National Botanic Gardens, Kilmacurragh, Kilbride, Co. Wicklow

Restoration of Kilmacurragh House

Bat Surveys and Ecological Impact Assessment

FINAL REPORT

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1. INTRODUCTION

1.1 Background

In 2022 Faith Wilson Ecological Consultant was commissioned by the Office of Public Works on behalf of the National Botanic Gardens (NBG) to prepare a series of ecological surveys prior to proposed construction works/renovations to Kilmacurragh House at Kilmacurragh, Kilbride, Co. Wicklow.

The renovation will include the reinstatement of the building's roof, the restoration of its windows and doors, and the conservation of external wall finishes – see **Section 1.2**.

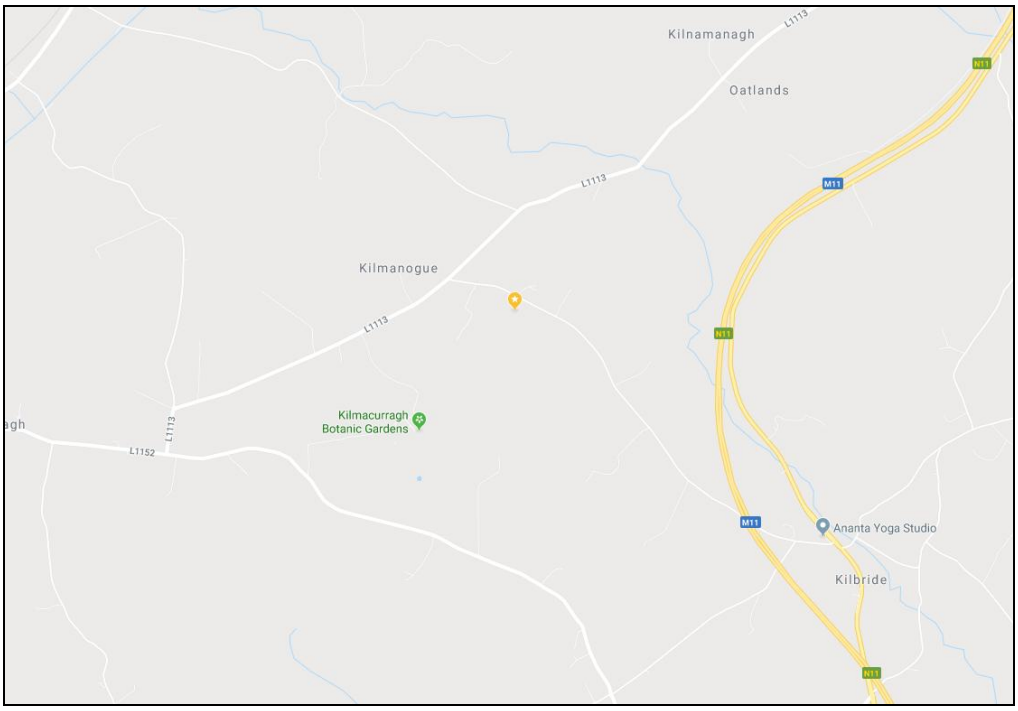

Figure 1. Location of Kilmacurragh, Kilbride, Co. Wicklow.

The aim of the bat and ecological surveys were:

a) To identify any species utilising (or potential species that may use) Kilmacurragh House and to ensure their protection during the proposed restoration works.

b) To determine if a bat derogation licence would be required for the project.

c) To present an outline of potential ecological issues or threats to biodiversity arising from the restoration of the house.

d) To provide recommendations on how species associated with the house can be integrated and managed in a way that enhances the biodiversity of Kilmacurragh House while facilitating its restoration.

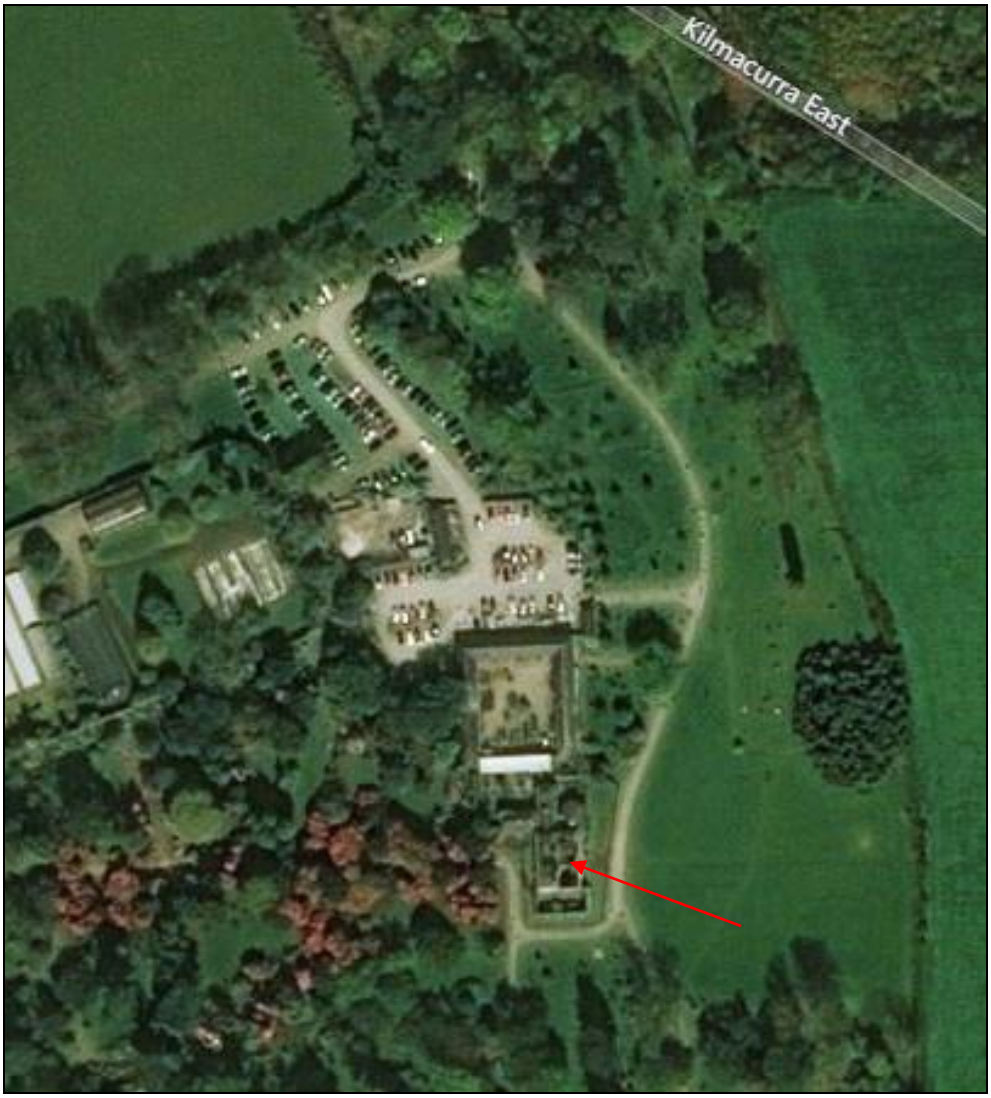

Figure 2. Location of Kilmacurragh House (indicated by the red arrow).

As described by the OPW:

> 'Kilmacurragh House was built by Thomas Acton II (1655-1750) who had the old abbey buildings torn down in 1697 and, from the stone salvaged, he built a fine, perfectly proportioned Queen Anne house to the design of the noted architect, Sir William Robinson (1643-1712), whose best-known work is the Royal Hospital Kilmainham. The five-bay mansion was one of the first unfortified houses of the time in County Wicklow, and is one of the few remaining (albeit in a ruinous state) early panelled houses in Ireland. Comprising five reception rooms and eight bedrooms, the house was perched on a hill facing east, making it a chilly place to be in winter.
>
> Kilmacurragh House was then surrounded by a formal Dutch-style landscape park, following the fashions of the period, and elements

> of this, such as the remains of canals, great avenues, and sweeping vistas, survive in the present garden. Thomas Acton II was also responsible for the Deer Park, an area of forty acres, carved into primeval oak and alder forest, completely surrounded by a six-foot deep ha-ha, and the old paddock walls that now surround the visitor carpark'.

An assessment of the ecological impacts of these proposed works was completed with mitigation measures designed to avoid or reduce these impacts as presented in **Section 5.**

1.2 Project Description

The works at Kilmacurragh House will consist of.

- Structural stabilisation and installation of a new roof to the Central Wing , South Wing and North Kitchen wing of Kilmacurragh House,
- Stabilisation, conservation and roof repairs to the North Wing Roof of the house. Note: that a large portion of the Central Wing Roof is missing, the South Wing Roof no longer exists, the North Wing Roof is partially intact and the Kitchen wing roof is beyond repair.
- All associated required drainage works and works to rainwater goods.
- Stabilisation and repairs to external and internal walls.
- Repair to existing floor structures.
- New floor structures (where no longer existing or replacement required).
- Repair and conservation to existing external joinery (doors, windows etc.)
- Installation of new external joinery required to close building envelope.
- Repair and conservation of the building envelope.
- The installation of a safe access system to maintain the roof.

1.3 Relevant Legislation

1.3.1 Nature Conservation Designations

International Conservation Designations

Special Areas of Conservation (SACs) are habitats of international significance that have been identified by NPWS and submitted for designation to the EU. SAC is a statutory designation, which has a legal basis under the EU Habitats Directive (92/43/EEC) as transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997, which were amended in 1998, 2005 and 2011. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the Court of Justice of the European Union (CJEU) judgements.

A Special Protection Area (SPA) is a statutory designation, which has a legal basis under the EU Birds Directive (79/409/EEC). The primary objective of SPAs is to maintain or enhance the favourable conservation status of the birds for which the SPAs have been designated.

National Conservation Designations
Proposed NHAs are habitats or sites of interest to wildlife that have been identified by NPWS. These sites become NHAs once they have been formally advertised and land owners have been notified of their designation. NHAs are protected under the Wildlife (Amendment) Act, 2000, from the date they are formally proposed. NHA is a statutory designation according to the Wildlife (Amendment) Act, 2000.

1.3.2 Bats

Wildlife Act 1976
In the Republic, under Schedule 5 of the Wildlife Act 1976, all bats and their roosts are protected by law. It is unlawful to disturb either without the appropriate licence. The Act was amended in 2000.

EU Habitat and Species Directive
The EU Directive on the Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species and their habitats, including all species of bats recorded in Ireland which are listed on Annex IV.

Bern and Bonn Convention
Ireland has also ratified two international conventions, which afford protection to bats amongst other fauna. These are known as the 'Bern' and 'Bonn' Conventions.

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), exists to conserve all species and their habitats, including bats.

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries, which covers certain species of bat.

Eleven species of bats occur in Ireland and all are protected under both national and international law. Nine species are resident and have confirmed breeding populations while two species are deemed to be vagrants as set out in **Table 1** below.

<u>Eurobats</u>
This is a Europe-wide (and neighbouring jurisdictions including North Africa and the Middle East) agreement that originates from efforts to apply the Bonn Convention to the protection of bats within areas to which they may migrate from their European summer or winter sites. There are 33 parties (including

Ireland) that have entered into a UN forum to protect the 52 species of bat (based on current knowledge) of Europe.

Table 1. Legal protection and status of the Irish bat fauna.

Common and scientific name	Wildlife Act 1976 & Wildlife (Amendment) Acts 2000 & 2010	Irish Red List status	Habitats Directive	Bern & Bonn Conventions
Common pipistrelle *Pipistrellus pipistrellus*	Yes	Least Concern	Annex IV	Appendix II
Soprano pipistrelle *P. pygmaeus*	Yes	Least Concern	Annex IV	Appendix II
Nathusius' pipistrelle *P. nathusii*	Yes	Not referenced	Annex IV	Appendix II
Leisler's bat *Nyctalus leisleri*	Yes	Near Threatened	Annex IV	Appendix II
Brown long-eared bat *Plecotus auritus*	Yes	Least Concern	Annex IV	Appendix II
Lesser horseshoe bat *Rhinolophus hipposideros*	Yes	Least Concern	Annex II Annex IV	Appendix II
Greater horseshoe bat *Rhinolophus ferruginous*		Data Deficient	Annex II Annex IV	Appendix II
Daubenton's bat *Myotis daubentonii*	Yes	Least Concern	Annex IV	Appendix II
Natterer's bat *M. nattereri*	Yes	Least Concern	Annex IV	Appendix II
Whiskered bat *M. mystacinus*	Yes	Least Concern	Annex IV	Appendix II
Brandt's bat *M. brandtii*	Yes	Data Deficient	Annex IV	Appendix II

Threats to Irish bats:
The principal pressures on Irish bat species have been identified as follows:

- urbanized areas (e.g. light pollution);
- bridge/viaduct repairs;
- pesticides usage;
- removal of hedges, scrub, forestry;
- water pollution;
- other pollution and human impacts (e.g. renovation of dwellings with roosts);
- infillings of ditches, dykes, ponds, pools and marshes;
- management of aquatic and bank vegetation for drainage purposes;
- abandonment of pastoral systems;
- speleology and vandalism;
- communication routes: roads; and
- inappropriate forestry management.

1.3.3 Birds

All nesting birds are legally protected under the Wildlife Acts in Ireland. The Birds of Conservation Concern in Ireland list (Gilbert *et al.* (2021)) identifies species of conservation concern in Ireland while other species (such as Kingfisher, birds of prey, seabirds and waterbirds) are listed under Annex I of the EU Birds Directive and Special Protection Areas (for birds) are designated for them under the Directive.

1.3.4 Vascular Plants

The '*Ireland Red List No. 10: Vascular Plants'* provides an assessment of how many of our plant species are under threat or at risk of extinction on the island of Ireland. A total of 1,211 different plant species (1,047), species aggregates (4), subspecies (157) and hybrids (3) were assessed in the report, ranging from the largest trees to the smallest wild flowers, grasses and ferns. Of the 1,211 vascular plants assessed, 106 (or 8.8%) are assigned an IUCN Red List threat category and are Ireland's Red-listed plants. 20 vascular plants (or 1.7% of those assessed) are Critically Endangered, 25 (2.1%) are Endangered and 61 (5.0%) are Vulnerable.

A number of these red listed plant species are then given legal protection under The Flora (Protection) Order, 2022 (S.I. No. 235 of 2022).

1.3.5 Bryophytes

The Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) also gives legal protection to 65 species of bryophytes in the Republic of Ireland (25 liverworts and 40 mosses).

1.3.6 Invasive Species

The European Communities (Birds and Natural Habitats) Regulations 2011-2021 include legislation on invasive and non-native species in Sections 49 and 50.

The EU Regulation on Invasive Alien Species (EU Regulation 1143/2014) also came into force on the 3rd August 2016.

The plant and animal species to which the Birds and Natural Habitats Regulations (2011 – 2021) apply are presented in Schedule Three. Part 1 details the plants species, while Part 3 outlines those animal or plant vector materials and are presented below.

Third Schedule: Part 1 Plants

Non-native species subject to restrictions under Regulations 49 and 50.

First column	Second column	Third column
Common name	**Scientific name**	**Geographical application**
American skunk-cabbage	*Lysichiton americanus*	Throughout the State
A red alga	*Grateloupia doryphora*	Throughout the State
Brazilian giant-rhubarb	*Gunnera manicata*	Throughout the State
Broad-leaved rush	*Juncus planifolius*	Throughout the State
Cape pondweed	*Aponogeton distachyos*	Throughout the State
Cord-grasses	*Spartina* (all species and hybrids)	Throughout the State
Curly waterweed	*Lagarosiphon major*	Throughout the State
Dwarf eel-grass	*Zostera japonica*	Throughout the State
Fanwort	*Cabomba caroliniana*	Throughout the State
Floating pennywort	*Hydrocotyle ranunculoides*	Throughout the State
Fringed water-lily	*Nymphoides peltata*	Throughout the State
Giant hogweed	*Heracleum mantegazzianum*	Throughout the State
Giant knotweed	*Fallopia sachalinensis*	Throughout the State
Giant-rhubarb	*Gunnera tinctoria*	Throughout the State
Giant salvinia	*Salvinia molesta*	Throughout the State
Himalayan balsam	*Impatiens glandulifera*	Throughout the State
Himalayan knotweed	*Persicaria wallichii*	Throughout the State
Hottentot-fig	*Carpobrotus edulis*	Throughout the State
Japanese knotweed	*Fallopia japonica*	Throughout the State
Large-flowered waterweed	*Egeria densa*	Throughout the State
Mile-a-minute weed	*Persicaria perfoliata*	Throughout the State
New Zealand pigmyweed	*Crassula helmsii*	Throughout the State
Parrot's feather	*Myriophyllum aquaticum*	Throughout the State
Rhododendron	*Rhododendron ponticum*	Throughout the State
Salmonberry	*Rubus spectabilis*	Throughout the State
Sea-buckthorn	*Hippophae rhamnoides*	Throughout the State
Spanish bluebell	*Hyacinthoides hispanica*	Throughout the State
Three-cornered leek	*Allium triquetrum*	Throughout the State
Wakame	*Undaria pinnatifida*	Throughout the State
Water chestnut	*Trapa natans*	Throughout the State
Water fern	*Azolla filiculoides*	Throughout the State
Water lettuce	*Pistia stratiotes*	Throughout the State
Water-primrose	*Ludwigia* (all species)	Throughout the State
Waterweeds	*Elodea* (all species)	Throughout the State
Wireweed	*Sargassum muticum*	Throughout the State

EU Regulation 1143/2014 on Invasive Alien Species

On 14 July 2016 the European Commission published Commission Implementing Regulation 2016/1141 which set out an initial list of 37 species to which the EU Invasive Alien Species Regulation 1143/2014 applies. The associated restrictions and obligations came into force on 3rd August 2016.

Three distinct types of measures are envisaged under the Directive, which follow an internationally agreed hierarchical approach to combatting IAS:

- Prevention: a number of robust measures aimed at preventing IAS of Union concern from entering the EU, either intentionally or unintentionally.
- Early detection and rapid eradication: Member States must put in place a surveillance system to detect the presence of IAS of Union concern as early as possible and take rapid eradication measures to prevent them from establishing.

- Management: some IAS of Union concern are already well-established in certain Member States and concerted management action is needed so that they do not spread any further and to minimize the harm they cause.

Plant species listed on the directive include:

- American skunk cabbage *Lysichiton americanus*
- Asiatic tearthumb *Persicaria perfoliata* (*Polygonum perfoliatum*)
- Curly waterweed *Lagarosiphon major*
- Eastern Baccharis *Baccharis halimifolia*
- Floating pennywort *Hydrocotyle ranunculoides*
- Floating primrose willow *Ludwigia peploides*
- Green cabomba *Cabomba caroliniana*
- Kudzu vine *Pueraria lobata*
- Parrot's feather *Myriophyllum aquaticum*
- Persian hogweed *Heracleum persicum*
- Sosnowski's hogweed *Heracleum sosnowskyi*
- Water hyacinth *Eichhornia crassipes*
- Water primrose *Ludwigia grandiflora*
- Whitetop weed *Parthenium hysterophorus*

Animal species listed on the directive include:

- Amur sleeper *Perccottus glenii*
- Asian hornet *Vespa velutina*
- Chinese mitten crab *Eriocheir sinensis*
- Coypu *Myocastor coypus*
- Fox squirrel *Sciurus niger*
- Grey squirrel *Sciurus carolinensis*
- Indian house crow *Corvus splendens*
- Marbled crayfish *Procambarus* spp.
- Muntjac deer *Muntiacus reevesii*
- North american bullfrog *Lithobates (Rana) catesbeianus*
- Pallas's squirrel *Callosciurus erythraeus*
- Raccoon *Procyon lotor*
- Red swamp crayfish *Procambarus clarkii*
- Red-eared terrapin/slider *Trachemys scripta elegans*
- Ruddy duck *Oxyura jamaicensis*
- Sacred ibis *Threskiornis aethiopicus*
- Siberian chipmunk *Tamias sibiricus*
- Signal crayfish *Pacifastacus leniusculus*
- Small Asian mongoose *Herpestes javanicus*
- South American coati *Nasua nasua*
- Spiny-cheek crayfish *Orconectes limosus*
- Topmouth gudgeon *Pseudorasbora parva*
- Virile crayfish *Orconectes virilis*

On 13 July 2017 the European Commission published Commission Implementing Regulation 2017/1263 which added a further 12 species to the current list of 37 species regulated under the EU Invasive Alien Species Regulation (1143/2014).

