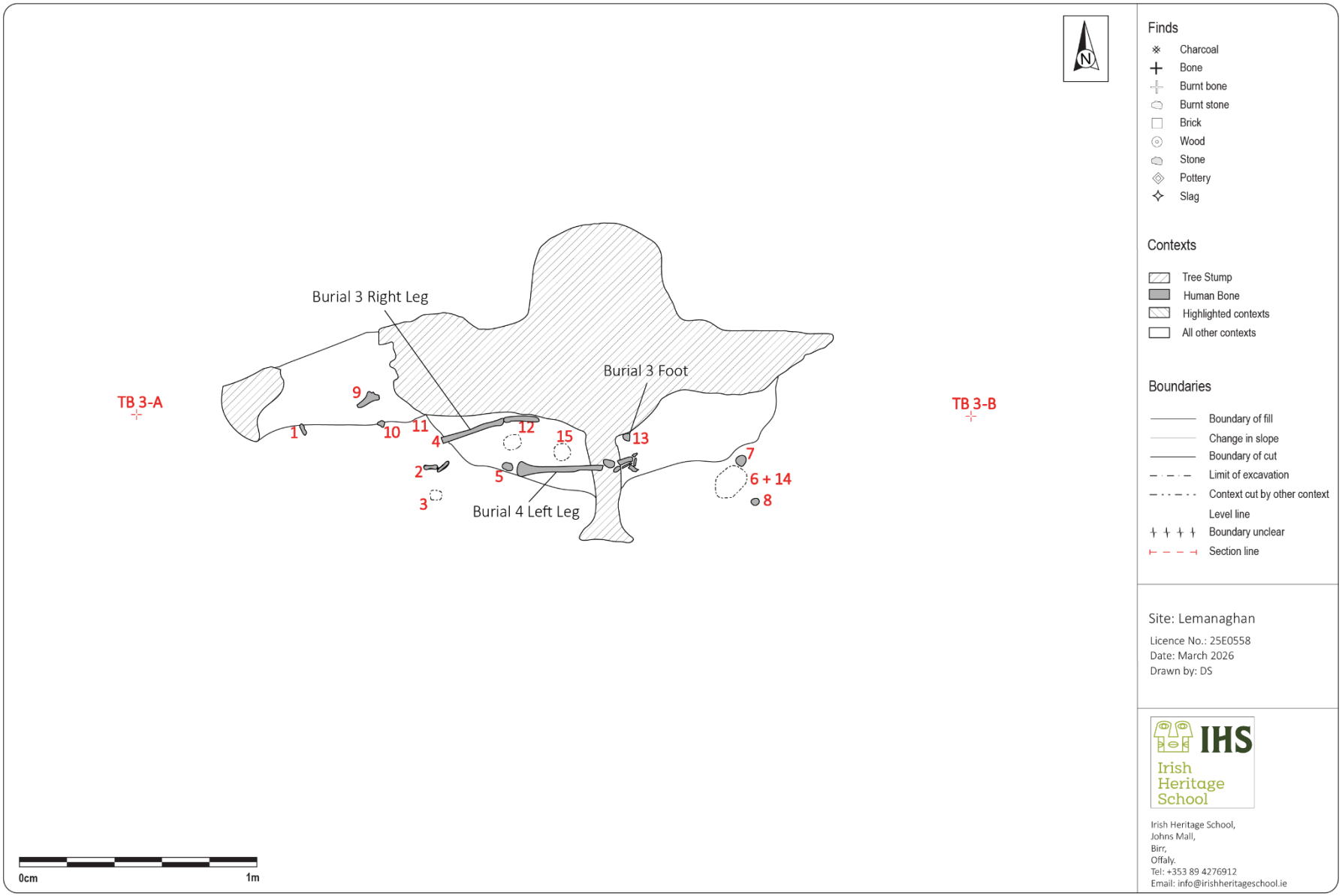

Figure 5.20: Tree Bole 3: plan showing Burial 3 and Burial 4 after removal of Skeleton 4's right leg. Annotated numbers: 1 Rib, 2 Hand bones, 3 Femur, 4 Skeleton 3 in section; 5 Skeleton 4 in section; 6,7, 8 and 14 cranial fragments; 9 and 11 disarticulated bones from Burials 3 and 4, 10 Rib, 12-13, 15 bone fragments clusters.

Figure 5.21: Tree Bole 1 after clean back. Looking NE.

Figure 5.22: Tree Bole 1: Working shot of Burial 1's initial exposure.

Figure 5.23: Scaled photogrammetric model of Burial 1.

Figure 5.24: Detail of Burial 1's skull and spine. The white arrow highlights the total width of the soil lens including the skull and underlying (very little) grave fill, holding the bones in place.

Figure 5.25: Working shot detailing Burial 1's dentition and left shoulder girdle.

Figure 5.26: Tree Bole 1: Burial 2 as seen through the roots.

Figure 5.27: Tree Bole 1: Burial 2.

Figure 5.28: Scaled photogrammetric model of Burial 2.

Figure 5.29: Tree Bole 1: Burial 2 before the root holding the skull was removed as skeletal remains were about to collapse.

Figure 5.30:Tree Bole 3 after clean back (skeletal remains visible at this stage were flagged with blue and yellow tags).

Figure 5.31: Tree Bole 3: disarticulated hand (and other) bones from Burials 3 and 4 (dashed oval). Note relative position of Skeleton 3, circled in orange, and Skeleton 4, indicated by white arrows.

Figure 5.32: Tree Bole 3: closer to the base of the fallen tree, Burial 3; the two long bone fragments on the southern view of the plate belong to Burial 4.

Figure 5.33: Tree Bole 3: Burial 4, Skeleton 4's left leg.

Figure 6.1: Skeleton 1's maxilla and mandible showing root taphonomic damage but excellent preservation of the dentition. The arrow indicates an accessory mental foramen (see non-metric traits).

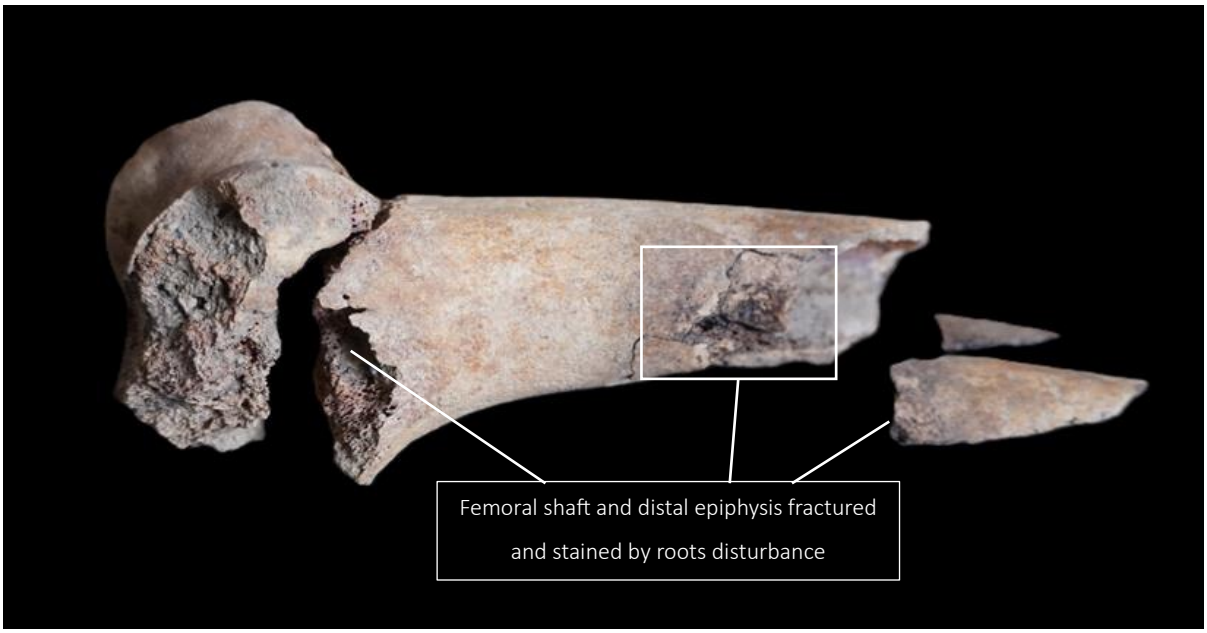

Figure 6.2: Skeleton 4's left distal femur.

Figure 6.3: Skeleton 4's feet and distal tibiae/fibulae.