These are:

Plant species

- Alligator weed (*Alternanthera philoxeroides*)
- Milkweed (*Asclepias syriaca*)
- Nuttall's waterweed (*Elodea nuttallii*)
- Chilean rhubarb (*Gunnera tinctoria*)
- Giant hogweed (*Heracleum mantegazzianum*)
- Himalayan balsam (*Impatiens glandulifera*)
- Japanese stiltgrass (*Microstegium vimineum*)
- Broadleaf watermilfoil (*Myriophyllum heterophyllum*)
- Crimson fountaingrass (*Pennisetum setaceum*)

Animal species

- Egyptian goose (*Alopochen aegyptiacus*)
- Raccoon dog (*Nyctereutes procyonoides*)
- Muskrat (*Ondatra zibethicus*)

The associated restrictions and obligations came into force from 2 August 2017 for all these species apart from the Raccoon dog, which came into force on 2 February 2019.

Other Invasive Species

The main guidance document that has been prepared dealing with invasive species/noxious weeds on sites is the NRA *'Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads'* which was published in 2010. This document and the subsequent TIII Guidelines (2020) detail other non-native species of note and provide recommendations on how to manage or control them.

A detailed survey for all of these invasive species was conducted in 2023 within the environs of Kilmacurragh House to ensure the works do not result in their spread – see results in **Section 3.2**.

2. METHODOLOGY

The survey was commissioned by the OPW in early February 2022 and the desktop study commenced on foot of same.

The study included surveys of:

- breeding birds that use the house for nesting purposes
- bats that may use the house for roosting purposes or the adjoining lands for foraging or commuting purposes
- the flora of the walls and wall tops of the house and surrounding habitats
- the bryophyte and liverwort flora of the walls of the house
- the presence of any invasive species to be cognisant of during the works.

Further details on the results of each of these studies are presented below.

2.1 Desk Study and Consultation

A desk study was carried out to collate the available information on the ecological environment of Kilmacurragh House.

The National Parks and Wildlife Service (NPWS) of the Department of Housing, Local Government and Heritage (DHLGH) database of designated conservation areas and NPWS records of rare and protected plant species as those listed under the Irish Red List - Vascular Plants (Wyse Jackson, *et al.* 2016) were checked with regard to the location of Kilmacurragh House.

Consideration was given to the potential presence of other flora and fauna as defined under the following legislative instruments and red data books:

- species protected under the **Wildlife Act (1976 (amended 2000)),** such as bats, badger, pine marten and common frog,
- vascular plant species listed under the **Flora (Protection) Order (2022)**,
- vascular plant species listed in the **Irish Red List for Vascular Plants**[1].
- bryophyte species listed under the **Flora (Protection) Order (2022)**,
- bird species listed under the '**Birds of Conservation Concern in Ireland**' document[2],
- mammals listed in the **Irish Red List for Terrestrial Mammals**[3],
- amphibians and reptiles listed in the **Irish Red List for Amphibians, Reptiles & Freshwater Fish** [4],
- invasive species listed under Schedule 3 of the **'Birds and Natural Habitats Regulations 2011'** and the **EU Regulation on Invasive Alien Species (EU Regulation 1143/2014**[5].

Information on protected species of fauna and flora listed for protection under Annex II of the EU Habitats Directive (92/43/EEC), Annex I of the Birds Directive (79/409/EEC) and the Wildlife (Amendment) Act (2000) was also sought from NPWS and published sources.

A review of data held by the National Biodiversity Data Centre was also completed.

Previous studies of the site were also reviewed.

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[1] Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016). Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

[2] Gilbert G, Stanbury A and Lewis L.J. (2021). Gilbert G, Stanbury A and Lewis L.J. 2021. Birds of Conservation Concern in Ireland 2020 –2026. Irish Birds 43, 1-22.

[3] Marnell, F., Looney, D. & Lawton, C. (2019). Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

[4] King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011). Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

[5] S.I. No. 477 of 2011. The European Communities (Birds and Natural Habitats) Regulations 2011. Irish Government, Government Publications Office, Molesworth Street, Dublin 2.

2.2 Field Surveys - Habitat & Botanical Survey

The habitats immediately adjoining Kilmacurragh House were described to level three using the Heritage Council Guide to Habitats of Ireland (Fossitt (2000)). Plant species within the site were identified using Parnell and Curtis (2012).

A particular focus of the surveys was to determine if any protected species of plant listed under the Flora (Protection) Order (2022) or listed in the red list of the Ireland Red List No. 10: Vascular Plants were present on the site or if any of the habitats present correspond to any of the habitats listed under Annex I of the EU Habitats Directive.

Invasive species present in the site were also identified and mapped if present. A particular focus of the surveys was for those invasive species listed under the Birds and Natural Habitats Regulations 2011, the EU Invasive Species Directive or in the NRA Guidance within the proposed works area.

2.3 Field Surveys – Bryophytes & Vascular Plants on the House

Vascular Plants
In advance of the opening up works, protection works, removal of salvage material, and final erection of scaffolding within the building the vegetation on the walls and parapets of the house was documented by Faith Wilson.

Bryophytes
Dr Joanne Denyer (Denyer Ecology) was commissioned by Faith Wilson to undertake a bryophyte of Kilmacurragh House, Co. Wicklow. The survey area included the old house ruin (where accessible), but not the gardens.

The following resources were consulted as part of the desktop survey:

- British Bryological Society Atlas of British and Irish bryophytes (Blockeel et al., 2014a & 2014b).
- British Bryological Society Atlas dataset.
- Bryophyte records from British Bryological Society summer meeting 2018, Co. Wicklow.

All accessible areas of the house and adjacent walls were walked over and surveyed in July 2022. It was possible to use the scaffolding and ladders inside the house to survey the higher house levels in some areas. On the outside of the house the survey was restricted to accessible lower areas of the house wall and the basement walls. All bryophyte species encountered were recorded and a small sample taken if the species required microscope identification confirmation.

Vascular plant nomenclature follows that of the *New Flora of the British Isles*. 4th Edition (Stace, 2019). The bryophyte nomenclature adopted by Blockeel *et al.* (2021) is used.

All accessible areas of the house were surveyed, including inside the house in areas where safe access was possible. This covered the main important bryophyte habitats within the house and is not considered a limitation. The survey was undertaken after a long period of dry weather and the bryophytes were very dry. A spray bottle was used to wet species for examination. However, it is possible that some species may have been missed if they had not survived the dry weather.

2.4 Field Surveys - Mammals

The faunal surveys were carried out by an experienced mammal specialist (Faith Wilson) in accordance with best practice as described in the 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (NRA 2009) and 'Guidelines for the treatment of badgers prior to the construction of National Road Schemes' (NRA 2005).

The survey was undertaken in the immediate environs of Kilmacurragh House where the works are proposed and aimed to identify any mammal species using this part of the property and to provide recommendations to provide continued protection for these species into the future.

A speedy and productive means of determining the mammal fauna within a site is to walk the area concerned, paying particular attention to all hedgerow, woodland, watercourses, fence lines, paths etc. to locate mammal signs. These include otter holts, badger setts, old bedding material, feeding signs, latrines, tracks or paw prints, badger paths and badger hair caught on vegetation or fences. While the main emphasis was on protected species, all mammal observations were recorded for completeness.

2.5 Field Surveys - Birds

In advance of the opening up works, protection works, removal of salvage material, and final erection of scaffolding within the building observations of any early nesting birds and breeding activity was completed on the 21st June 2022 to ensure that areas in the building used by birds (including area of vegetation such as dense ivy on the walls) was documented and these areas were then avoided during the works and retained.

A breeding bird survey of the house was then completed during the breeding bird season in 2022 and observations of various species using the buildings for nesting purposes were made. Bird identification follows Mullarney *et al* (2009)[6]. All birds seen and heard were noted, and the breeding species were recorded. Other observations of nesting bird activity by NBG staff members are also summarised within this report.

[6] Mullarney, K., Svensson, L., Zetterstrom, D. and P. Grant (1999). Collins Bird Guide - The Most Complete Guide to the Birds of Britain and Europe. Collins Bird Guide. Collins.

2.6 Field Surveys - Bats

A specialised bat survey was commissioned to determine the potential for/confirm the use of the House and Tunnel for roosting by bats and to inform any mitigation measures required.

This survey built on previous surveys, some of which have been completed by Faith Wilson, and observations of bats by NBG staff members. These are summarised within this report.

The aim of the bat survey was to:

a) To determine what species of bats are known from Kilmacurragh Demesne and the immediate environs.
b) To identify any roosting sites in Kilmacurragh House and to ensure the safeguarding of bats during the proposed building works and building renovation.
c) To identify any roosting sites in the Tunnel at the front of Kilmacurragh House and to ensure the safeguarding of bats during the works.
d) To raise awareness to ensure that bats are considered in any further works at Kilmacurragh including restoration works to buildings within the gardens and any tree surgery/remedial works proposed to trees within the grounds.

The bat survey consisted of several elements:

- Desk Study and Consultation
- Review of Previous Bat Surveys
- Detector surveys (including a hibernation study)

Bat Surveys have taken place over many years – 2022, 2023, 2024 and 2025 as detailed below.

2022 and 2023

The bat survey was initially commissioned by the OPW in February 2022, which is outside the recommended time period for bat activity surveys as bats are in hibernation as can be seen on **Figure 3** below (Source: NPWS Bat Mitigation Guidelines) however it was within the suitable period for hibernation studies – see **Section 2.6.1** below. The results of this hibernation survey are presented in **Section 3.4.3** and **3.4.4**.

This survey was followed up with a detector survey to record emergence from the house and bat activity in the general environs of the house in July 2022 and May 2023 - see **Section 2.6.2** below. This is within the summer maternity period and the results of these surveys are presented in **Section 3.4.5** and **3.4.6**.

The building was physically inspected over the course of several site visits - see **Section 2.6.3** below. The results of these surveys are presented in **Section 3.4**.

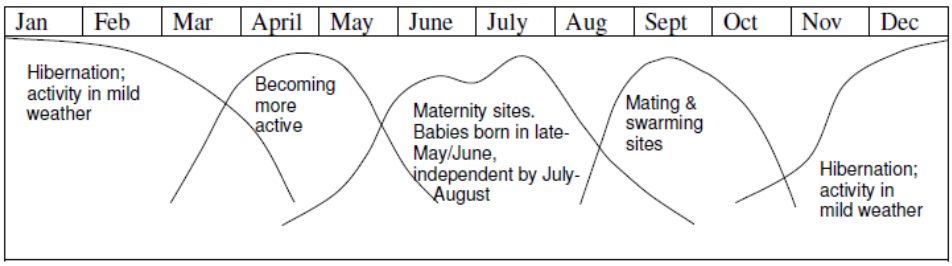


Figure 8. The bat year. Although there are species-specific differences, the bat year can be divided into the two major phases of breeding and hibernation, with other activities interspersed.

Figure 3. The Bat Year.

Table 2 within that same document is also presented below, which outlines the appropriate months for bat surveys.

Table 2. The applicability of survey methods. (Source: NPWS Bat Mitigation Guidelines).

Season	Roost Type	Inspection	Bat detectors and emergence counts
Spring (Mar – May)	Building	Suitable (signs, perhaps bats)	Limited, weather dependent
	Trees	Difficult (best for signs before leaves appear)	Very limited, weather dependent
	Underground	Suitable (signs only)	Static detectors may be useful
Summer (June-August	Building	Suitable (signs and bats)	Suitable
	Trees	Difficult	Limited; use sunrise survey
	Underground	Suitable (signs only)	Rarely useful
Autumn (September – November)	Building	Suitable (signs and bats)	Limited, weather dependent
	Trees	Difficult	Rather limited, weather dependent; use sunrise survey?
	Underground	Suitable (signs, perhaps bats)	Static detectors may be useful
Winter (December - February)	Building	Suitable (signs, perhaps bats))	Rarely useful
	Trees	Difficult (best for signs after leaves have gone)	Rarely useful
	Underground	Suitable (signs and bats)	Static detectors may be useful

2.6.1 Hibernation Study – 2022

The bat surveys began on the 16th March 2022 with a site visit in the company of the head gardener at Kilmacurragh when the tunnel in front of the house was accessed and visually inspected for signs or observations of hibernating bats. A remote monitoring static bat detector (A Song Meter Mini 2) was deployed in the tunnel in front of the house to determine if it was being used as a bat hibernation site. The detector was retrieved on the 21st April 2022 and the calls analysed using Kaleidoscope pro.

2.6.2 Bat Emergence and Activity Surveys 2022

Emergence studies from the house were completed on the 28th July 2022 and any recordings made using the Echometer Touch Pro 2 were analysed using Kaleidoscope Pro.

2.6.3 Bat Emergence and Activity Surveys 2023

A remote monitoring static bat detector (A Song Meter Mini 2) was deployed in the kitchen garden beside the Kitchen Wing of the house as shown on **Figure 4** below on 24th May 2023. The detector was retrieved on 29th May 2023 and the calls analysed using Kaleidoscope pro.

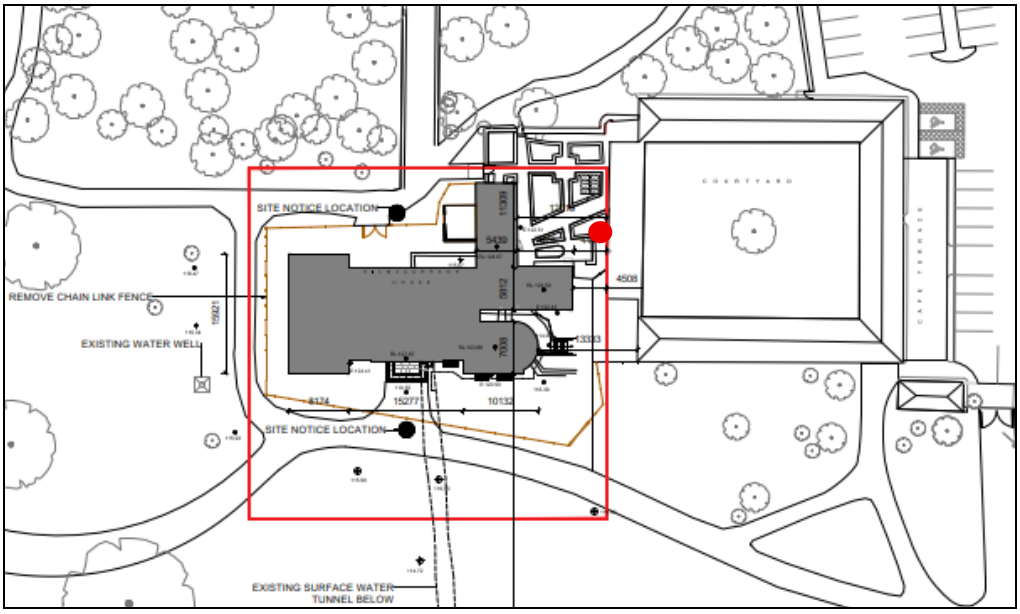


Figure 4. Location of static detector in the Kitchen Garden at Kilmacurragh between the 24th and 29th May 2023.

2.6.4 Bat Emergence and Activity Surveys 2024

Two remote monitoring static bat detectors (A Song Meter Mini 2) were deployed on the 1st August 2024 – one was located at the front of the house and one at the rear as indicated on **Figure 5** below.

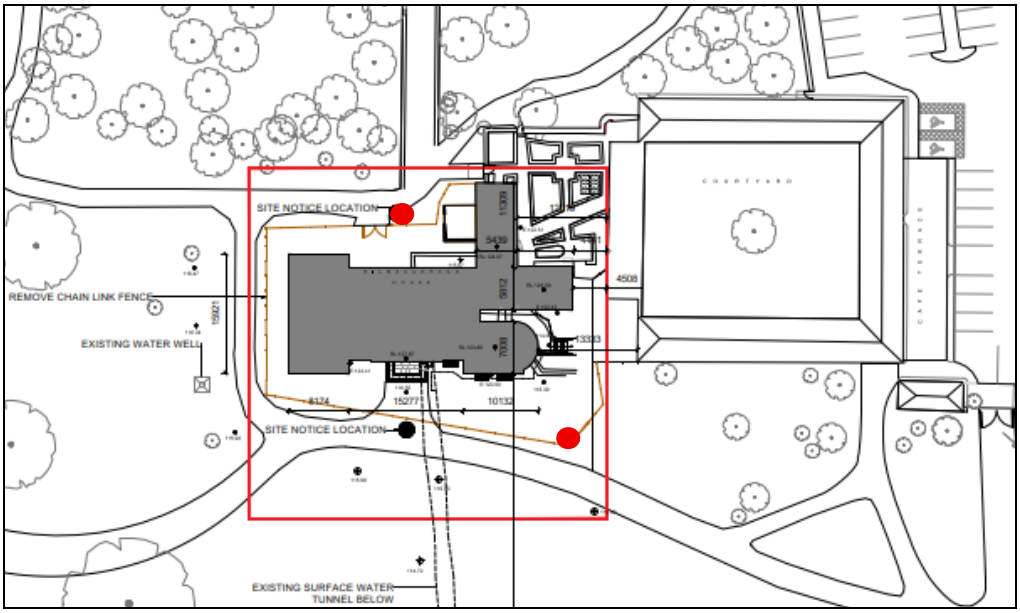


Figure 5. Location of static detectors at Kilmacurragh on 1st August 2024.

In light of the restricted view of the eastern side of the Kitchen Wing a static detector was deployed in the Kitchen Garden, between the 12th and 19th August 2024 as shown on **Figure 6** below.

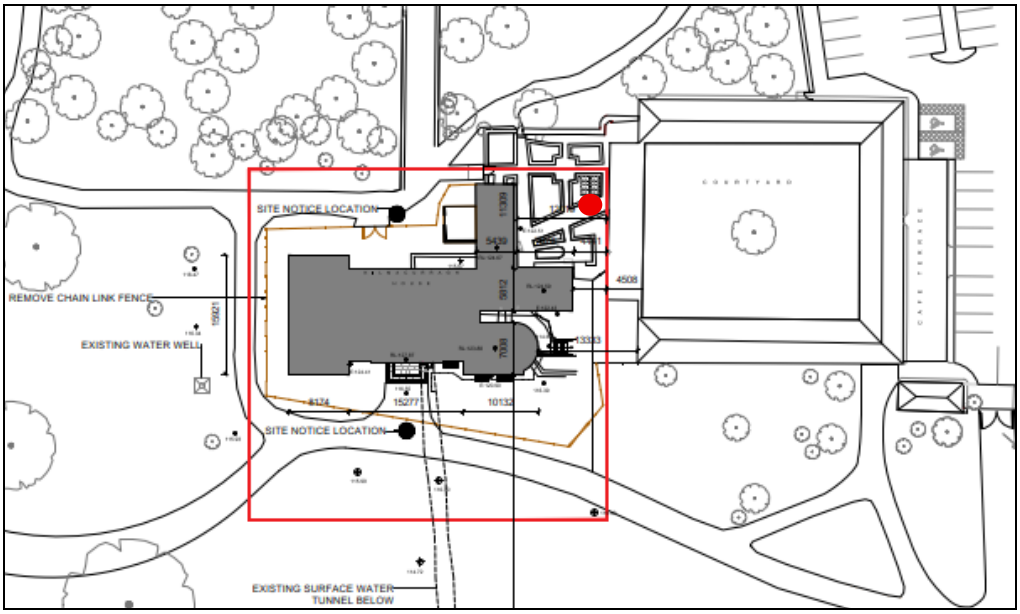


Figure 6. Location of static detector in the Kitchen Garden at Kilmacurragh between the 12th and 19th August 2024.

2.6.5 Bat Emergence and Activity Surveys 2025

An emergence survey was completed on the 23rd June 2025, which was completed by Faith Wilson. This survey combined the use of emergence observations and walking transects with an Echometer Touch 2 Pro.

An additional emergence survey was conducted on the 17th of July 2025 by Faith Wilson and John Curtin. This survey consisted of 4 Night Vision Aids (NVAs) surveying the southern portion of the complex, where the roof structure is heavily deteriorated. NVAs were positioned where the highest roost potential was found, based on the results of the previous surveys and a daylight inspection of roost features. The locations are shown on **Figure 7** below and were as follows;

- Location 1: located at the bullnose to the front of the site,
- Location 2: looking towards the front face of the house,
- Location 3: facing towards the kitchen complex and the rear of the house
- Location 4: facing the kitchen wing roof and renovated kitchen garden wall.