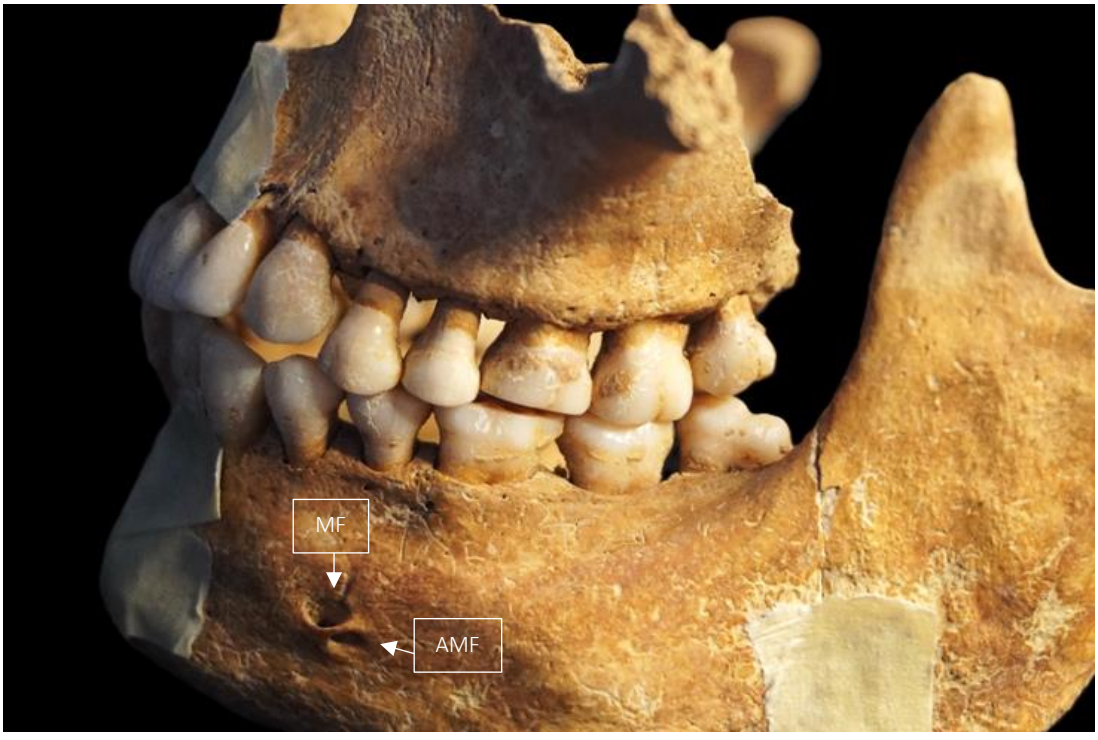

Figure 6.4: Skeleton 1's left non-metric accessory mental foramen.

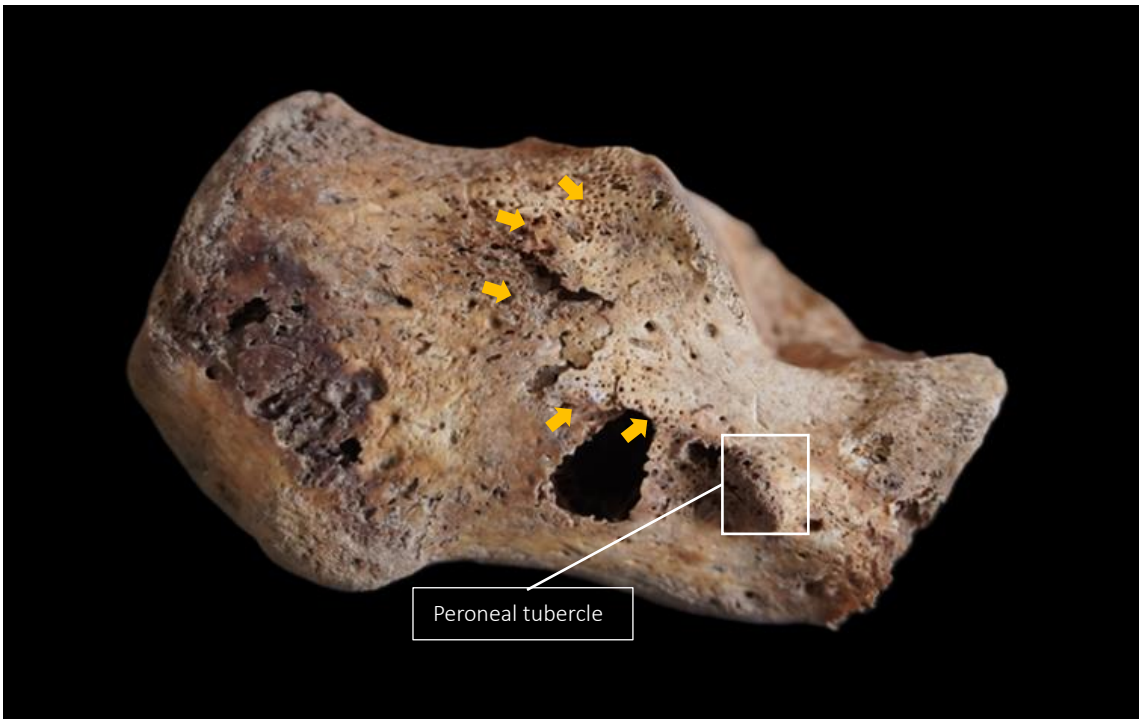

Figure 6.5: Skeleton 4's right calcaneus exhibiting peroneal tubercle on lateral view; note also pitting and porosity (highlighted by yellow arrows).

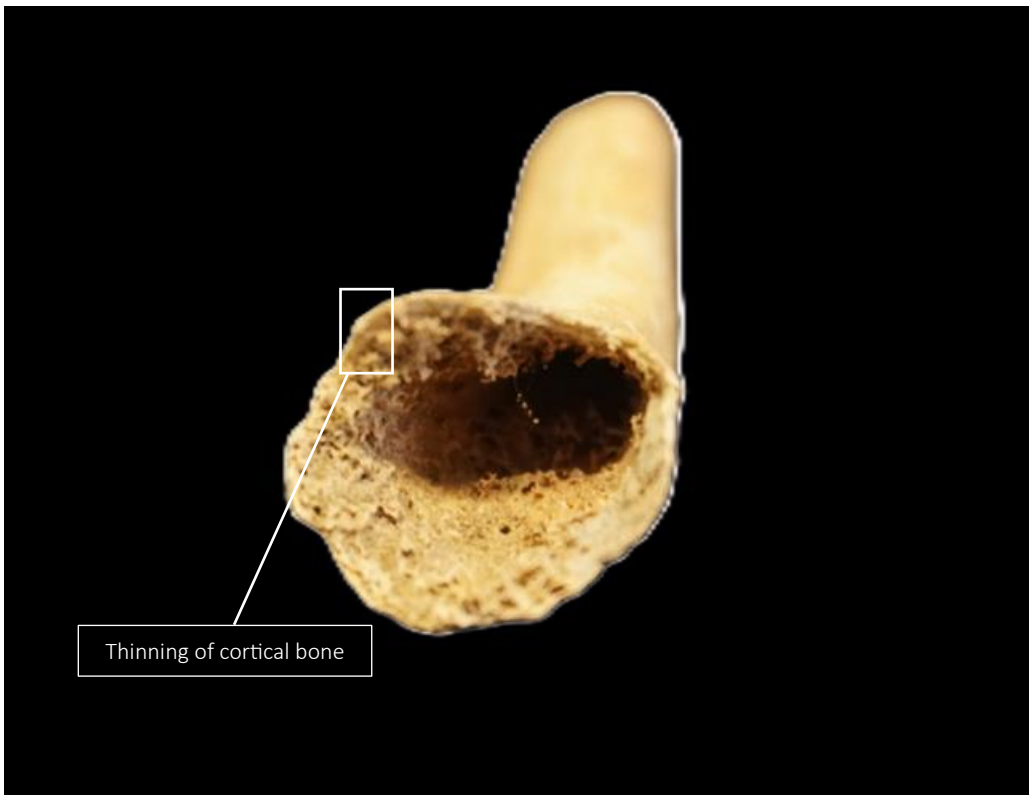

Figure 6.6: Skeleton's clavicular cortical bone and hollow medullary cavity seen in fracture.

Figure 6.7: Very mild porosity on Skeleton 2's orbital roof.

Figure 6.8: Skeleton 2's lumbar vertebrae showing increased porosity and lytic lesions on the body.

Figure 6.9: Skeleton 3's right femoral shaft (posterior view) with lamellar bone depositions and strong muscle attachments.

Figure 6.10: Skeleton 3's femora (the right femur is above) displaying abnormal torsion/bowing.

Figure 6.11: Skeleton 3's left distal fibula.

Figure 6.12: Skeleton 4's left tibia held in anatomical position and looked at from the tibial plateau to highlight abnormal torsion.

Figure 6.13: Skeleton 2's left maxillary sinus – arrows indicate new bone depositions and spicules.