Each NVA was setup with an ultrasonic detector, either an Echometer Touch Pro 2 or a Song Meter Mini to ensure full audio-visual coverage of the survey area. A walking transect survey was also completed with an Echometer Touch 2 Pro.

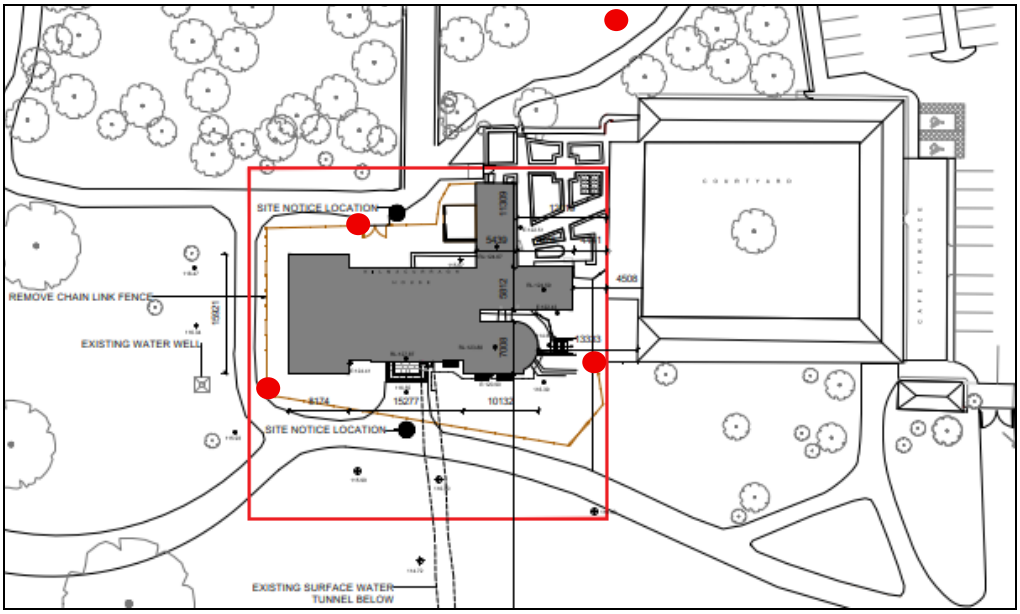


Figure 7. Location of Night Vision Aids and accompanying ultrasonic detectors on 17th of July 2025.

2.6.6 Building Inspections

The building was inspected on several occasions over the course of the study once access to the property via scaffolding had been facilitated. Suitable roosting locations within stonework were examined visually for signs of bats or inspected with an endoscope.

Bat activity in buildings or structures is usually detected by the following signs (though direct observations are also occasionally made):

- bat droppings (these will accumulate under an established roost or under access points);
- insect remains (under feeding perches);
- oil (from fur) and urine stains;
- scratch marks; and
- bat corpses.

2.7 Survey Constraints

The attic/roof spaces in the eastern section of the house – the Kitchen Wing and above the Bullnose could not be safely accessed for physical inspection purposes.

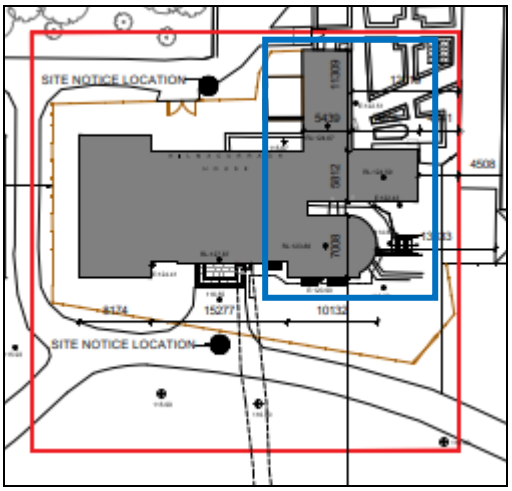


Figure 8. Locations unable to be safely accessed shown in blue.

These are the only parts of Kilmacurragh House in which the roof remains somewhat intact offering a potential roosting space for bats.

3. RESULTS

3.1 Desktop Research and Consultation

A search for records from within the Kilmacurragh Estate was made on the National Biodiversity Data Centre (NBDC) mapping system as shown on **Figure 9** below.

Figure 9. National Biodiversity Data Centre Query.

The NBDC hold 174 records from Kilmacurragh including records of birds, plants, butterflies, dragonflies and moths. These are presented in **Appendix 1**.

3.2 Botanical Surveys - Vascular Plants

The land surrounding Kilmacurragh House inside the security fence consists of mown grassland which is akin to the habitat **GS2 dry meadows and grassy verges**. Species recorded here in the sward included Bird's-foot trefoil (*Lotus corniculatus*), Mouse ear chickweed (*Cerastium fontanum*), Sheep's sorrel (*Rumex acetosella*), Yellow clover (*Trifolium dubium*), Bush vetch (*Vicia sepium*), Spear thistle (*Cirsium vulgare*), Common vetch (*Vicia sativa*), Red clover (*Trifolium pratense*), Broad-leaved willowherb (*Epilobium montanum*), common corn salad (*Valerianella locusta*), Germander speedwell (*Veronica chamaedrys*), Field wood-rush (*Luzula campestris*), Sweet vernal grass (*Anthoxanthum odoratum*), Red fescue (*Festuca rubra*) and Yorkshire fog (*Holcus lanatus*).

The dominant species recorded on much of the walls of the house (which correspond to the habitat **Buildings and other artificial surfaces BL3**) was Ivy (*Hedera helix*) alongside Ivy-leaved toadflax (*Cymbalaria muralis*) and the fern Maidenhair spleenwort (*Asplenium trichomanes*).

Other climbers on the house included native Honeysuckle (*Lonicera periclymenum*), and Ivy of Uruguay (*Cissus striata*). The latter are South American plants which were supplied to the Acton's by the Veitch Nursery. This material had been collected from the wild in Chile (Seamus O'Brien, pers. comm.).

Photo 1. Mown grassland surrounding the house with abundant Giant viper's bugloss.

Photo 2. Ivy of Uruguay (*Cissus striata*) and native Honeysuckle (*Lonicera periclymenum*) on the house.

Other species which were recorded near the base of the walls include; Scarlet pimpernel (*Anagallis arvensis*), Hairy tare (*Vicia hirsuta*), Creeping jenny (*Lysimachia nummularia*), Ribwort plantain (*Plantago lanceolata*), Herb Robert

(*Geranium robertianum*), Barren strawberry (*Potentilla sterilis*), Cleavers (*Galium aparine*), Ivy–leaved toadflax, Hairy bitter cress (*Cardamine hirsuta*), Wavy bitter cress (*Cardamine flexuosa*), Dandelion (*Taraxacum* agg.), Daisy (*Bellis perennis*), Hawkbit (*Leontodon* sp.), White clover (*Trifolium repens*), Groundsel (*Senecio vulgaris*), Nettle (*Urtica dioica*), Wild carrot (*Daucus carota*), Creeping buttercup (*Ranunculus repens*), Field wood-rush (*Luzula campestris*), Bramble (*Rubus fruticosus* agg.), Tutsan (*Hypericum androsaemum*), Yellow rattle (*Rhinanthus minor*), Red fescue (*Festuca rubra*) and Yorkshire fog (*Holcus lanatus*) and plants of Sally willow (*Salix cinerea*), Elder (*Sambuccus nigra*), and Spotted laurel (*Aucuba japonica*).

Garden escapes noted at the base of the walls included; Great honey flower (*Melianthus major*), Bear's breeches (*Acanthus mollis*), Goldencup St. John's wort (*Hypericum patulum*), Caster bean (*Ricinus communis*), Black Parsley (*Melanoselinum decipiens*) and abundant Giant viper's bugloss (*Echium pininana*).

Species recorded on the tops of the walls of the house included Pheasantberry (*Leycesteria formosa*), Bracken (*Pteridium aquilinum*), Dandelion, Bramble, Perennial rye-grass (*Lolium perenne*), Yorkshire fog and seedlings of Sycamore (*Acer pseudoplatanus*), Yew (*Taxus baccata*), Western red cedar (*Thuja plicata*), Holly (*Ilex aquifolium*), and Ash (*Fraxinus excelsior*). There were also good populations of Common polypody fern (*Polypodium vulgare*) on the walls. Alongside the bryophyte species detailed in **Section 3.3** below species such as Hart's tongue fern (*Phyllitis scolopendrium*), and Fringe cups (*Tellima grandiflora*).

Within the house opportunistic species such as Enchanters' nightshade (*Circaea lutetiana*), Cleavers, Herb Robert, Yorkshire fog, Wavy bitter cress, Hairy bitter cress have become established on the detritus and soil on the floor.

No invasive species as detailed in **Section 1.3.6** were identified however the invasive nature of the Giant viper's bugloss *Echium pininana* is noted. This species has become established in the wild on the Howth Peninsula where it is causing an issue on the cliffs.

Photo 3. Vegetation on the wall tops of the house.

Photo 4. Vegetation on the wall tops of the house.

Photo 5. Common polypody fern on the house.

Photo 6. Ivy-leaved toadflax.

Photo 7. Fern and moss rich walls of the basement passageway.

3.3 Botanical Surveys - Bryophytes

3.3.1 British Bryological Society (BBS) Bryophyte recording meeting 2018 (desktop data)

In 2018 a group of bryologists on a BBS meeting in Co. Wicklow (organised by Joanne Denyer) visited the gardens and undertook a survey of the gardens. This did not include Kilmacurragh House as this was not accessible. A total of 69 species were recorded in 2018 (**Table 3**), which is a moderate to high diversity for a small area largely on acid soils.

The only other historic record for Kilmacurragh Gardens is a 2007 record of *Orthotrichum stramineum* on an 'SW-facing trunk of ash tree near stream, at edge of arboretum' (BBS Atlas dataset). This species was also recorded in 2018 within the gardens and is becoming more frequent in Co. Wicklow.

Table 3. Bryophyte species recorded from Kilmacurragh Gardens (2018).

Species name	Previous name	Group
Amblystegium serpens		Moss
Atrichum undulatum		Moss
Barbula unguiculata		Moss
Brachythecium rutabulum		Moss
Bryum capillare		Moss
Bryum dichotomum		Moss
Calliergonella cuspidata		Moss
Campylopus introflexus		Moss
Ceratodon purpureus		Moss
Cirriphyllum piliferum		Moss
Dicranella heteromalla		Moss
Dicranum scoparium		Moss
Didymodon fallax		Moss
Didymodon insulanus		Moss
Eurhynchium striatum		Moss
Fissidens bryoides		Moss
Fissidens taxifolius		Moss
Grimmia trichophylla		Moss
Heterocladium heteropterum		Moss
Homalothecium sericeum		Moss
Hookeria lucens		Moss
Hypnum andoi		Moss
Hypnum cupressiforme var. *cupressiforme*		Moss
Hypnum cupressiforme var. *resupinatum*		Moss
Isothecium alopecuroides		Moss
Isothecium myosuroides var. myosuroides		Moss
Kindbergia praelonga		Moss
Mnium hornum		Moss
Neckera complanata		Moss
Neckera pumila		Moss
Orthodontium lineare		Moss
Lewinskya affinis	*Orthotrichum affine*	Moss
Pulvigera lyellii	*Orthotrichum lyellii*	Moss
Orthotrichum stramineum		Moss
Lewinskya striata	*Orthotrichum striatum*	Moss
Oxyrrhynchium hians		Moss
Plagiomnium undulatum		Moss
Plagiothecium succulentum		Moss
Plenogemma phyllantha	*Ulota phyllantha*	Moss
Pogonatum aloides		Moss
Polytrichum formosum	*Polytrichastrum formosum*	Moss
Pseudotaxiphyllum elegans		Moss
Racomitrium heterostichum		Moss
Rhynchostegium riparioides	*Platyhypnidium riparioides*	Moss
Rhizomnium punctatum		Moss

Species name	Previous name	Group
Rhynchostegiella tenella		Moss
Rhytidiadelphus squarrosus		Moss
Thamnobryum alopecurum		Moss
Thuidium tamariscinum		Moss
Tortula muralis		Moss
Trichostomum crispulum		Moss
Weissia controversa var. *controversa*		Moss
Calypogeia arguta		Liverwort
Cephalozia bicuspidata		Liverwort
Cephalozia lunulifolia		Liverwort
Frullania dilatata		Liverwort
Lophocolea bidentata		Liverwort
Lunularia cruciata		Liverwort
Marchantia polymorpha subsp. *ruderalis*		Liverwort
Metzgeria furcata		Liverwort
Metzgeria violacea		Liverwort
Pellia endiviifolia		Liverwort
Pellia epiphylla		Liverwort
Plagiochila porelloides		Liverwort
Preissia quadrata		Liverwort
Radula complanata		Liverwort
Scapania irrigua		Liverwort
Scapania nemorea		Liverwort
Solenostoma gracillimum		Liverwort

3.3.2 Bryophyte Survey 2022

In the 2022 survey of Kilmacurragh House, 31 species were recorded from the house and associated walls and basement (**Table 4**). Of these, 12 were newly recorded for the site (i.e., not recorded in the 2007 or 2018 surveys of the gardens). These are: *Bryoerythrophyllum recurvirostrum, Cratoneuron filicinum, Didymodon rigidulus, Didymodon tophaceus, Fissidens dubius, Gyroweisia tenuis, Homalothecium lutescens, Leptobryum pyriforme, Schistidium crassipilum, Streblotrichum convolutum* var. *convolutum, Streblotrichum convolutum* var. *commutatum* and *Syntrichia montana.* The main bryophyte habitats were dry and damp stonework and concrete (**Photo 8**), with some additional species on areas of disturbed soil. Most species were recorded from the damp basement walls and mortar on the north and eastern side of the house (e.g., **Photos 9** and **10**). Of the bryophytes recorded from the damp basement walls the most notable records are the mosses *Gyroweissia tenuis* (**Photo 11**) and *Leptobryum pyriforme* (**Photo 12**) (2nd record for Co. Wicklow for both species) and liverwort, *Marchantia quadrata* (3rd record for Co. Wicklow). In total, 81 bryophyte species have been recorded from the house and gardens, with 38% (31 species) recorded from the house and associated walls alone.

Table 4. Bryophyte species recorded from Kilmacurragh House (2022).

Species name	Previous name	Group
Amblystegium serpens		Moss
Streblotrichum convolutum var. *convolutum*	*Barbula convoluta* var. *convoluta*	Moss
Streblotrichum convolutum var. *commutatum*	*Barbula convoluta* var. *sardoa*	Moss
Barbula unguiculata		Moss

Species name	Previous name	Group
Brachythecium rutabulum		Moss
Bryoerythrophyllum recurvirostrum		Moss
Bryum capillare		Moss
Calliergonella cuspidata		Moss
Cratoneuron filicinum		Moss
Didymodon insulanus		Moss
Didymodon rigidulus		Moss
Didymodon tophaceus		Moss
Fissidens dubius		Moss
Fissidens taxifolius		Moss
Gyroweisia tenuis		Moss
Homalothecium lutescens		Moss
Homalothecium sericeum		Moss
Kindbergia praelonga		Moss
Leptobryum pyriforme		Moss
Neckera complanata		Moss
Oxyrrhynchium hians		Moss
Rhynchostegiella tenella		Moss
Schistidium crassipilum		Moss
Syntrichia montana		Moss
Thamnobryum alopecurum		Moss
Tortula muralis		Moss
Trichostomum crispulum		Moss
Lunularia cruciata		Liverwort
Marchantia polymorpha subsp. *ruderalis*		Liverwort
Metzgeria furcata		Liverwort
Pellia endiviifolia		Liverwort
Marchantia quadrata	*Preissia quadrata*	Liverwort

Summary

- A bryophyte survey was undertaken of Kilmacurragh House in July 2022.
- 31 species were recorded from the house and associated walls.
- 12 species were recorded new to the site (house and gardens).
- Species which are rare in Co. Wicklow were recorded from the damp basement walls: the mosses *Gyroweissia tenuis* and *Leptobryum pyriforme* and the liverwort *Marchantia quadrata*.
- 81 bryophyte species have been recorded from the house and gardens (2007-2022), with 38% (31 species) recorded from the house and associated walls alone.
- A series of conservation measures to protect the bryophyte flora of the house are presented in **Section 5.4**.

Photo 8. Bryophytes on concrete steps to east of house.

Photo 9. Bryophytes dominating wall in basement (main species *Thamnobryum alopecurum*).

Photo 10. Bryophytes on mortar in basement wall to NE of house (at bottom of steps).

Photo 11. ***Gyroweissia tenuis*** **on mortar on basement wall.**

Photo 12. ***Leptobryum pyriforme*** **at bottom of basement wall.**

3.4 Bat Survey

3.4.1 Desk Study and Consultation

The Bat Conservation Ireland database and other bat specialists were consulted regarding records of bat activity in the area.

Other records of bats within a 10km radius of Kilmacurragh Gardens within the Bat Conservation Ireland database include those of roosts and other records made from ad hoc observations, car monitoring transect surveys, dedicated EIS work by other bat specialists (particularly for the M11 Rathnew to Arklow motorway), and the BATLAS 2010 and 2020 projects.

These include records of the following species:

- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- Common pipistrelle (*Pipistrellus pipistrellus*)
- Unidentified pipistrelle (*Pipistrellus* spp.)
- Daubenton's bat (*Myotis daubentonii*)
- Leisler's bat (*Nyctalus leisleri*)
- Natterer's bat (*Myotis nattereri*)
- Whiskered bat (*Myotis mystacinus*)
- Brown long-eared bat (*Plecotus auritus*)
- *Myotis* sp.

There is a single ad-hoc record a Daubenton's Bat within the grounds of the estate, just 120m southwest of Kilmacurragh House, in the Bat Conservation Ireland database. This record was submitted in 2021 and describes the bat flying low over a small pond south of the house.

Casual observations made by this author previously recorded Soprano Pipistrelle bats (*Pipistrellus pygmaeus*), Common pipistrelle (*Pipistrellus pipistrellus*), Daubenton's bat (*Myotis daubentonii*), and Leisler's bat (*Nyctalus leisleri*) from the general environs of the demesne at Kilmacurragh.

3.4.2 Previous Bat Surveys at Kilmacurragh - the Pump House and Kitchen Garden Wall

Local NBG staff have observed bats within the demesne at Kilmacurragh over many years and it had been noted that bats use the old pump house where bat droppings had been noted. In 2020 this building underwent refurbishment and upgrade and works were also completed on a section of the wall in the Kitchen Garden which was unstable and at risk of collapse. Bat surveys were completed in 2019 of both the Pump House and the Kitchen Garden Wall at Kilmacurragh prior to the works in 2020.

The surveys found evidence of bat usage in the form of droppings in the Pump House. The works were therefore scheduled for the winter months as this is when bat numbers are lowest in buildings and a bat derogation licence was granted from the National Parks and Wildlife Service for the works, which were supervised by Faith Wilson. During the renovation works a hibernating Pipistrelle bat was encountered in the Pump House and safely removed and relocated to one of the stone buildings in the yard. A dedicated bat roosting space within the Pump House was created for crevice dwelling bats.

Suitable crevices and holes in the Kitchen Garden Wall were inspected with an endoscope for roosting/hibernating bats in December 2019 but no evidence of bats or bats were recorded. Prior to the rebuild and repointing works the wall was surveyed for bats on the 26th July 2020. During the detector survey three whiskered bats (*Myotis mystacinus*) emerged from the wall. There was good general foraging activity of soprano pipistrelle (*Pipistrellus pygmaeus*) and common pipistrelle (*Pipistrellus pipistrellus*) in the general vicinity of the wall and in the shelter of the tree rhododendrons. A single brown long-eared bat (*Plecotus auritus*) was also recorded.

A bat derogation licence was granted from the National Parks and Wildlife Service for the works to the wall and suitable holes/crevices for bats were inspected and then marked up during the works in October 2020 to ensure they remained unjointed and available for bats to return to.

3.4.3 Hibernation Survey of Kilmacurragh House 2022

A long tunnel extends from the house eastwards below the front lawn as shown on **Figure 10** below which offers roosting potential for bats as a hibernation site.