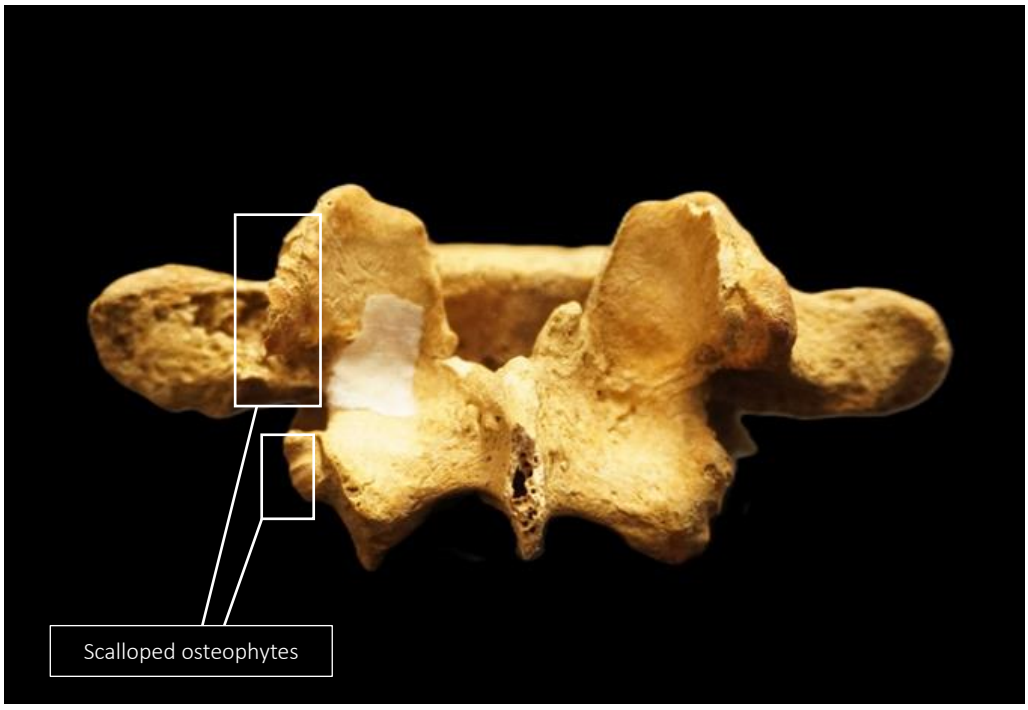

Figure 6.14: New bone formation (osteophytosis) on the articular margins of the 5th Lumbar vertebra.

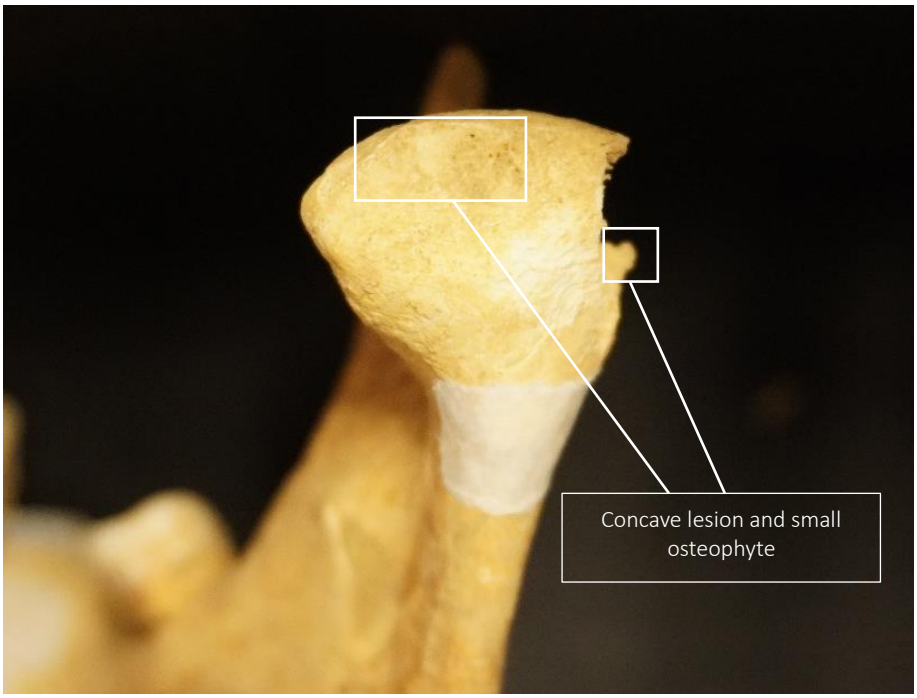

Figure 6.15: Skeleton 2's mandibular condyle presenting degenerative lesions.

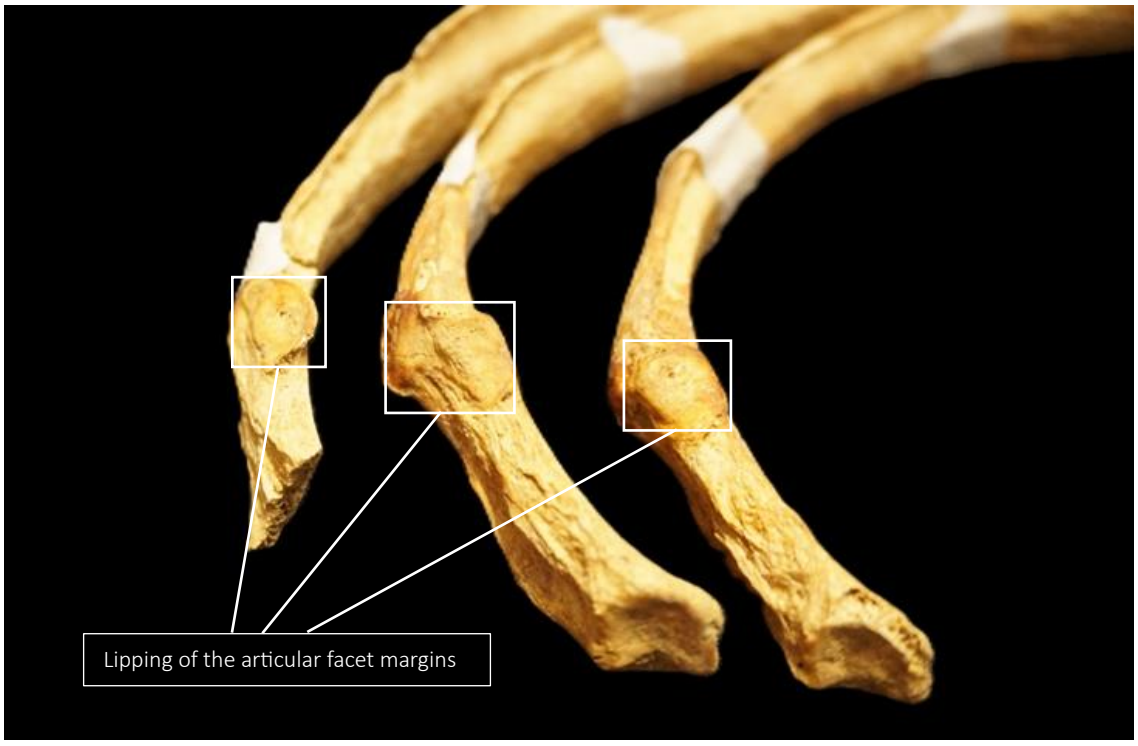

Figure 6.16: Lipping, osteophytosis and enlargement of the margins of costal facets on Skeleton 2.

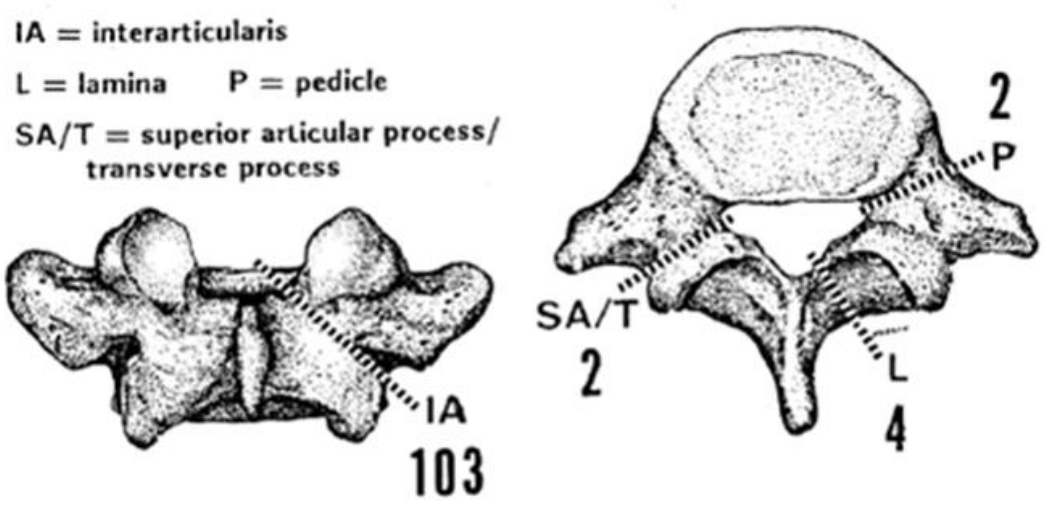

Figure 6.17: Illustration showing possible sites of spondylolysis (source: Merbs 1996, Fig. 3).