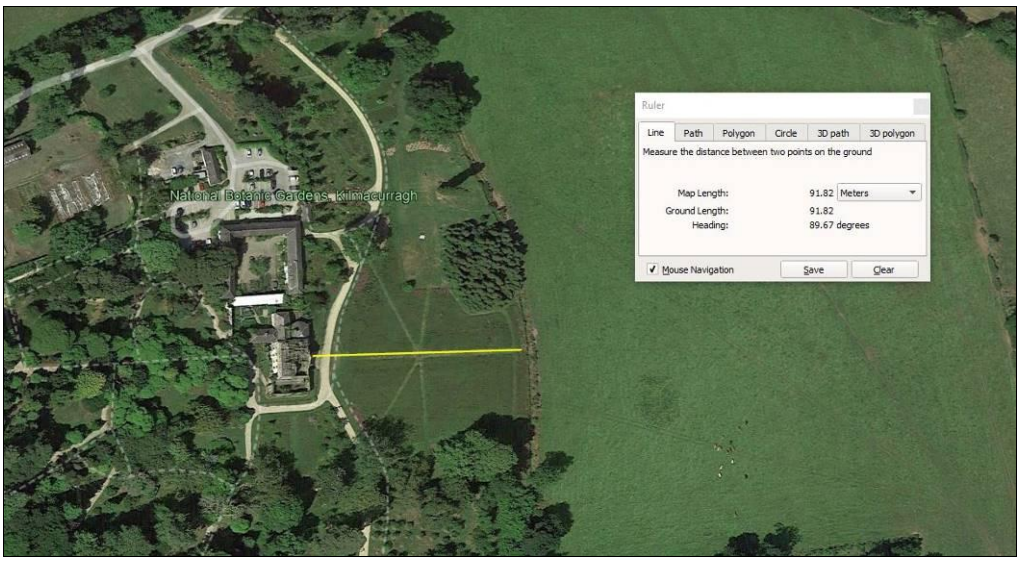


Figure 10. Location of the Kilmacurragh House and indicative location of tunnel indicated by the yellow line.

The tunnel was examined internally for signs and evidence of roosting bats on the 16th March and the 21st April 2022.

There was no evidence of bats utilising the tunnel for hibernation purposes during this inspection and the SM2 detector which was left recording from between the 16th March and the 21st April 2022 had only a small number of records of bat activity from the tunnel where it exists the basement from the front of the house. These were of Natterer's bat (*Myotis nattereri*), Soprano pipistrelle (*Pipistrellus pygmaeus*) and a number of social calls of bats.

The tunnel is quite wet on account of the ground above it which renders the crevices between the stone slabs which form the ceiling of the tunnel less favourable to usage by bats. At times water drains through the tunnel and was seen flowing at the base of same.

Several potential prey items for bats were recorded in the tunnel (see below).

Photo 13. The tunnel in front of Kilmacurragh House.

Photo 14. Deployment of the static detector within the tunnel.

3.4.4 Bat Prey Items from Within the Tunnel

A large population of hibernating Herald (*Scoliopteryx libatrix*) moths (approximately sixty) were recorded in the accessible part of the tunnel on the 16th March 2022. This moth flies between June and November, in one or two broods. During the winter the Herald moth hibernates in dark, cool structures (e.g. cellars, barns and caves or tunnels such as at Kilmacurragh), returning to take wing again from March to June. Its habitat is woodland parks and gardens, and (perhaps consequently) the resting wing pattern resembles a dead, shrivelled leaf.

A number of Cave spiders (*Meta menardi*) are also present. There are relatively few records of this species in the National Biodiversity Data Centre as can be seen on **Figure 11** below.

Both of these species are potential prey items for bats.

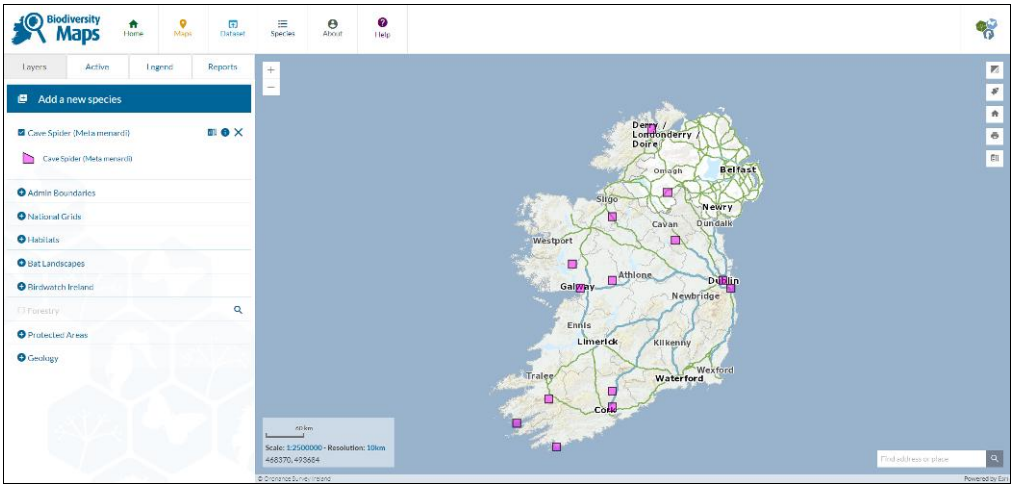


Figure 11. Cave Spider records held by the National Biodiversity Data Centre.

Photo 15. Hibernating Herald Moths (*Scoliopteryx libatrix*) in the tunnel on 16th March 2022.

Photo 16. Cave spiders in the tunnel.

3.4.5 Bat Activity Surveys 2022

July 2022

The detector survey completed on the 28th July 2022 was completed in calm, overcast perfect conditions. Sunset was at 21:27. Temperatures at the beginning of the study were 16°C decreasing to 14.5°C by the time the survey concluded at 23:30. No bats were recorded emerging from the house during the survey however a diverse array of bat species were encountered foraging in the vicinity of the house and grounds.

These included:

- Whiskered bat,
- Natterer's bat,
- Daubenton's bat,
- Common pipistrelle bat,
- Soprano pipistrelle bat,
- Brown long-eared bat, and
- Leisler's' bat.

The first recorded bat was a Leisler's bat, which was observed at 21:39 and the last recorded bat was a Soprano pipistrelle which was recorded at 23.12.

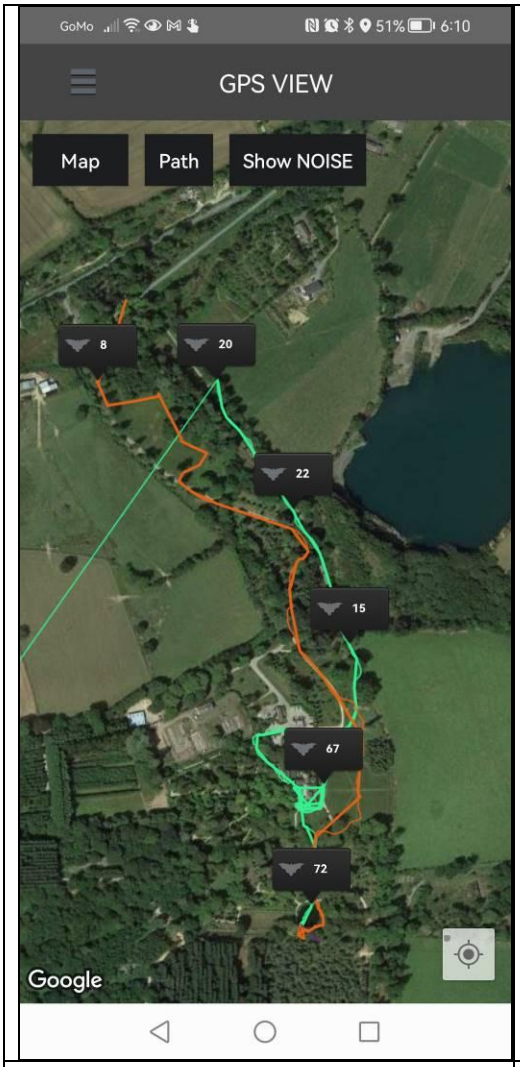


Figure 12. Transects walked.

Figure 13. Activity around the house.

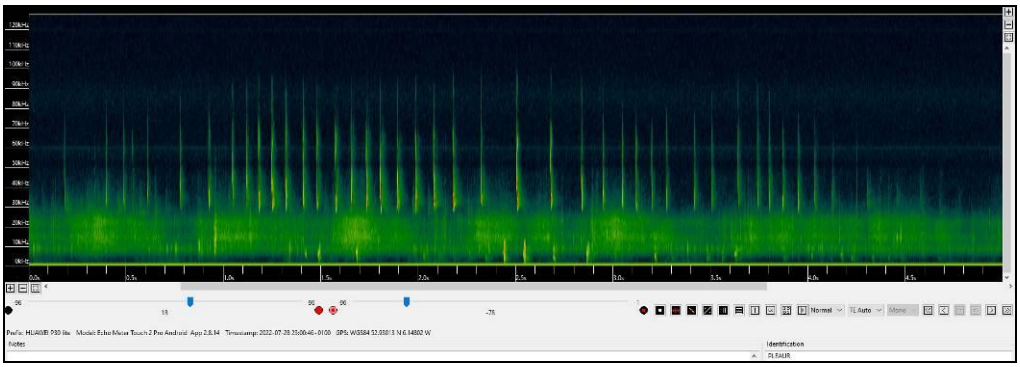


Figure 14. Sonogram of Brown long-eared bat at Kilmacurragh.

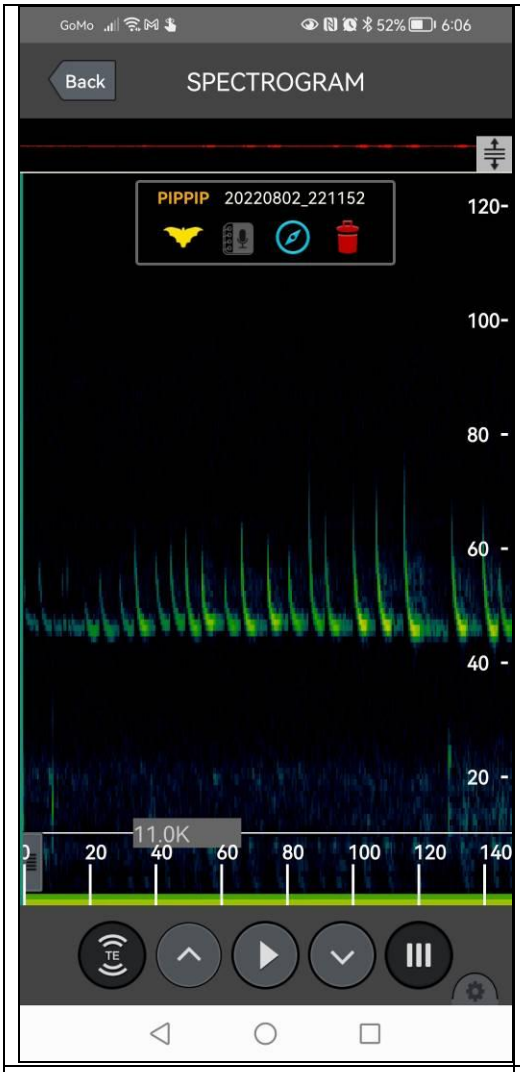


Figure 15. Sonogram of Common Pipistrelle.

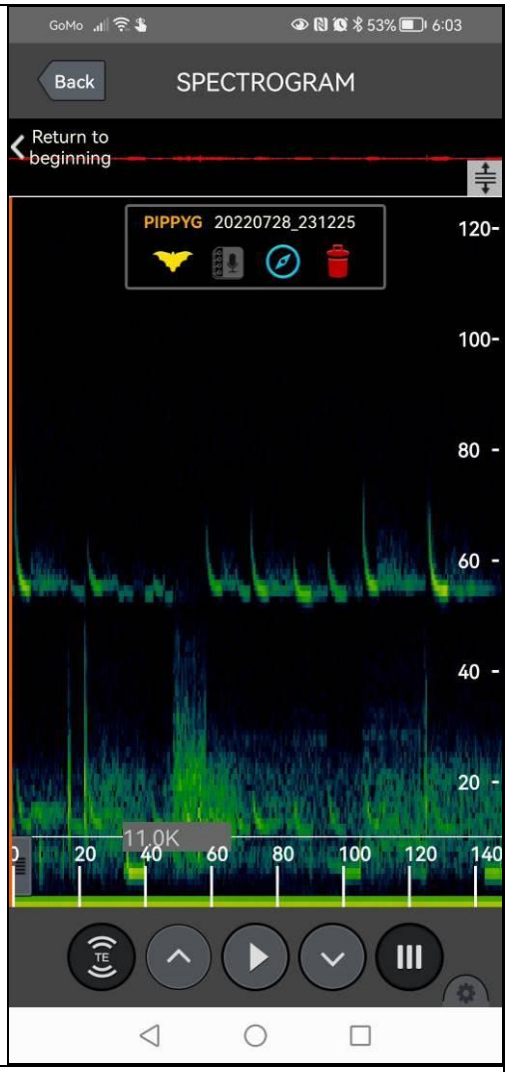


Figure 16. Sonogram of Soprano Pipistrelle.

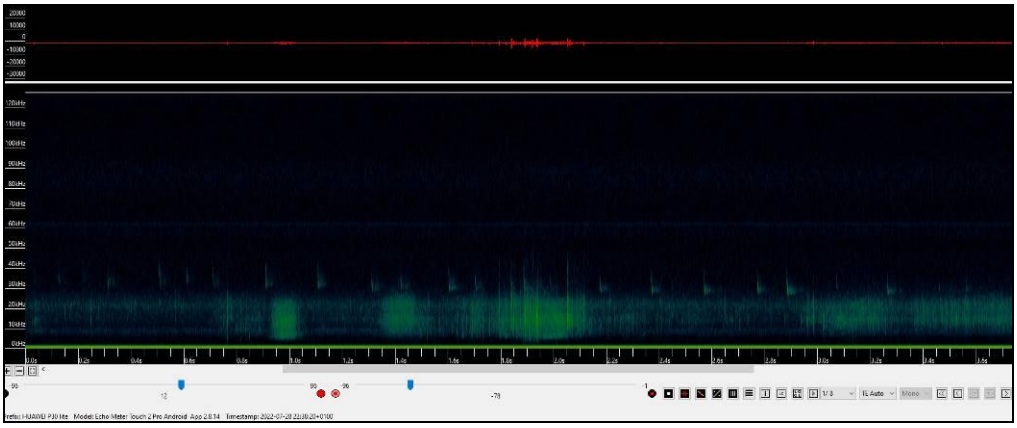


Figure 17. Sonogram of Leisler's bat at Kilmacurragh.

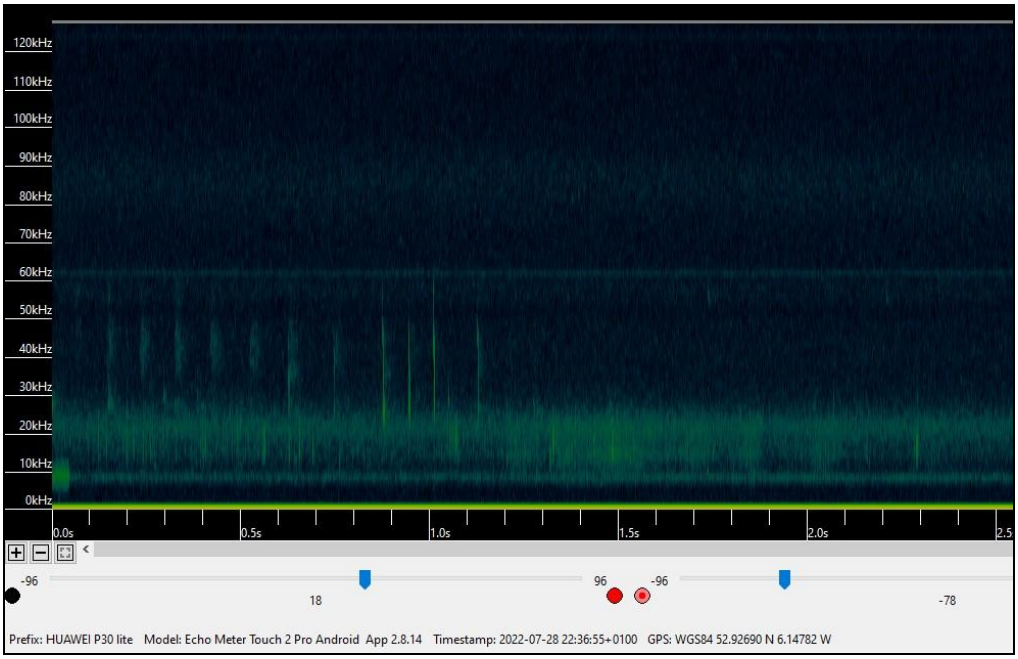


Figure 18. Sonogram of *Myotis* sp. at Kilmacurragh.

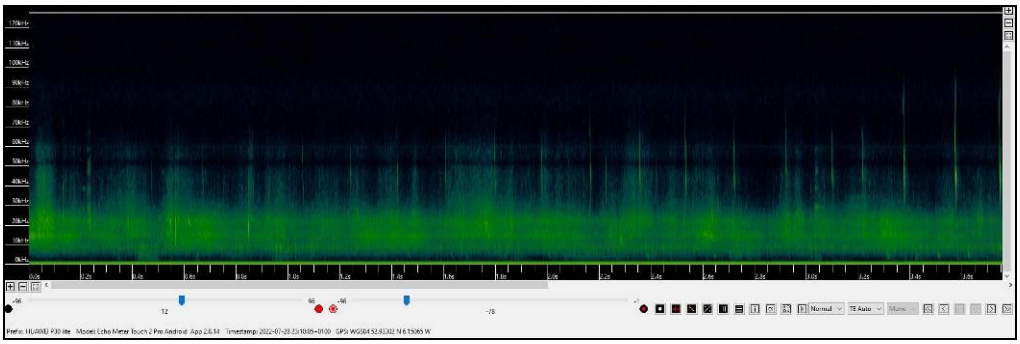


Figure 19. Sonogram of Whiskered bat at Kilmacurragh.

3.4.6 Bat Activity Surveys 2023

The bat activity in the vicinity of Kilmacurragh House was resurveyed in May 2023 when a SM2 detector was left recording in the Kitchen Garden adjoining the Kitchen Wing between the 24th and 29th May 2023. This recorded significant bat activity with over this time period with Common pipistrelle bat, Soprano pipistrelle bat, Daubenton's bat, possible Whiskered/Brandt's bat, Brown long-eared bat, Leisler's bat and possible Nathusius's pipistrelle confirming the importance of the property for bats.

The static detector in the Kitchen Garden, recorded species of bats between the 24th and 29th May 2023 as set out in **Table 5**.

Table 5. Bat registrations from the static detector located in the Kitchen Garden in 2023.

Species	Daubenton's Bat	Myotis sp.	Nathusius's Pipistrelle	Leisler's Bat	Common Pipistrelle	Soprano pipistrelle	Brown Long-eared Bat
No. of Registrations	18	1	1	235	470	249	14

3.4.7 Bat Activity Surveys 2024

Two remote monitoring static bat detectors (A Song Meter Mini 2) were deployed on the 1st August 2024. An Echometer Touch 2 Pro was also used and a series of transects in the grounds were completed taking in the pond and meadows.

The emergence study recorded three Leisler's bats emerging from the house along with three Common and two Soprano pipistrelle bats between 21:31 and 22.23. Bats were recorded emerging from both sides of the house and then flying towards the pond and hunting over the front meadow. At 22.41 a Brown long-eared bat was detected emerging from the rear of the house through the windows.

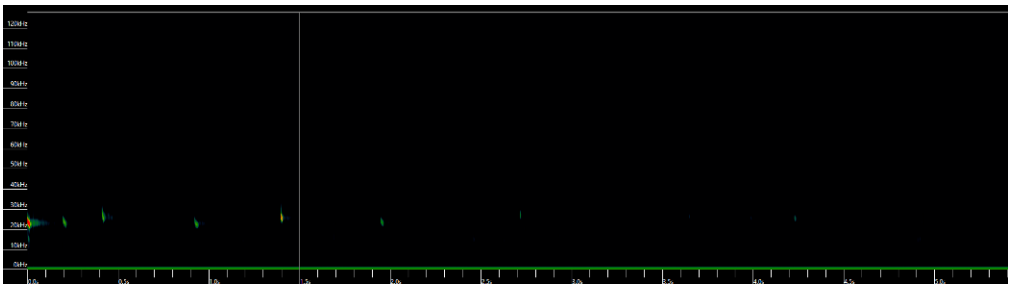


Figure 20. Leisler's bat on 1st August 2024.