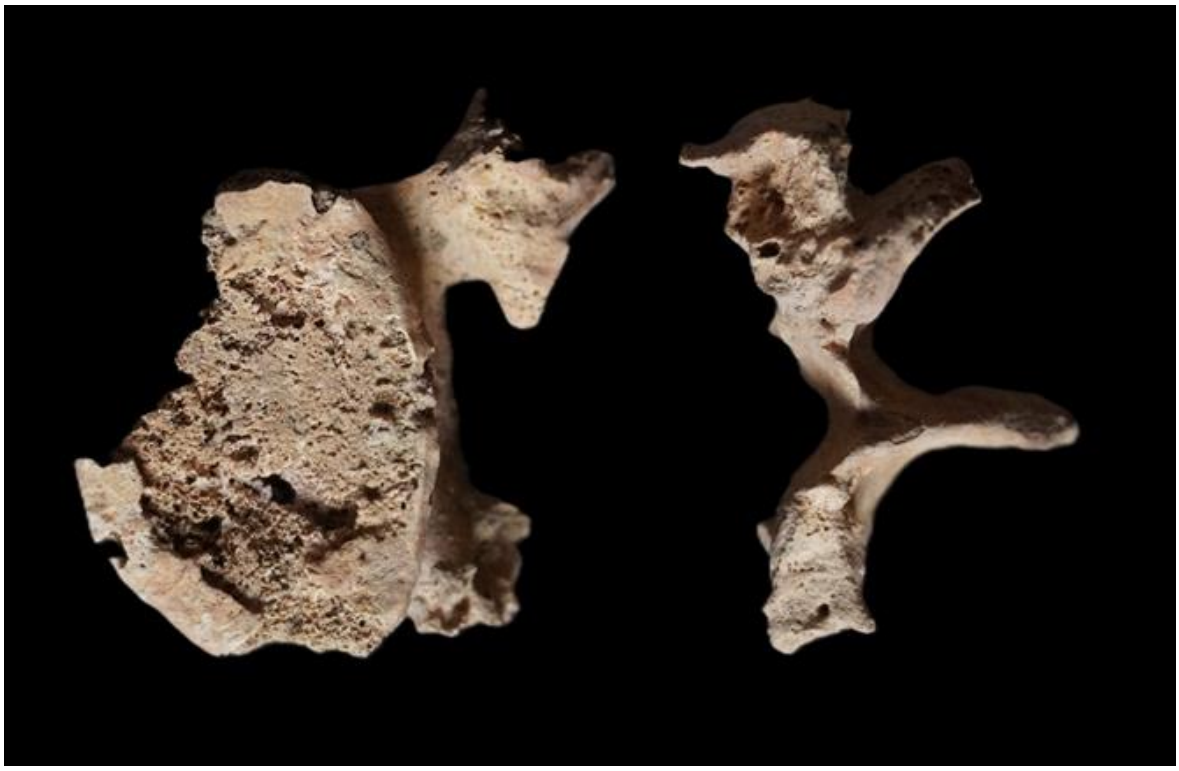

Figure 6.18: Bilateral spondylolysis of Skeleton 1's 5th (?) lumbar vertebra.

Figure 6.19: Skeleton 1's unfused or fractured sacral spine.

Figure 6.20: Pronounced radial tuberosity on Skeleton 3's right radius.

Figure 6.21: Skeleton 4, first foot phalanx (right) with remodelled oval lytic lesion on its dorso-medial view.

Figure 6.22: Skeleton 4's metacarpals, immature proximal ends displaying eroded medullary cavity.

Figure 6.23: Skeleton 2's relatively enlarged mental foramen (circled).

Figure 6.24: Severe calculus depositions and anterior attrition on Skeleton 2's lower incisors and canines.

Figure 6.25: Hypoplastic lines on Skeleton 2's maxillary dentition.