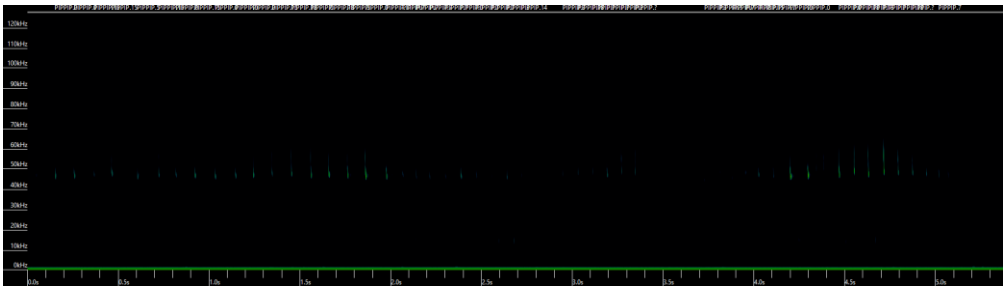


Figure 21. Common pipistrelle bat on 1st August 2024.

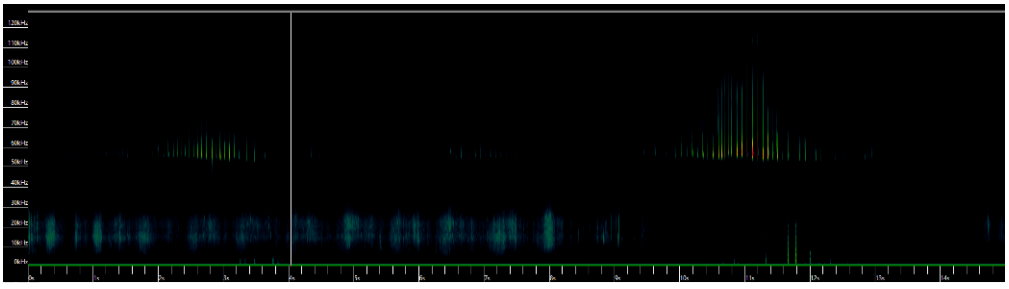


Figure 22. Soprano pipistrelle bat on 1st August 2024.

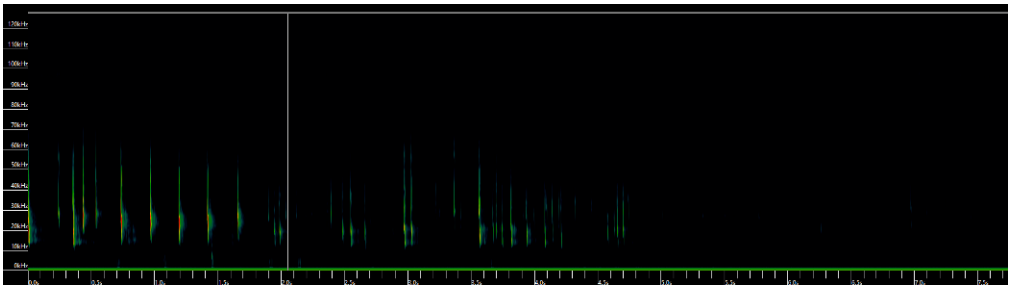


Figure 23. Brown long-eared bat on 1st August 2024.

The static detector at the front of the house recorded five species of bats as set out in **Table 6**.

Table 6. Bat registrations from the static detector at the front of the house.

Species	Daubenton's Bat	Leisler's Bat	Common Pipistrelle	Soprano pipistrelle	Brown Long-eared Bat
No. of Registrations	1	45	167	64	11

The static detector at the rear of the house recorded six species of bat as set out in **Table 7**.

Table 7. Bat registrations from the static detector at the rear of the house.

Species	Daubenton's Bat	Natterer's Bat	Leisler's Bat	Common Pipistrelle	Soprano pipistrelle	Brown Long-eared Bat
No. of Registrations	2	2	13	31	80	17

The static detector, which was deployed in the Kitchen Garden, recorded seven species of bats (and a *Myotis* bat) between the 12th and 19th August 2024 as set out in **Table 8**.

Table 8. Bat registrations from the static detector located in the Kitchen Garden.

Species	Daubenton's Bat	Whiskered Bat	Myotis sp.	Natterer's Bat	Leisler's Bat	Common Pipistrelle	Soprano pipistrelle	Brown Long-eared Bat
No. of Registrations	10	5	33	11	242	4918	992	555

The walking transect surveys completed on 1st August 2024 recorded a rich diversity of species using the grounds as shown on **Figure 24** below reflecting a similar suite of species as recorded during the emergence surveys.

Figure 24. Bats recording during transect surveys completed on 1st August 2024.

3.4.8 Bat Activity Surveys 2025

The emergence survey and walked transects completed using the Echometer Touch Pro 2 in the vicinity of the house on the 23rd June 2025 recorded six species of bats (Leisler's' bat. Common and Soprano pipistrelle, Brown long-eared, Daubenton's bat and a *Myotis* sp.) as shown on **Figure 25** below.

Figure 25. Emergence survey and walked transects completed using the Echometer Touch Pro 2 in the vicinity of the house on the 23rd June 2025.

The walked transects completed using the Echometer Touch Pro 2 in the vicinity of the house on the 17th July 2025 recorded five species of bats (Leisler's' Common and Soprano pipistrelle, Brown long-eared and a *Myotis* sp.) as shown on **Figure 26** below.

Figure 26. Emergence survey and walked transects completed using the Echometer Touch Pro 2 in the vicinity of the house on the 17th July 2025.

Weather conditions were favourable as can be seen on **Table 9** below.

Table 9. Weather conditions during the emergence survey.

Date	Sunset / sunrise	Start / finish	Temp	Wind speed m/s	Wind direction	Rain
17/07/2025	21:41	21:17	15	None	-	Drizzle
		00:25	16	0.8	-	Intermittent drizzle

The videos made using the NVAs were reviewed and the observations for each are summarised below. In total 14 bats were seen emerging from the building using the NVAs as follows:

- NVA 1 - Two Soprano pipistrelle bats – Bullnose
- NVA 2 – One bat emerges – Front of House
- NVA 3 - Nine bats emerge - One Common Pipistrelle, Two Leisler's, One Natterer's/ Myotis and 5 Brown Long Eared Bats – Rear of House
- NVA 4 – One bat emerges – Kitchen Wing

Table 10. Bats recorded on the NVA 1 – focused on the Bullnose.

Time	Species	Details
21:47	Leisler's Bat	First Bat Recorded
22:10	Soprano Pipistrelle	Bat emerges from facia board (29mins after sunset)
22:18	Soprano Pipistrelle	Bat flies from S-N in front of Scope, begins moving back and forth along the path here
22:20	Pipistrelle	Both Pipistrelle call at the same time, one bat on scope
22:25	Common and Soprano Pipistrelle	Feeding in front of scope (video captured)
22:43	Soprano Pipistrelle	Emerges from crevice in left hand window

Figure 27. Emergence locations at the Bullnose – recorded by NVA 1.

The static detector associated with NVA1 recorded Leisler's bat, Common pipistrelle, Soprano pipistrelle and Brown long-eared bats.

Table 11. Bats recorded on the NVA 2 – focused on the front of the house.

Time	Species	Details
22:17	Unknown	First bat seen on Pixfra, passing up and down along path (36 minutes after sunset)
22:20	Unknown	Bat emerges from crevices in wall/under plaster, Right of the main door
23:17	Unknown	24 bat passes along path, no more emerging

Figure 28. Emergence location from the front of the house – recorded by NVA 2.

The static detector associated with NVA2 recorded Leisler's bat, Common pipistrelle, Soprano pipistrelle, possible Nathusius's pipistrelle and Daubenton's bats.

Table 12. Bats recorded on the NVA 3 – focused on the rear of the house.

Time	Species	Details
21:57	Common Pipistrelle	Emerges from roof of main derelict building
22:09	Leisler's Bat	Emerges from main building wall
22:10	Natterer's Myotis	Emerges from facia board
22:17	Leisler's Bat	Emerges from main building window, second from the right
22:20	Brown Long eared	Emerges from window, second on the top right
22:23	Brown Long eared	Emerges from the same window
22:25	Brown Long eared	Emerges from the same window
22:35	Brown Long eared	Emerges from the same window
23:12	Brown Long eared	emerges from top right most window, second bat seen inside building

Figure 29. Emergence locations at the rear of the house – recorded by NVA 3.

The static detector associated with NVA3 recorded Leisler's bat, Common pipistrelle, Soprano pipistrelle, Natterer's bat, and *Myotis* bat (possible Whiskered bat).

Table 13. NVA 4 - focused on the Kitchen Wing.

Time	Species	Details
21:53	Unknown	First bat seen on Thermal 19mm (12 minutes after sunset)
22:09	Unknown	Bat pos. emerging from rear of building
23:01	Soprano Pipistrelle	Activity over kitchen garden increases, many bats feeding over yard here

Figure 30. Emergence location from the Kitchen Wing – recorded by NVA4.

The static detector associated with NVA4 recorded Leisler's bat, Common pipistrelle, Soprano pipistrelle, possible Whiskered bat and Daubenton's bats.

Modifications or changes to the structure of the house

On the 7th August 2025 the interior of the house was again inspected. It was noted that there had been changes to the Bullnose with the erection of sheeting to prevent weather from entering this structure. This has allowed a darkened 'attic' to be created which is very attractive to bats. The slates here are fixed with traditional lime parging on battens which are very favourable to roosting bats. The attic below the Bullnose has many cobwebs present but some bat droppings were present here and on the floor below.

Photo 17. Repairs to the roof of the bullnose have created a darkened attic space.

Photo 18. Repairs to the roof of the bullnose have created a darkened attic space.

Photo 19. Repairs to the roof of the bullnose have created a darkened attic space.

Photo 20. Bat droppings in the Bullnose.

3.5 Mammal Survey

There was no evidence of any mammals from the general environs of the house beyond bats but species such as House mouse (*Mus musculus*) and Brown rat (*Rattus norvegicus*) are likely. Badger (*Meles meles*) are present in the Deer Park.

Grey squirrel (*Sciurus carolinensis*) which are a listed invasive species under the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014) are common in the garden.

3.6 Bird Survey - 2023

Jackdaws (*Corvus monedula*) and Starlings (*Sturnus vulgaris*) have nested in Kilmacurragh House for over sixty years. In his visit to Kilmacurragh with Lady Moore in 1957, Roy Jenkinson (an English botanist) noted and commented on the nesting Jackdaws and Starlings as recorded in the Journal of the Royal Horticultural Society (Jenkinson, 1958).

During the present survey Jackdaw nests were recorded in many locations within the house including in chimneys, the library, the rear drawing room, the kitchen wing and below the eaves along the back of the house as well as in several holes within the walls. A large number of Jackdaw cadavers were also recorded. Approximately ten nests were identified.

Starling (*Sturnus vulgaris*) was recorded nesting in a hole in the wall at the back of the house and in the basement. Blackbird (*Turdus merula*) was recorded nesting in dense ivy on the Dining room.

Photo 21. Starlings were recorded nesting in a hole behind the ivy in the corner of the Kitchen Wing.

Photo 22. Jackdaw was recorded nesting in this hole in the wall of the Drawing Room.

Photo 23. Jackdaw was recorded nesting in these holes in the wall of the Drawing Room.

Photo 24. Jackdaw nesting in the Kitchen Wing.

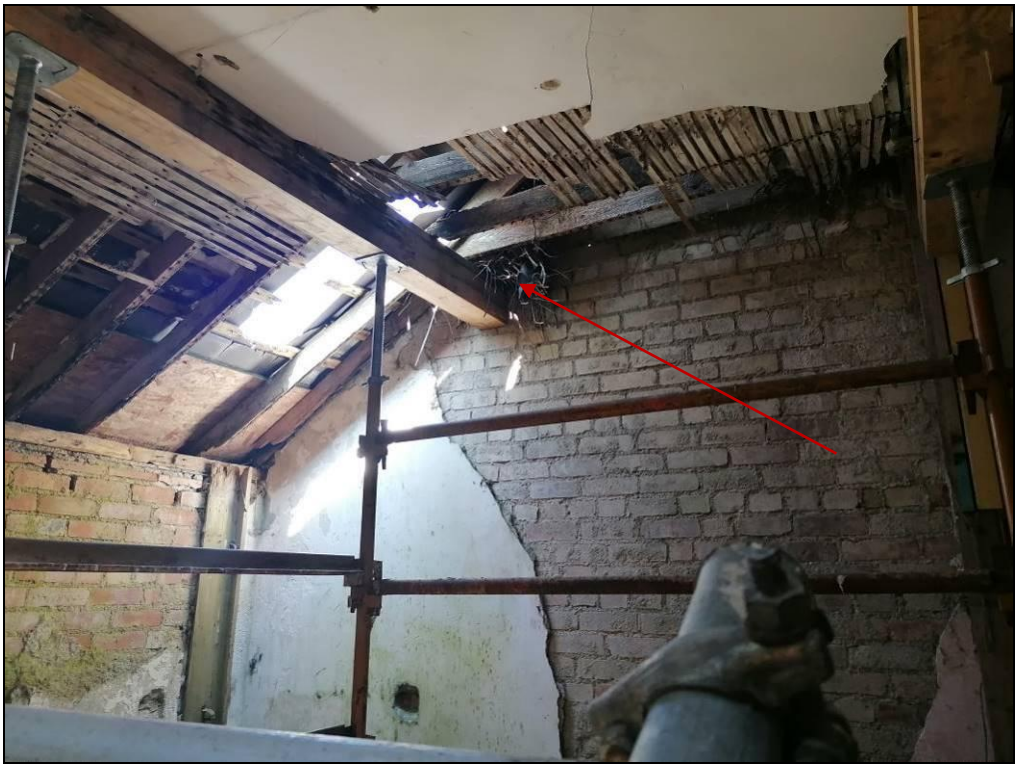


Photo 25. Jackdaw nesting in the Kitchen Wing.

Photo 26. Jackdaw nesting in the Library.

Photo 27. Jackdaw nest in the fireplace.

Photo 28. Dead Jackdaw.

Photo 29. Jackdaw nest in chimney.

Photo 30. Jackdaw nest in fireplace/chimney.

Photo 31. Jackdaw nest above old plaster laths.

Photo 32. Starling nest in basement.

3.7 Bird Survey - 2025

In 2025 the building was reinspected from the perspective of nesting Jackdaws and a minimum of 16 nests were recorded.

4. POTENTIAL IMPACTS

Potential impacts on flora and fauna arise during both the Construction and Operational Phases of the proposed restoration of the house and its ultimate reuse in the long term.

The activities associated with the proposed restoration that have the potential to affect the ecology of Kilmacurragh House and associated biodiversity include:

- Direct Habitat Loss for bryophyte communities and other flora;
- Loss of Nesting Sites for Jackdaw, Starling and Blackbird;
- Loss of Potential Roosting Sites for bats; and
- Disturbance to fauna.

There is also potential to incorporate new nesting and roosting opportunities within the restored house for birds and bats and the conservation of the building ensures the long term conservation of these faunal resources.

4.1 Potential Impacts on Habitats

Construction Phase:
No habitat designated for nature conservation purposes, or plant species protected under the Floral (Protection) Order 2022, will be impacted by the proposed restoration of Kilmacurragh House.

There is the potential for the loss of some of the climbers associated with the house arising from the construction works unless protective measures are put in place for these prior to the commencement of construction activities on the site.

The areas of grassland habitat surrounding the house will be temporarily lost.

There are potential impacts on the bryophyte and fern community on the basement wall if these areas were to be cleaned off or devgetated. They are also vulnerable to any changes in shading or dampness.

Operational Phase:
Over time and reinstated plantings surrounding the house will mature and provide cover and habitat for birds, invertebrates and other fauna within the site if designed appropriately.

4.2 Potential Impacts on Fauna

The proposed restoration of Kilmacurragh House which is currently a derelict, unused building will ultimately result in the loss of biodiversity associated with the house with the permanent loss of nesting habitat, undisturbed areas for birds to rest and forage and potential roosting locations for bats.

The use by several species of birds nesting within the building and stone walls has been confirmed from the present survey. Although no confirmed bat roosts have been identified given the age and nature of the building, the diversity of bat species recorded and the variety of potential roosting opportunities for bats including both crevice dwelling and free flying bats the potential for bats to be encountered during the works is acknowledged. Bats are highly mobile species and may utilise different parts of a building at different times of the year or even within the same season as temperatures may change depending on shading or as slates continue to fall off the building.

Repointing works have the potential to destroy nesting spaces within walls or if conducted during the breeding bird season without due awareness and care could entomb and kill young hatchlings prior to fledging. They can also entomb or exclude roosting bats.

The presence of a commercial kitchen and café at Kilmacurragh ultimately requires the control of rodents in the grounds. Regulation (EC) No 178/2002 laying down the general principles and requirements of food law, places the primary responsibility to produce safe food on the food business operator. Regulation (EC) No 852/2004 on the hygiene of foodstuffs, requires that food business operators prevent animals and pests from contaminating food and have adequate pest control procedures in place. Owners/ occupiers of food premises must, as a matter of routine, visually check for signs of pests and have a pest control reporting system in place. Rodenticides have the potential to poison birds of prey, other wildlife, dogs and children and the impacts of same must be considered.

Although there were no roosts confirmed within the main house in Kilmacurragh in 2023 it was noted that there are unlimited roosting locations into which small numbers of bats can secrete themselves and avail of for roosting purposes. These can be easily lost during renovation works.

The only extant areas of roof in which the remains of an attic space is found are the areas above the Bullnose and the Kitchen wing, as indicated below on **Figure 31**, which are in an increasing state of dereliction. It was unsafe to enter these areas in 2023 to physically inspect them for the presence of or signs of bats.

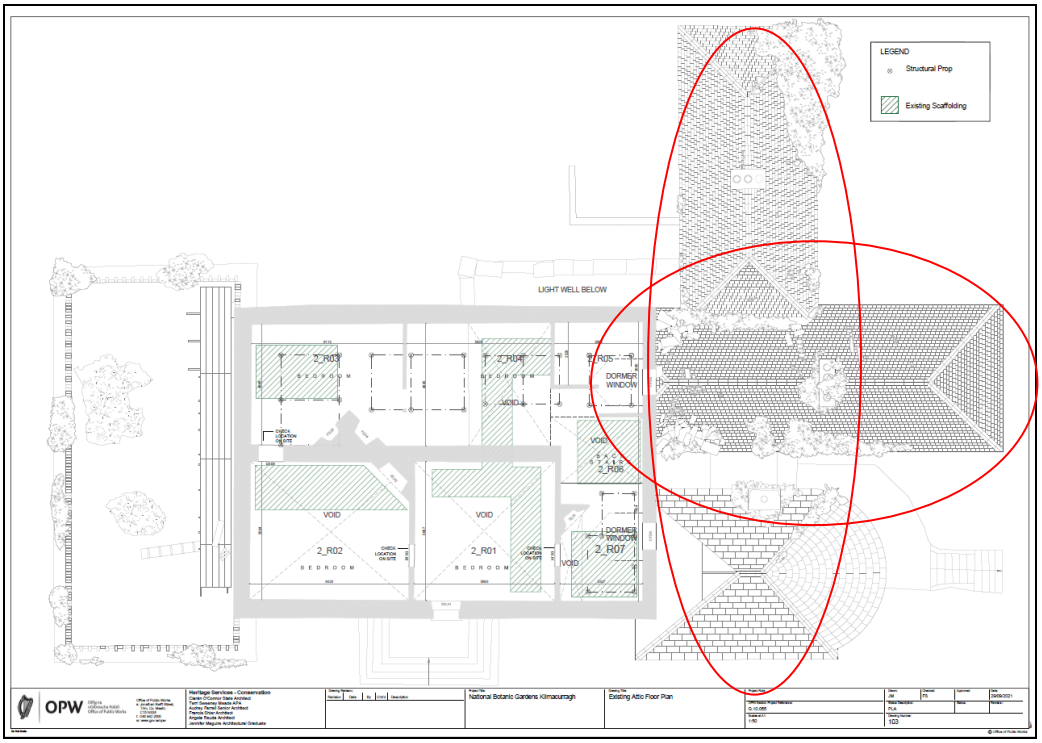


Figure 31. The Kitchen Wing and Bullnose remain partly roofed.

Should the roof renovation and building conservation and restoration works at Kilmacurragh not proceed these structures, which offer some roosting potential for bats will continue to degrade and will ultimately be lost.

5. REMEDIAL OR REDUCTIVE MEASURES

A series of mitigation measures to avoid/reduce impacts on biodiversity during the proposed restoration/renovation works for Kilmacurragh House have been discussed with the OPW/NBG design team and will be implemented over the course of the project as appropriate.

These are detailed/set out below in line with best practice.

5.1 Mitigation by Avoidance

The principal mitigation that should be considered in any development is avoidance of impact.

5.2 Tree and Habitat Protection

Protective fencing will be erected in advance of any construction works commencing outside the drip-line of the canopy of retained trees and vegetation in the vicinity of the house such as the specimen Rhododendrons, the wildflower meadows and other planting associated with the garden in order to prevent damage by machinery, compaction of soil, etc. in accordance with BS 5837:2012. This will be signed off by the design team lead in consultation with the head gardener or NBG director to ensure it has been erected properly before any machinery is allowed on site. No ground clearance, earth moving, stock-piling or machinery movement will occur within these protected areas. There will be a designated works area for activities such as the mixing of lime render and mortar whose dust can be detrimental for vegetation.

5.3 Vascular Plants

The Ivy of Uruguay climbers should be retained in situ if possible and protected during the works.

In order to allow the visual inspections of the walls by the design team during the enabling works some of them required cutting back - this was done by the gardening team in Kilmacurragh to ensure they were appropriately pruned.

New planting material should also be propagated to ensure the conservation of these plants.

The final design for the surrounds of the house will need to consider planting pits at appropriate locations to allow the reinstatement of climbers on the house.

5.4 Bryophytes

The damp basement walls had the highest bryophyte diversity and a number of county rare species were recorded within the house survey area.

Given the importance of the damp basement walls, disturbance and habitat changes should be avoided/ minimised. Potentially damaging operations include re-pointing and repairing of the walls here, spillage of lime onto the

adjacent damp ground at the base of the wall and changes to dampness or shading.

It is advised that if any areas of wall that area important for bryophyte diversity are to be altered, removed, or re-pointed, that a pre-works bryophyte survey is undertaken/ advice sought.

Bryophytes and ferns may also be dislodged during the works if they are physically disturbed by workers/knocked as building materials are carried in and out. In this regard a timber screen covered with a shading mesh cloth was created to protect this area during the opening up and protection works.

It is recommended that this is kept in place during future works and the condition of the wall behind monitored to ensure that it does not dry out or become too dark for the vegetation here to grow.

As a conservation measure it is recommended that an ex-situ population of these fern and moss species are collected and cultivated by the National Botanic Gardens prior to the works commencing thereby ensuring that they can be reinstated should this area require works or be negatively impacted by works higher up on the building. Specialist advice in this regard should be sought. Populations could be established elsewhere in the gardens as well as in Glasnevin.

5.5 Protection of Nesting Birds

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1 March to 31 August. **No clearance of vegetation suitable for nesting birds within the site (shrubs, bramble tangles, etc.) will take place during this period. Should such clearance be required than the area proposed for clearance should be inspected by an ecologist to ascertain if any nesting birds are present.**

Minor holes or crevices (typically <20mm in diameter) in the walls of the house which are currently accessible to birds and bats, and that can be retained from a structural perspective, will be clearly marked up and shown to the contractor when the works commence.

These can then be retained to provide long term nesting sites for birds and roosting opportunity for bats without any significant structural risks to the building and with no risk of harm to any fauna that might be availing of them.

If any holes are deemed unsuitable from a structural perspective for retention once they have been inspected with an endoscope by a licensed bat specialist or ecologist they can be lightly blocked with newspaper or other material to prevent bats/birds from accessing them. This work needs to take place in advance of the bird breeding season. The material can then be easily removed as the works proceed and the repointing completed.

5.6 Provision of Nesting Opportunities

The restoration of the house will result in the loss of nesting locations for a number of bird species including: Starling, Jackdaw and Blackbird.

A number of dedicated new structures/artificial nest boxes will be provided to accommodate same. The design team are also considering incorporating nesting opportunity for species such as Swift (*Apus apus*), which are in trouble in Ireland and other species associated with buildings such as House martin and House sparrow.

Guidance for same is provided below and relies on the expertise provided by Williams (2010).

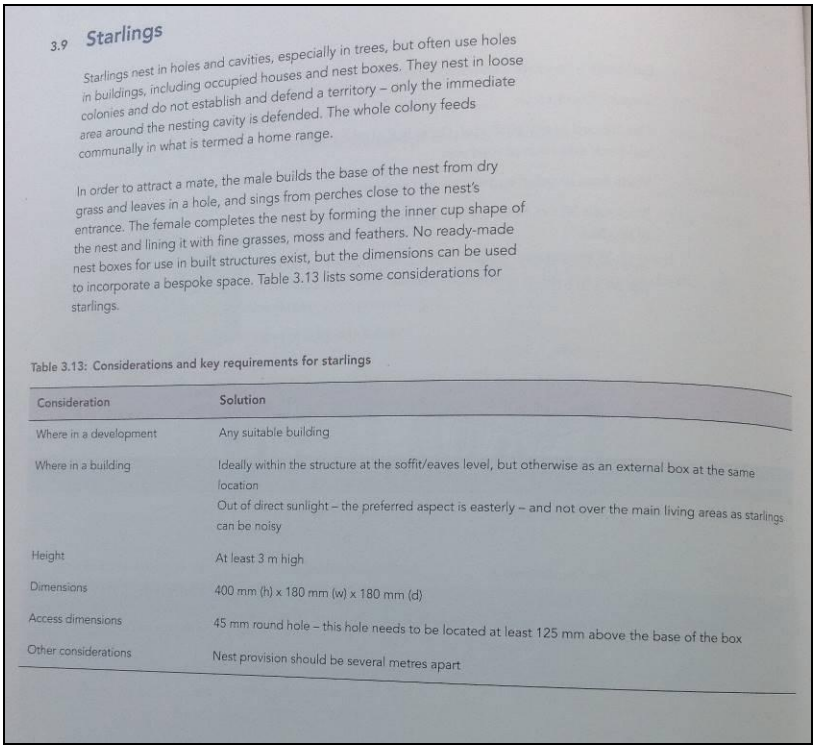
For the Swifts, which are a red listed species, a series of swift boxes (number to be determined on site) will be erected in suitable locations in buildings within the property. It may also be possible to include some integrated boxes or provide access for swifts to traditional nesting locations above the wall plate in the long term. In order to attract the birds a swift caller and speaker will be deployed during the bird breeding season.

Provision for House Martin on the gable of the kitchen wing or other buildings could also be made.

A series of artificial nest boxes for Starling (c.5) and Jackdaw (c.10 – 15) will need to be provided. These can be erected on either buildings or trees and the exact numbers and locations for same will be determined on site. Best practice guidance suggests that Jackdaw nest boxes should be sited a minimum of 6 – 8 m above ground on a building and as they are a colonial nesting species several boxes should be erected together.

Guidance from the Biodiversity in Low Carbon Buildings document (Williams (2010)) is presented below for various species.

A suitably qualified ornithologist/ecologist will advise on the exact numbers, location and placement of the boxes on trees and buildings within Kilmacurragh. All boxes should be erected a minimum of one breeding season in advance of the works commencing to allow the birds to become familiar with the new breeding locations.



3.9 Starlings

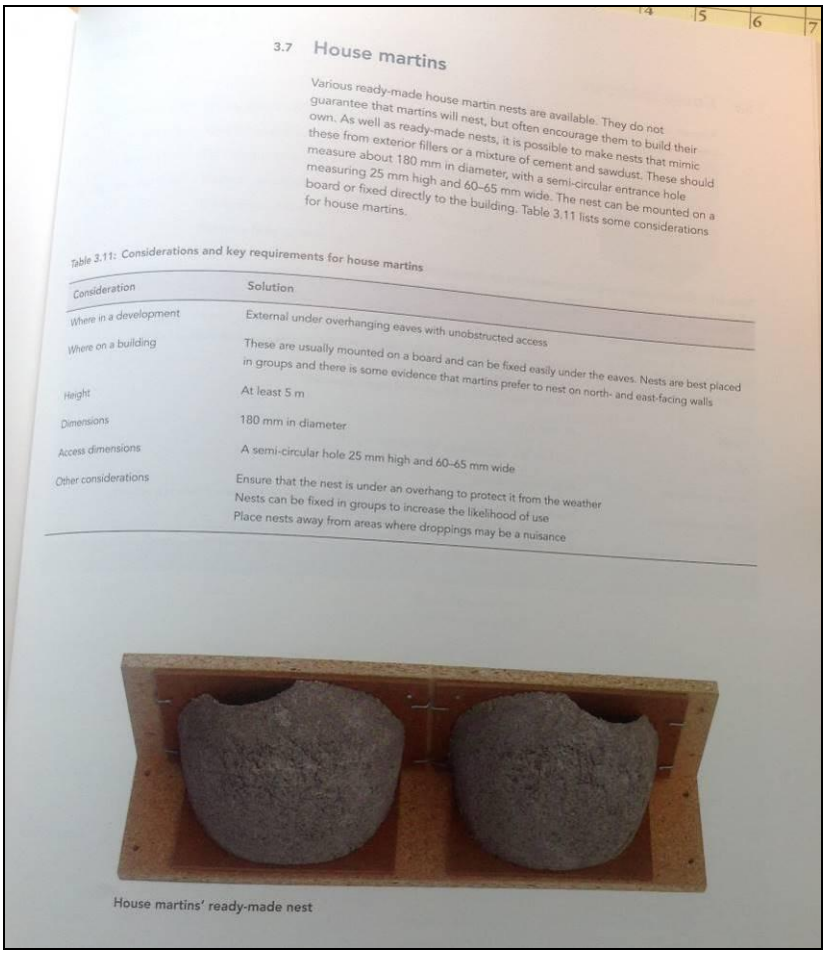
Starlings nest in holes and cavities, especially in trees, but often use holes in buildings, including occupied houses and nest boxes. They nest in loose colonies and do not establish and defend a territory – only the immediate area around the nesting cavity is defended. The whole colony feeds communally in what is termed a home range.

In order to attract a mate, the male builds the base of the nest from dry grass and leaves in a hole, and sings from perches close to the nest's entrance. The female completes the nest by forming the inner cup shape of the nest and lining it with fine grasses, moss and feathers. No ready-made nest boxes for use in built structures exist, but the dimensions can be used to incorporate a bespoke space. Table 3.13 lists some considerations for starlings.

Table 3.13: Considerations and key requirements for starlings

Consideration	Solution
Where in a development	Any suitable building
Where in a building	Ideally within the structure at the soffit/eaves level, but otherwise as an external box at the same location Out of direct sunlight – the preferred aspect is easterly – and not over the main living areas as starlings can be noisy
Height	At least 3 m high
Dimensions	400 mm (h) x 180 mm (w) x 180 mm (d)
Access dimensions	45 mm round hole – this hole needs to be located at least 125 mm above the base of the box
Other considerations	Nest provision should be several metres apart

Figure 32. Guidance for Starlings (Source: Williams (2010)).



3.7 House martins

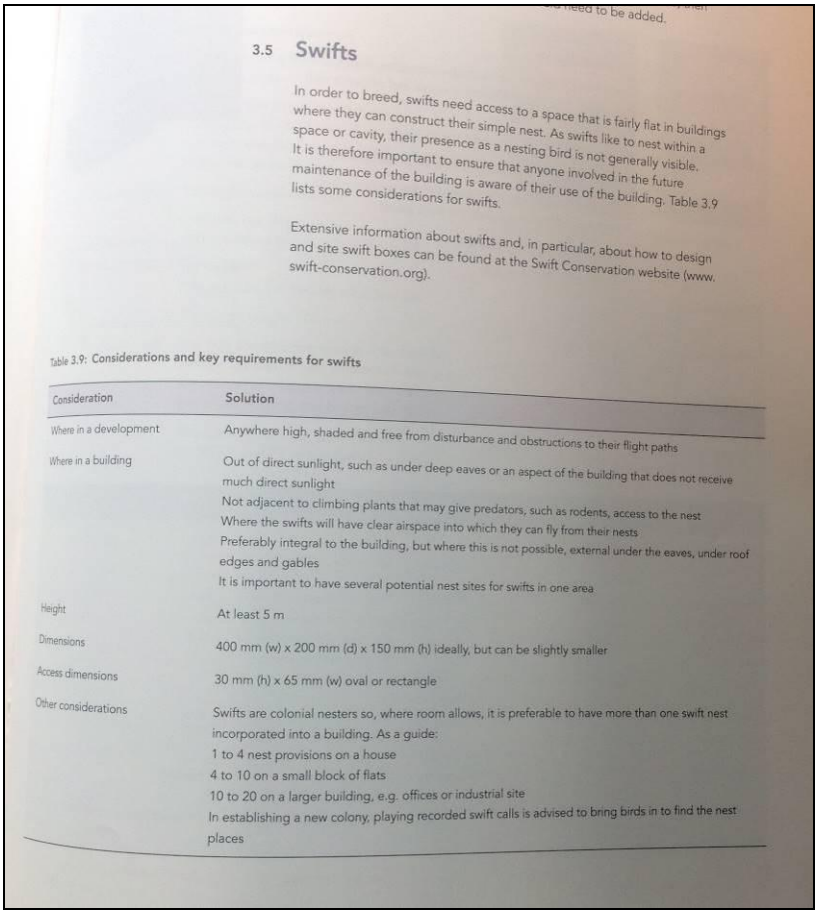
Various ready-made house martin nests are available. They do not guarantee that martins will nest, but often encourage them to build their own. As well as ready-made nests, it is possible to make nests that mimic these from exterior fillers or a mixture of cement and sawdust. These should measure about 180 mm in diameter, with a semi-circular entrance hole measuring 25 mm high and 60–65 mm wide. The nest can be mounted on a board or fixed directly to the building. Table 3.11 lists some considerations for house martins.

Table 3.11: Considerations and key requirements for house martins

Consideration	Solution
Where in a development	External under overhanging eaves with unobstructed access
Where on a building	These are usually mounted on a board and can be fixed easily under the eaves. Nests are best placed in groups and there is some evidence that martins prefer to nest on north- and east-facing walls
Height	At least 5 m
Dimensions	180 mm in diameter
Access dimensions	A semi-circular hole 25 mm high and 60–65 mm wide
Other considerations	Ensure that the nest is under an overhang to protect it from the weather Nests can be fixed in groups to increase the likelihood of use Place nests away from areas where droppings may be a nuisance

House martins' ready-made nest

Figure 33. Guidance for House Martin (Source: Williams (2010)).



need to be added.

3.5 Swifts

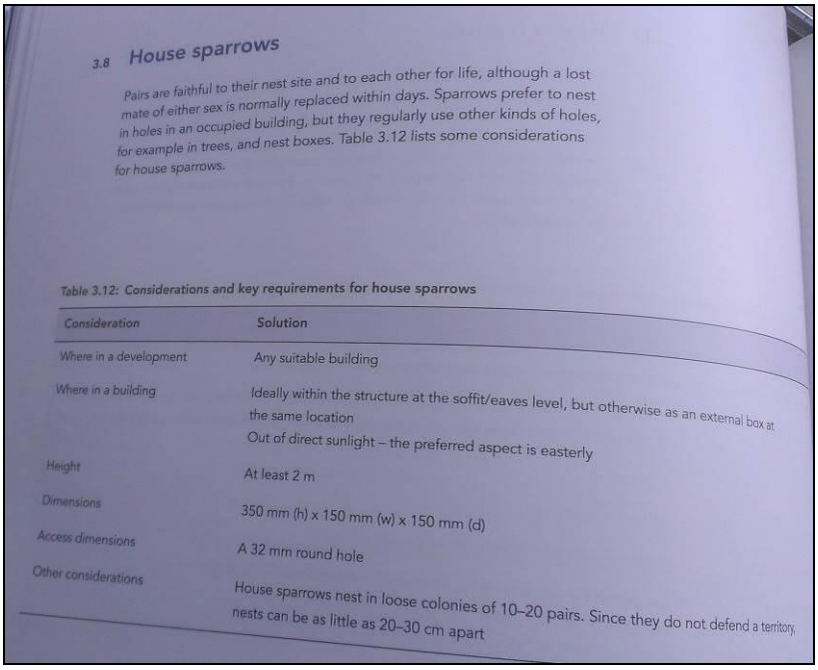
In order to breed, swifts need access to a space that is fairly flat in buildings where they can construct their simple nest. As swifts like to nest within a space or cavity, their presence as a nesting bird is not generally visible. It is therefore important to ensure that anyone involved in the future maintenance of the building is aware of their use of the building. Table 3.9 lists some considerations for swifts.

Extensive information about swifts and, in particular, about how to design and site swift boxes can be found at the Swift Conservation website (www.swift-conservation.org).

Table 3.9: **Considerations and key requirements for swifts**

Consideration	Solution
Where in a development	Anywhere high, shaded and free from disturbance and obstructions to their flight paths
Where in a building	Out of direct sunlight, such as under deep eaves or an aspect of the building that does not receive much direct sunlight Not adjacent to climbing plants that may give predators, such as rodents, access to the nest Where the swifts will have clear airspace into which they can fly from their nests Preferably integral to the building, but where this is not possible, external under the eaves, under roof edges and gables It is important to have several potential nest sites for swifts in one area
Height	At least 5 m
Dimensions	400 mm (w) x 200 mm (d) x 150 mm (h) ideally, but can be slightly smaller
Access dimensions	30 mm (h) x 65 mm (w) oval or rectangle
Other considerations	Swifts are colonial nesters so, where room allows, it is preferable to have more than one swift nest incorporated into a building. As a guide: 1 to 4 nest provisions on a house 4 to 10 on a small block of flats 10 to 20 on a larger building, e.g. offices or industrial site In establishing a new colony, playing recorded swift calls is advised to bring birds in to find the nest places

Figure 34. Guidance for Swifts (Source: Williams (2010)).



3.8 House sparrows

Pairs are faithful to their nest site and to each other for life, although a lost mate of either sex is normally replaced within days. Sparrows prefer to nest in holes in an occupied building, but they regularly use other kinds of holes, for example in trees, and nest boxes. Table 3.12 lists some considerations for house sparrows.

Table 3.12: **Considerations and key requirements for house sparrows**

Consideration	Solution
Where in a development	Any suitable building
Where in a building	Ideally within the structure at the soffit/eaves level, but otherwise as an external box at the same location Out of direct sunlight – the preferred aspect is easterly
Height	At least 2 m
Dimensions	350 mm (h) x 150 mm (w) x 150 mm (d)
Access dimensions	A 32 mm round hole
Other considerations	House sparrows nest in loose colonies of 10–20 pairs. Since they do not defend a territory, nests can be as little as 20–30 cm apart

Figure 35. Guidance for House Sparrows (Source: Williams (2010)).

Photo 33. Jackdaw nest boxes.

5.7 Measures for Bats

5.7.1 Roosts in Kilmacurragh – Bat Derogation Licence

2023

At planning application stage in 2023 no bat roosts had been confirmed in Kilmacurragh House but it was noted that there were unlimited potential locations they may use within the building as detailed above.

A bat derogation licence was therefore recommended for any works to this building and was issued to the OPW by NPWS for the proposed works and is presented in **Appendix 3**.

2024/2025

Since then some modifications to the building took place – notably the enclosing in of the ceiling of the Bullnose. This has created a darkened space that bats can avail of and what appears to be a small maternity roost of Brown long - eared bats are using this structure. On exiting the roost they generally have been observed flying through the structure of the house and emerging through the back windows as can be seen on **Figure 29**. The use of thermal imaging scopes and cameras have confirmed small numbers of other species of bats utilising a variety of locations within the house to roost in.

A bat derogation licence is therefore required for the construction works at Kilmacurragh which are due to commence in December 2025/January 2026.