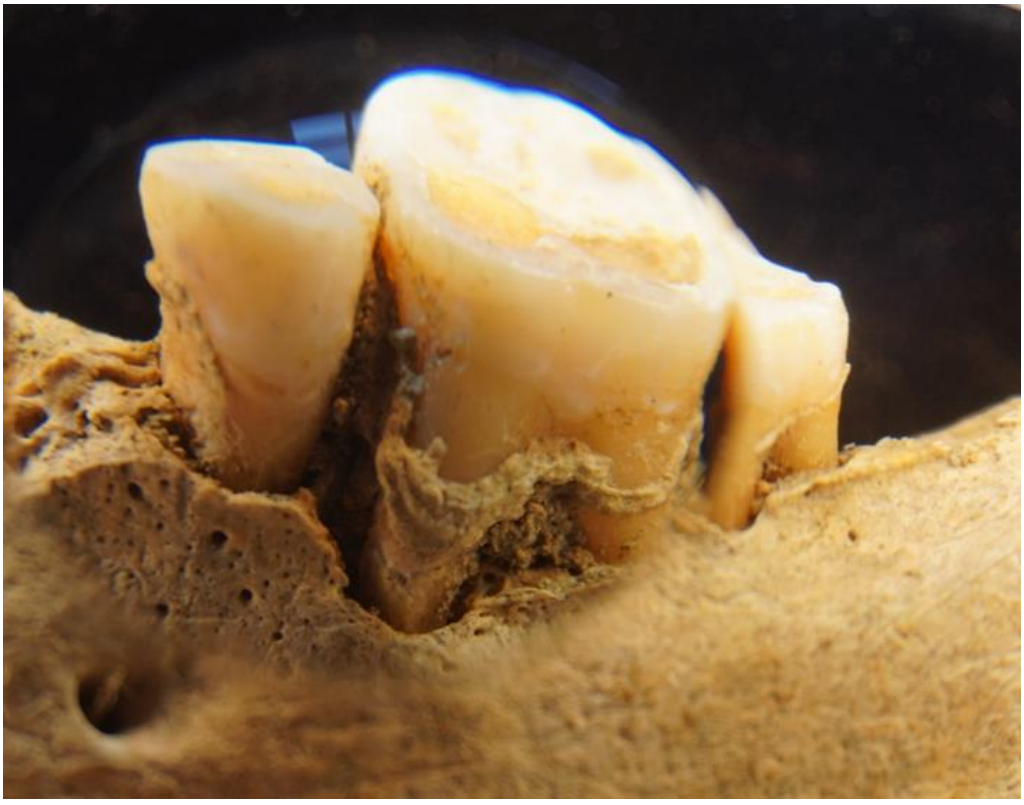

Figure 6.26: Skeleton 2's left mandibular second premolar, first and second molar (photographed through the magnifying glass). Remodelling and porosity of the gumline, together with calculus depositions, indicate periodontal disease.

Figure 7.1: Tree Bole 1 after completion of works and reseeding.

Figure 7.2: Tree Bole 2 after completion of works and reseeding.

Figure 7.3: Tree Bole 3 after completion of works and reseeding.

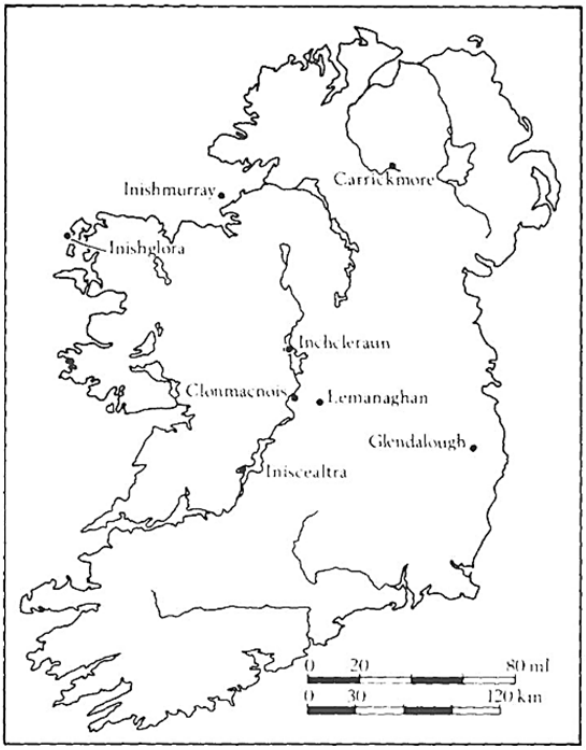

Figure 7.4: Mapping of sites with evidence of women's churches/graveyards (source: Hamlin and Foley 1983, Figure 4)