This report forms part of the application for a Derogation Licence for these works.

The bat derogation licence must undergo three tests for approval as follows:

- Test 1: Reason for the Derogation
- Test 2: Absence of Alternative solutions
- Test 3: Impact of a Derogation on Conservation Status

A bat derogation licence will be sought for conservation works under the following reason:

"In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment"

A restoration and conservation management plan has been developed for Kilmacurragh House. The structural survey of the property has identified that the condition of the building has deteriorated over many years and considerable works are required to restore the building. These works have received planning permission. These works have potential impacts on roosting bats which utilise the structure.

A Do Nothing approach is not favourable as if no works are proposed the building will continue to deteriorate. The purpose of the works is to secure the surviving historic masonry of Kilmacurragh House for the long-term. It is currently in poor condition and will continue to deteriorate without intervention. The increased frequency of heavy rainfall events resulting from global warming will accelerate this deterioration. In addition the building currently poses a health and safety risk and a percentage of the grounds surrounding the building have been fenced off for safety reasons.

The proposed conservation works and mitigation measures set out below ensure the protection of the bats during the works and the long-term conservation of their roosting locations within the structure as well as the structure itself.

The species of bats recorded at Kilmacurragh (*Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri, Plecotus auritus, Myotis daubentonii, Pipistrellus nathusii, Myotis nattereri, Myotis mystacinus/brandtii*) are all listed as species of Least Conservation Concern with Leisler's bat being listed as Near Threatened and Brandt's/Nathusius not assessed/data deficient (Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.)

The proposed works to Kilmacurragh House will not be detrimental to the maintenance of populations of these species at a favourable conservation status in their natural range as required under Section 54 (2) of the European Communities (Birds and Natural Habitats) Regulations. A range of roosting locations will be retained within the structure to provide continued access to roosting sites for bats.

Overall the current condition of the property is very poor and at risk of collapse and failure. Given it's current poor condition it is generally only suitable as a roost for very small numbers of bats.

The works will ensure the long term conservation of Kilmacurragh House and will ensure that a variety of roosting locations are available for a variety of species of bats to utilise.

Given that the Bullnose is in relatively good condition it is recommended that any minor works to this area are prioritised on commencement of the project so the bats can continue to avail of this area during the ongoing works.

The works will need to be staggered so that if works are then required here that a finished roof space, such as in the remainder of the Kitchen Wing is complete and made available for the bats.

Given that a number of crevices that bats are availing of for roosting purposes have been identified these will be inspected by the bat specialist with an endoscope to check them for roosting bats and once bats are not present they can then be blocked up with hessian to prevent bats from re-entering them.

A new bat derogation licence will be required as the previous one has expired.

It is now a condition from the NPWS licensing section that bat derogation licences are only granted on an annual basis and must be applied for year on year.

5.7.2 Provision of Roosts for Bats

Detailed design will be completed by the bat specialist in conjunction with the project architects to ensure provision for roosting bats is designed in the restored building as appropriate. The design principles for same are set out below as guidance for the OPW and are being included within the project at detailed design stage.

Different species of bats have different roosting preferences as shown on **Figure 36**. At Kilmacurragh we have species of bat that favour crevices for roosting purposes (Common pipistrelle, soprano pipistrelle, Leisler's, Daubenton's and Whiskered bat) and bats that need a flight space in their roost (Natterer's and Brown long eared). Other *Myotis* bat species and possibly Nathusius's pipistrelle bat may also be present.

Roosting spaces to accommodate this have been developed in the overall project design following the guidance set out below in **Figures 37** to **42** for crevice dwelling species and **Figures 43** to **45** for species such as Natterer's and brown long eared bats.

Table 1.2: The roosting preferences of UK bat species

Category	Bat species
Crevice-dwelling bats (that tend to be hidden from view) and roof-void dwelling bats (that may be visible on roof timbers)	Common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Brandt's, whiskered Noctule, serotine, Leisler's, Daubenton's, greater mouse-eared, barbastelle and Bechstein's
Bats that need flight space in certain types of roost	Natterer's, and brown and grey long-eared
Bats that need flight space and flying access	Greater horseshoe, lesser horseshoe

Figure 36. Roosting requirements for bats.

5.7.3 Creation of a dedicated bat roosting area for crevice dwelling bats (Pipistrelle, Leisler's, Daubenton's and Whiskered)

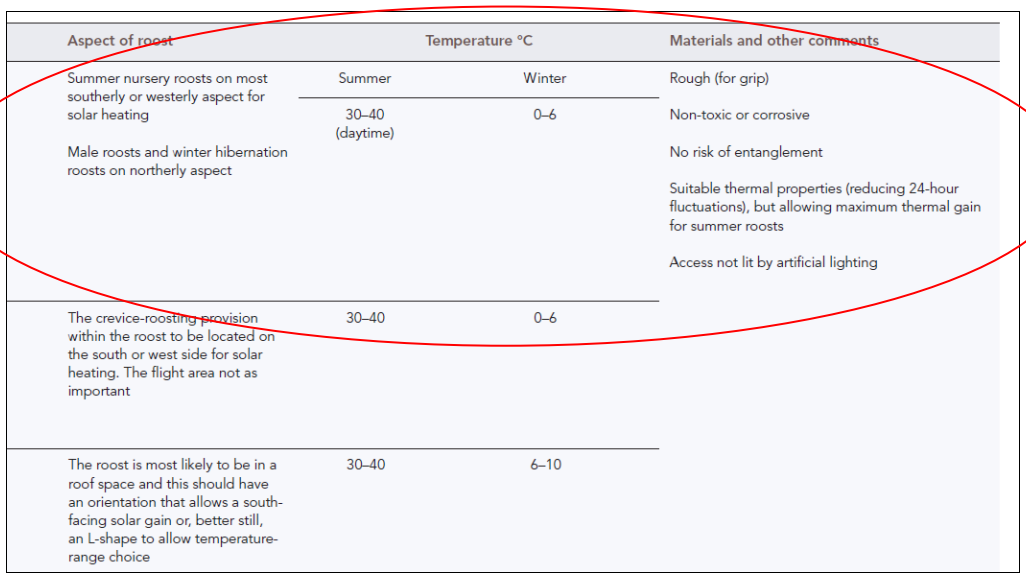
The renovation of the house will easily incorporate a dedicated bat roosting area for crevice dwelling bats. The general fabric of the roof space of the building will remain accessible to bats and not be closed off or sealed up particularly at the wall plate/roof interface.

Access points to the dedicated roosting area and the roost design has followed the best practice guidance for crevice dwelling species as set out below in **Figures 37** to **42** (Source: Dr Carol Williams of the Bat Conservation Trust (2010). Biodiversity for Low and Zero Carbon Buildings A Technical Guide for New Build).

Table 3.1: General outline of roosting and nesting requirements

Bat/bird species	Access dimensions	Roost/nesting dimensions	Height of entry
Crevice-dwelling bats	15–20 mm (h) x 20–50 mm (w)	Any size as long as some components of the area are crevices about 20–30 mm as the width of the gap Greater total areas of about 1 sq m would be useful for nursery (summer) roosts Male roosts contain smaller numbers of bats or even individual bats Roof void dwelling bats need timber joists or beams on which to roost	2–7 m
Bats needing a flying area	15–20 mm (h) x 20–50 mm (w)	2–2.8 m (h) x 5 m (w) x 5 m (l) not trussed to allow flight. Ideally 2.8 m height, but a height of 2 m may be acceptable in some circumstances. To incorporate roost crevices dimensions as above with crevice-dwelling bats	Over 2 m
Horseshoe bats	Lesser horseshoes 300 mm (w) x 200 mm (h) Greater horseshoes 400 mm (w) x 300 mm (h)	2–2.8 m (h) x 5 m (w) x 5 m (l) not trussed to allow flight. Ideally 2.8 m height, but a height of 2 m may be acceptable in some circumstances	Over 2 m

Figure 37. General outline of bat roosting and nesting requirements – crevice dwelling species.



Aspect of roost	Temperature °C		Materials and other comments
	Summer	Winter	Rough (for grip)
Summer nursery roosts on most southerly or westerly aspect for solar heating Male roosts and winter hibernation roosts on northerly aspect	30–40 (daytime)	0–6	Non-toxic or corrosive No risk of entanglement Suitable thermal properties (reducing 24-hour fluctuations), but allowing maximum thermal gain for summer roosts Access not lit by artificial lighting
The crevice-roosting provision within the roost to be located on the south or west side for solar heating. The flight area not as important	30–40	0–6	
The roost is most likely to be in a roof space and this should have an orientation that allows a south-facing solar gain or, better still, an L-shape to allow temperature-range choice	30–40	6–10	

Figure 38. General outline of bat roosting and nesting requirements – crevice dwelling species (contd.).

3.12.1 Roof space

Drawing Nos 5 and 6 provide provision for crevice-dwelling bats in a roof design that uses tiles and allows access to the space between the tiles/ slates and the U value envelope. Included in these figures are examples of the placement of some of the ready-made products, as well as bespoke bat-roosting areas.

Drawing No. 5
Roofspace 1 – solid wall construction at roof eaves and ridge providing places for bats and birds (uninsulated outbuilding)

1	Ridge roost, similar materials to (3c)
1a	Option: Could be empty ridge tile space with closed ends and ways through to next ridge tile space
2	Handmade clay ridge tile with bat access
3	Bat roost fixed to side of rafters below ridge beam, 2 boards spaced apart, 15–20 mm minimum, 25–30 mm maximum
3a	Option: Reclaimed, locally grown or FSC temperate softwood scraps
3b	Option: FSC WBP water boil proof plywood strips
3c	Option: Cement-wood particle board, Roughened/grooved surface for climbing and hanging
4	Reclaimed, locally grown or FSC temperate softwood rafters, 200 mm (avoid trussed rafters)
5	Reclaimed, locally grown or FSC temperate durable hardwood wall plate
6	As (7)
7	Potential roost/nest box/platform positions (not necessarily all together, along length of building) some face fixed, some sheltering under others
8	Bat access tile set, 18 mm gap x 165 mm long
9	Handmade clay plain tile roofing, 265 mm x 160 mm x 10 mm
10	Mortar bedding
11	Reclaimed, locally grown or FSC Oak or durable hardwood ridge purlin

Figure 39. Example of build up in roof space for crevice dwelling bats in an uninsulated roof space.

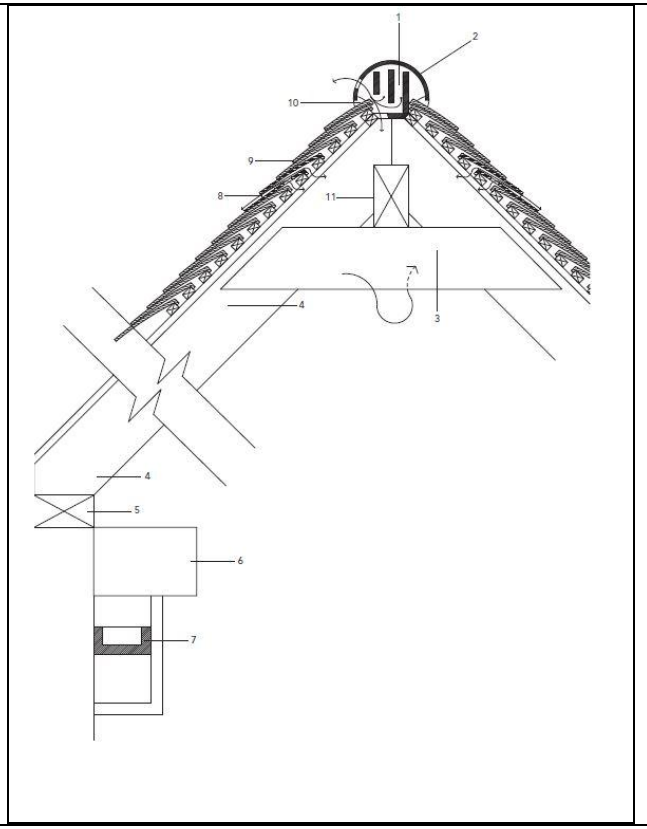


Figure 40. Drawing showing detailed design of roof space for crevice dwelling bats in an uninsulated space.

Drawing No. 6
Roofspace 2 – Insulated cavity wall and pitched roof providing places for bats and small birds

1 Additional layer of underlay below gap supported on FSC board on battens
2 'Pro clima Intello Plus' ATL Air tightness layer, polyolefine, lapped and sealed joints
3 Cellulose fibre insulation, 3 x 100 mm
4 Drylining ceiling board
5 Reclaimed, locally grown or FSC temperate softwood wall plate, 75 x 100 mm with GMS holding down straps
6 Air tight parge coat: clay, lime or gypsum, 5–8 mm or plaster
7 Cellular clay blockwork inner leaf, 100 mm
8 Reclaimed, locally grown or FSC temperate softwood wall plate, 100 x 75 mm
9 Full fill cavity wall insulation, 3 x 100 mm rock mineral fibre
10 Option: 2 part long wall tie, austenitic stainless steel (304 equivalent), 400 mm
10a Option: 'MagmaTech TeploTie Type 4', extruded basalt and fibre long wall tie, 425 x 6.5 dia. mm
11 Fired clay facing brick outer leaf, 102 x 215 x 65 mm
12 'RoofBLOCK masonry roof overhang system' Hollow precast 'eco-concrete' eaves/verge system incorporating bird or bat roosts (modified size required and shown here)
13 Gutter galvanized mild steel (half round)
14 Reclaimed, locally grown or FSC temperate softwood rafters, 200 mm (avoid trussed rafters)
15 Bat access tile set, 18 mm gap x 165 long mm
16 Cement-wood particle board, Roughened/grooved surface for climbing and hanging
17 'Pro clima Solitex Plus' WTL Wind Tightness Layer vapour permeable roofing underlay (breathing roof), lapped and sealed joints
17a Gap in underlay (17) below bat access tile set (15)
18 Reclaimed, locally grown or FSC temperate durable species softwood roof tiling battens
19 Handmade clay plain tile roofing, 265 x 160 x 10 mm

Figure 41. Example of build up in roof space for crevice dwelling bats in an insulated roof space.

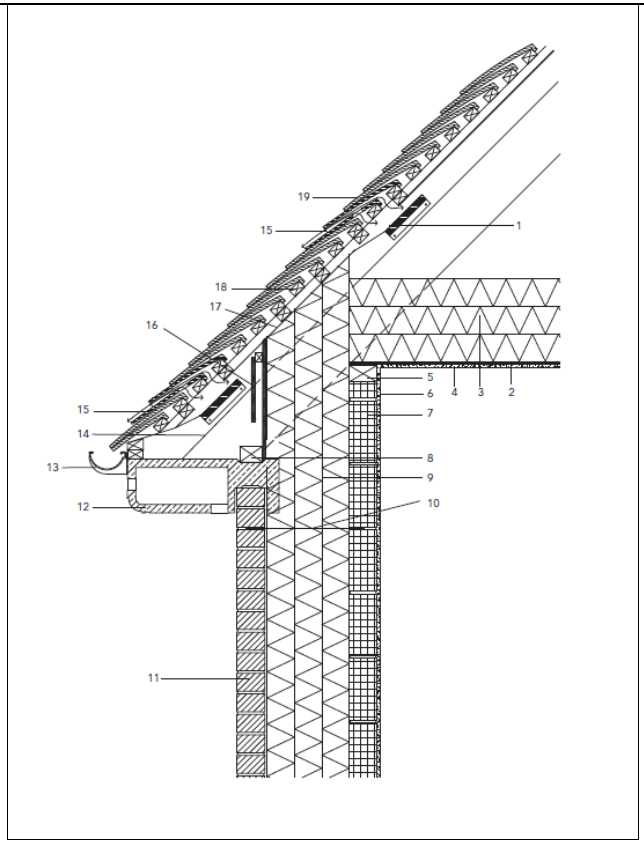


Figure 42. Drawing showing detailed design of roof space for crevice dwelling bats in an insulated space.

5.7.4 Creation of a dedicated bat roosting area within the house for bats requiring a flying area (Natterer's and brown long eared bats)

These bat species (brown long-eared and Natterer's) can, in the same way as crevice-dwelling bats, gain access to their roost spaces by crawling through a small gap, but they need a roost in which they can fly especially when females are roosting during the summer.

This fact will necessitate the use of a cold roof space in most instances as their need to gain access to a flight area would breach the U value envelope and air-tightness of that part of the structure. Inside the roof space, bats will roost within crevices (see **Figures 37** and **38**), but they will require the additional space for flying and dimensions of 2.8 m (h) x 5 m (w) x 5 m (l) are optimal. It is also important that this space does not have framed or trussed rafters to ensure sufficient flight space – see **Figures 43, 44** and **45**.

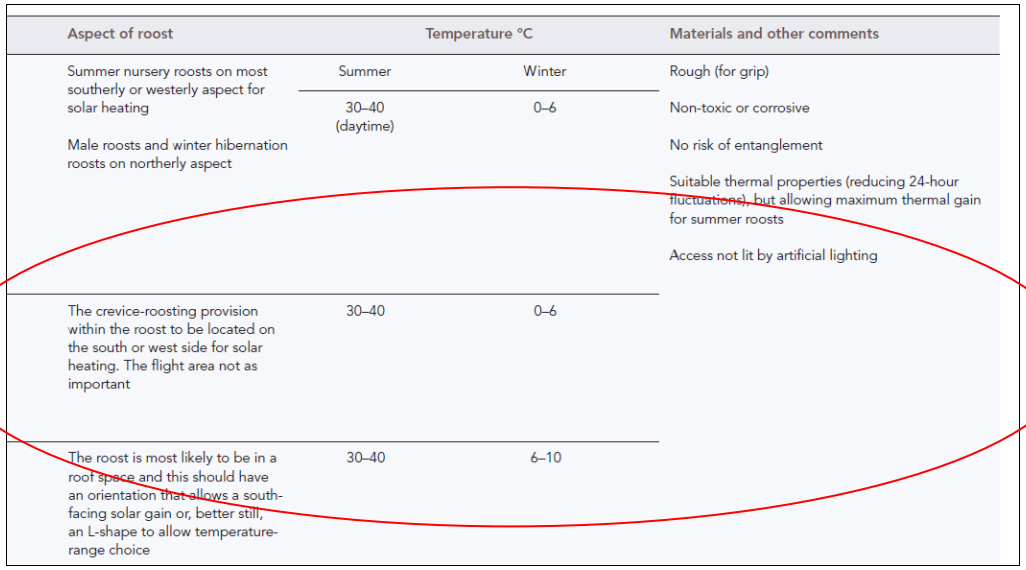
The roof spaces above both the Kitchen Wing and the Dining room could accommodate these bats within the attic spaces there (although the exact dimensions indicated above may not be possible to achieve at Kilmacurragh).

In the long term the Kitchen wing may provide suitable conditions for a maternity roost as the south facing aspect of the roof there may generate a warmer roof space whilst the dining room attic with it west/north/east aspect may offer an attentive species for bats to use at other times of the year.

Table 3.1: General outline of roosting and nesting requirements

Bat/bird species	Access dimensions	Roost/nesting dimensions	Height of entry
Crevice-dwelling bats	15–20 mm (h) x 20–50 mm (w)	Any size as long as some components of the area are crevices about 20–30 mm as the width of the gap Greater total areas of about 1 sq m would be useful for nursery (summer) roosts Male roosts contain smaller numbers of bats or even individual bats Roof void dwelling bats need timber joists or beams on which to roost	2–7 m
Bats needing a flying area	15–20 mm (h) x 20–50 mm (w)	2–2.8 m (h) x 5 m (w) x 5 m (l) not trussed to allow flight. Ideally 2.8 m height, but a height of 2 m may be acceptable in some circumstances. To incorporate roost crevices dimensions as above with crevice-dwelling bats	Over 2 m
Horseshoe bats	Lesser horseshoes 300 mm (w) x 200 mm (h) Greater horseshoes 400 mm (w) x 300 mm (h)	2–2.8 m (h) x 5 m (w) x 5 m (l) not trussed to allow flight. Ideally 2.8 m height, but a height of 2 m may be acceptable in some circumstances	Over 2 m

Figure 43. General outline of bat roosting and nesting requirements – Natterer's and brown long eared bats.



Aspect of roost	Temperature °C		Materials and other comments
Summer nursery roosts on most southerly or westerly aspect for solar heating Male roosts and winter hibernation roosts on northerly aspect	Summer	Winter	Rough (for grip) Non-toxic or corrosive No risk of entanglement Suitable thermal properties (reducing 24-hour fluctuations), but allowing maximum thermal gain for summer roosts Access not lit by artificial lighting
	30–40 (daytime)	0–6	
The crevice-roosting provision within the roost to be located on the south or west side for solar heating. The flight area not as important	30–40	0–6	
The roost is most likely to be in a roof space and this should have an orientation that allows a south-facing solar gain or, better still, an L-shape to allow temperature-range choice	30–40	6–10	

Figure 44. General outline of bat roosting and nesting requirements – Natterer's and brown long eared bats.

Consideration	Solution
Where in a development	Anywhere where the access is not illuminated by artificial lighting
Where in a building	The crevice roosting provision within the roost is to be located on the south or west side for solar heating. The flight area is not as important
Height	Over 2 m
Roost dimensions	2–2.8 m (h) x 5 m (w) x 5 m (l), not trussed. Ideally 2.8 m height, but a height of 2 m may be acceptable in some circumstances To incorporate roost cervices with dimensions of any size as long as some components of the area are crevices in the region of 20–30 mm x width of gap Greater total areas of something like 1 sq m would be useful for nursery (summer) roosts
Access dimensions	15–20 mm (h) x 20–50 mm (w)
Other considerations	Rough (for grip) Non-toxic and non-corrosive No risk of entanglement Suitable thermal properties (reducing 24-hour fluctuations), but allowing maximum thermal gain Access not lit by artificial lighting

Figure 45. Considerations and key requirements for bats needing flying space – Natterer's and brown long eared bats.

A site meeting will be required with the contractor prior to works commencing to explain the concept of the roost design and the requirements of the bats.

5.7.5 Roofing Membranes

In recent years concerns have been raised about the use of modern roofing membranes in buildings either used by or designed for future bat uses. These are called Non-Bitumen Coated Roofing Membranes. Their use in general has not been recommended as they can entrap and tangle bats causing their death.

The Bat Mitigation Guidelines for Ireland state:
'Modern roof linings and breathable membranes that are composed of fibres have been shown to trap and ensnare bats causing mortality. These are

commonly called "Non-bitumen coated roofing membranes". The use of these materials should be carefully considered if bats are in the building. Older linings such as mineral felt or rough timber should instead be used where possible to facilitate bat roosting. It may however be acceptable to use breathable membranes and such linings in conjunction with older linings, on the advice of a bat specialist, if it can be ensured that bats will only come into contact with the latter. In some cases breathable membranes can be made safe for bats by adding a layer of Netlon and batons'.

In the UK the Bat Conservation Trust brought together Natural England, NatureScot, Natural Resources Wales, senior academics, bat ecologists and industry experts in roofing materials to form a steering group that has set up the test protocols for roofing underlays intended for use where bats are present.

At present only one product in the UK has passed the snagging propensity test completed by an independent laboratory. This is **TLX 'Bat Safe'**.

For technical questions covering any of the below areas in relation to TLX 'Bat Safe' please contact TLX Insulation on [redacted]

TLX can provide free technical support from their head office in Bolton on:

- How TLX Batsafe should be installed
- Building regulations advise and how they apply
- Condensation risk calculations
- Access to CAD drawings
- Energy payback calculations
- Advice can also be sought from building control or the relevant manufacturer of any membrane that has passed the snagging propensity test.

Additional products may also be approved in the intervening period of the project so it is recommended that updates on whether other suitable products have passed the independent snagging propensity test are checked with the steering group.

5.7.6 Water Tanks

Should any water tanks be sited within the roof space of the property they will be permanently covered to prevent future accidental drowning of and contamination by bats.

5.7.7 Timber Treatment/Insecticides

Should any necessary timber treatment operations be required (e.g. of extant roof timbers which are to be conserved or of new timbers proposed for use) only bat safe poisons will be used. The OPW and building contractor will ensure that only bat safe, pre-treated timbers are used where necessary during the restoration of the roof. Should any of the timbers or roof spaces

within the buildings require the use of insecticides only bat safe insecticides will be used.

5.7.8 Provision of bat Boxes in Kilmacurragh Demesne and Deer Park

Bats can benefit from the provision of bat boxes in the wider landscape. A variety of bat boxes will therefore be erected on the property to provide potential roosting locations for bats.

5.7.9 Lighting

Many species of bats are sensitive to lighting and it has been shown that lighting can deter bats from using an area for foraging. Given the importance of the property at Kilmacurragh with a confirmed bat roost present in adjoining buildings and the recorded presence of several species of foraging bats it is important that Kilmacurragh House, adjoining buildings and yard, and adjoining wooded habitats, pond, watercourse, mature trees, meadows and walled garden are not directly illuminated.

Access points to the roosting locations in the house will not be illuminated and no additional lighting will be developed for the property and adjoining yard and buildings without detailed design in terms of the potential impacts of same on the bats. If any additional lighting is required around the property for security or safety (beyond that already provided in the car park) it will be placed below tree canopy height to a lower level and where practicable it should be provided by bollard lighting. This would reduce the illumination of trees and other foraging habitats and ensure these areas remain dark for bats to forage in.

Should any additional lighting be proposed for the property it will be wildlife friendly. General design recommendations from the BCT (2010) for wildlife-friendly lighting include:

1. Do not "over" light. This is a major cause of obtrusive light and is a waste of energy. Use only the minimum amount of light needed for safety. There are published standards for most lighting tasks, adherence to which will help minimise upward reflected light.
2. Eliminate any bare bulbs and any light pointing upwards. The spread of light should be kept near to or below the horizontal.
3. Use narrow spectrum bulbs to lower the range of species affected by lighting.
4. Use light sources that emit minimal ultra-violet light. Insects are attracted to light sources that emit ultra-violet radiation.
5. Reduce light-spill so that light reaches only areas needing illumination. Shielding or cutting light can be achieved through the design of the luminaire or with accessories, such as hoods, cowls, louvers and shields to direct the light.
6. Reduce the height of lighting columns. Light at a low level reduces ecological impact. However, higher mounting heights allow lower main beam angles, which can assist in reducing glare.
7. For pedestrian lighting, use low level lighting that is directional as possible and below 3 lux at ground level.

8. Limit the times that lights are on to provide some dark periods for wildlife.
9. Use lighting design computer programs and professional lighting designers to predict where light spill will occur.
10. In general any lighting used in the development should not overspill onto the adjoining trees and woodland thereby ensuring that a dark corridor for foraging and commuting bats and movement for other wildlife is maintained.

5.7.10 Health and Safety Issues

Workers on the project should be informed that bats are a protected species under both Irish and European legislation. Ideally bats should only be handled by a licensed bat specialist. If a grounded bat is encountered (typically a young bat) it will only be handled wearing gloves and lifted up in a piece of cloth (such as a tea towel) before being placed in a ventilated closed cardboard box. A bat specialist will be called and can then attend site and advise on what to do. As with all wild animals bats can carry diseases and hence protective measures to ensure that one is not bitten by a bat should be taken.

5.7.11 Bat Monitoring

Monitoring will be required on an ongoing basis over the lifetime of the project and will also be completed post-construction works. This monitoring will involve the following aspects:

- Monitoring of the bat mitigation measures as set out in this report. All mitigation measures will be checked to determine that they were successful.
- A full summer bat survey will be required annually to inform each bat derogation licence.
- A full summer bat survey will be completed post-works.

5.8 Invasive Species

The only invasive species noted in the current survey was the Grey Squirrel, which is a non-native invasive species listed under the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014). The presence and recovery of natural populations of Pine marten in Ireland have been shown to restore the balance of non-native grey v's native red squirrels as the pine marten is a natural predator of the grey squirrel. Pine marten has been recorded from within 2km of Kilmacurragh locally in the townlands of Ballinclare and Carrigmore and may be present on site but have not yet been confirmed. The provision of a den box for pine marten within the deer park could assist in encouraging this species within the property. (Note that this survey focused on the buildings only and did not extend to the gardens).

5.9 Gaps or Further Studies

Prior to any works commencing a breeding bird and bat survey should be repeated as a significant time is likely to have passed between this present study and the project commencing. A study such as this provides only a snapshot in time of faunal use of a site which can alter over time.

5.10 Ecological Clerk of Works

The Design Team lead, with the support and oversight of a retained qualified ecologist will ensure the various mitigation measures outlined in this report are implemented.

5.11 Future Works at Kilmacurragh

The protection of bats and other species should be considered in any future renovations to small stone buildings/other built structures within the gardens such as the Gothic Folly at the Upper Monks Walk and the Changing Rooms at the bottom of the Lower Monks Walk.

There are also a large number of buildings within the courtyard which have never been surveyed and bats may be availing of these for roosting purposes also. It is recommended that they are examined.

Other parts of the property should be subject to a detailed biodiversity study to ensure that any increased public access to these areas following the acquisition of the Deer Park by NBG does not result in disturbance to any protected species such as Badger (*Meles meles*).

6. CONCLUSION

The ecological surveys were designed to ensure minimal impacts on biodiversity associated with the house during the proposed conservation, renovation and restoration works. These included surveys of bats, nesting birds, vegetation on the house and immediate surrounds (bryophytes, vascular plants and invasive species).

Kilmacurragh House contains a confirmed roost for Brown long-eared bats, Common and Soprano Pipistrelles, Leisler's bat, Natterer's bat and potentially other species such as Whiskered, Daubenton's and Nathusius's pipistrelle.

These are mostly small numbers of bats and it appears that a small maternity roost of Brown long-eared bats have taken up residence in the Bullnose since the previous bar derogation licence application was granted in 2023.

A wide diversity of species were recorded during the present surveys.

A bat derogation licence was therefore sought from National Parks and Wildlife Service given the likelihood of encountering bats over the course of the building renovation. This licence is presented in **Appendix 3**.

Ultimately the restoration of Kilmacurragh House will be of benefit to bats as the building will be preserved and utilised and the renovation works will include access for roosting bats.

The provision of artificial bird and bat nesting boxes on other buildings or in suitable locations throughout the property will mitigate for the loss of confirmed nesting sites and roosting opportunities within the house which have been identified to date.

A number of measures to ensure the conservation of bryophytes and ferns on the basement wall of the house are also detailed and will be implemented.

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8. APPENDIX 1 – NBDC RECORDS

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
bird	Common Blackbird (Turdus merula)	1	19/12/2016	Birds of Ireland	
bird	Common Buzzard (Buteo buteo)	2	16/05/2021	Birds of Ireland	
bird	Common Raven (Corvus corax)	1	06/08/2020	Birds of Ireland	
bird	Eurasian Jackdaw (Corvus monedula)	1	06/08/2020	Birds of Ireland	
bird	European Goldfinch (Carduelis carduelis)	1	06/08/2020	Birds of Ireland	
bird	European Greenfinch (Carduelis chloris)	1	19/07/2020	Birds of Ireland	
bird	Great Spotted Woodpecker (Dendrocopos major)	1	07/06/2021	Birds of Ireland	
bird	Red Kite (Milvus milvus)	1	21/03/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
conifer	European Silver-fir (Abies alba)	1	07/08/2009	Heritage Trees of Ireland	
fern	Maidenhair Spleenwort (Asplenium trichomanes)	1	03/06/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Common Bird's-foot-trefoil (Lotus corniculatus)	1	22/07/2018	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Common Dog-violet (Viola riviniana)	1	18/04/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Common Knapweed (Centaurea nigra)	1	27/08/2017	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Common Spotted-orchid (Dactylorhiza fuchsii)	1	24/07/2021	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Cupressus lusitanica	2	07/08/2009	Heritage Trees of Ireland	
flowering plant	Devil's-bit Scabious (Succisa pratensis)	1	27/08/2017	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Early-purple Orchid (Orchis mascula)	1	03/06/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Greater Bird's-foot-trefoil (Lotus pedunculatus)	1	24/07/2021	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Herb-Robert (Geranium robertianum)	1	03/06/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Ivy-leaved Toadflax (Cymbalaria muralis)	1	03/06/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
flowering plant	Laureliopsis philippiana	1	07/08/2009	Heritage Trees of Ireland	
flowering plant	Purple-loosestrife (Lythrum salicaria)	1	27/08/2017	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Selfheal (Prunella vulgaris)	2	24/07/2021	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
flowering plant	Tree Rhododendron (Rhododendron arboreum)	1	07/08/2009	Heritage Trees of Ireland	
insect - beetle (Coleoptera)	7-spot Ladybird (Coccinella septempunctata)	1	26/08/2018	Ladybirds of Ireland	
insect - butterfly	Comma (Polygonia c-album)	5	17/08/2019	Butterflies of Ireland	
insect - butterfly	Common Blue (Polyommatus icarus)	8	23/08/2021	Butterflies of Ireland	
insect - butterfly	Green-veined White (Pieris napi)	6	07/08/2020	Butterflies of Ireland	
insect - butterfly	Holly Blue (Celastrina argiolus)	4	23/08/2021	Butterflies of Ireland	
insect - butterfly	Large White (Pieris brassicae)	7	27/08/2021	Butterflies of Ireland	
insect - butterfly	Meadow Brown (Maniola jurtina)	13	07/08/2020	Butterflies of Ireland	
insect - butterfly	Orange-tip (Anthocharis cardamines)	5	14/05/2021	Butterflies of Ireland	
insect - butterfly	Painted Lady (Vanessa cardui)	12	25/08/2019	Butterflies of Ireland	
insect - butterfly	Peacock (Inachis io)	17	27/08/2021	Butterflies of Ireland	
insect - butterfly	Red Admiral (Vanessa atalanta)	18	27/08/2021	Butterflies of Ireland	
insect - butterfly	Ringlet (Aphantopus hyperantus)	2	05/08/2019	Butterflies of Ireland	
insect - butterfly	Silver-washed Fritillary (Argynnis paphia)	2	14/08/2018	Butterflies of Ireland	
insect - butterfly	Small Copper (Lycaena phlaeas)	6	23/08/2021	Butterflies of Ireland	
insect - butterfly	Small Heath (Coenonympha pamphilus)	1	05/08/2019	Butterflies of Ireland	Threatened Species: Near threatened
insect - butterfly	Small Tortoiseshell (Aglais urticae)	8	27/08/2021	Butterflies of Ireland	
insect - butterfly	Small White (Pieris rapae)	6	02/08/2019	Butterflies of Ireland	
insect - butterfly	Speckled Wood (Pararge aegeria)	19	27/08/2021	Butterflies of Ireland	
insect - dragonfly (Odonata)	Azure Damselfly (Coenagrion puella)	2	24/06/2021	Dragonfly Ireland 2019 to 2024	
insect - dragonfly (Odonata)	Blue-tailed Damselfly (Ischnura elegans)	2	01/07/2021	Dragonfly Ireland 2019 to 2024	

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
insect - dragonfly (Odonata)	Brown Hawker (Aeshna grandis)	2	25/08/2019	Dragonfly Ireland 2019 to 2024	
insect - dragonfly (Odonata)	Common Blue Damselfly (Enallagma cyathigerum)	1	18/06/2017	Dragonfly Records	
insect - dragonfly (Odonata)	Common Hawker (Aeshna juncea)	1	25/08/2019	Dragonfly Ireland 2019 to 2024	
insect - dragonfly (Odonata)	Emperor Dragonfly (Anax imperator)	6	24/06/2021	Dragonfly Ireland 2019 to 2024	
insect - dragonfly (Odonata)	Four-spotted Chaser (Libellula quadrimaculata)	1	26/06/2015	Dragonfly Records	
insect - dragonfly (Odonata)	Large Red Damselfly (Pyrrhosoma nymphula)	5	24/06/2021	Dragonfly Ireland 2019 to 2024	
insect - hymenopteran	Andrena (Hoplandrena) scotica	1	28/05/2018	Bees of Ireland	
insect - hymenopteran	Barbut's Cuckoo Bee (Bombus (Psithyrus) barbutellus)	1	27/07/2015	Bees of Ireland	Threatened Species: Endangered
insect - hymenopteran	Bombus (Bombus) terrestris	11	13/02/2022	Bees of Ireland	
insect - hymenopteran	Bombus lucorum agg.	24	07/08/2019	Bees of Ireland	
insect - hymenopteran	Common Carder Bee (Bombus (Thoracombus) pascuorum)	25	07/08/2019	Bees of Ireland	
insect - hymenopteran	Early Bumble Bee (Bombus (Pyrobombus) pratorum)	12	07/08/2019	Bees of Ireland	
insect - hymenopteran	Early Mining Bee (Andrena (Trachandrena) haemorrhoa)	1	07/05/2017	Bees of Ireland	
insect - hymenopteran	Four Coloured Cuckoo Bee (Bombus (Psithyrus) sylvestris)	1	26/06/2015	Bees of Ireland	
insect - hymenopteran	Gipsy Cuckoo Bee (Bombus (Psithyrus) bohemicus)	3	18/08/2015	Bees of Ireland	Threatened Species: Near threatened
insect - hymenopteran	Honey Bee (Apis mellifera)	15	07/08/2019	Bees of Ireland	
insect - hymenopteran	Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius)	20	24/07/2021	Bees of Ireland	Threatened Species: Near threatened

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
insect - hymenopteran	Moss Carder-bee (Bombus (Thoracombus) muscorum)	4	18/08/2015	Bees of Ireland	Threatened Species: Near threatened
insect - hymenopteran	Small Garden Bumble Bee (Bombus (Megabombus) hortorum)	5	27/07/2015	Bees of Ireland	
insect - moth	Agapeta hamana	1	03/07/2021	Moths Ireland	
insect - moth	Agonopterix propinquella	1	08/09/2021	Moths Ireland	
insect - moth	Angle Shades (Phlogophora meticulosa)	1	17/06/2021	Moths Ireland	
insect - moth	Barred Fruit-tree Tortrix (Pandemis cerasana)	2	03/07/2021	Moths Ireland	
insect - moth	Beautiful Carpet (Mesoleuca albicillata)	1	03/07/2021	Moths Ireland	
insect - moth	Bright-line Brown-eye (Lacanobia oleracea)	1	03/07/2021	Moths Ireland	
insect - moth	Brimstone Moth (Opisthograptis luteolata)	4	08/09/2021	Moths Ireland	
insect - moth	Broken-barred Carpet (Electrophaes corylata)	2	03/07/2021	Moths Ireland	
insect - moth	Brown Silver-line (Petrophora chlorosata)	3	17/06/2021	Moths Ireland	
insect - moth	Brussels Lace (Cleorodes lichenaria)	2	17/08/2021	Moths Ireland	
insect - moth	Buff Arches (Habrosyne pyritoides)	1	17/06/2021	Moths Ireland	
insect - moth	Buff Footman (Eilema depressa)	2	08/09/2021	Moths Ireland	
insect - moth	Bulrush Wainscot (Nonagria typhae)	1	17/08/2021	Moths Ireland	
insect - moth	Celypha aurofasciana	1	03/07/2021	Moths Ireland	
insect - moth	Celypha lacunana	1	17/06/2021	Moths Ireland	
insect - moth	Chequered Fruit-tree Tortrix (Pandemis corylana)	1	17/08/2021	Moths Ireland	
insect - moth	Clepsis consimilana	1	03/07/2021	Moths Ireland	
insect - moth	Clouded Border (Lomaspilis marginata)	4	03/07/2021	Moths Ireland	
insect - moth	Clouded Silver (Lomographa temerata)	1	03/07/2021	Moths Ireland	
insect - moth	Common Carpet (Epirrhoe alternata)	3	17/08/2021	Moths Ireland	
insect - moth	Common Grass-veneer (Agriphila tristella)	1	17/08/2021	Moths Ireland	
insect - moth	Common Marbled Carpet (Chloroclysta truncata)	4	17/08/2021	Moths Ireland	

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
insect - moth	Common Pug (Eupithecia vulgata)	1	17/06/2021	Moths Ireland	
insect - moth	Common Swift (Hepialus lupulinus)	1	03/07/2021	Moths Ireland	
insect - moth	Common Wave (Cabera exanthemata)	1	17/06/2021	Moths Ireland	
insect - moth	Common White Wave (Cabera pusaria)	3	03/07/2021	Moths Ireland	
insect - moth	Copper Underwing (Amphipyra pyramidea)	1	17/08/2021	Moths Ireland	
insect - moth	Cryptoblabes bistriga	1	03/07/2021	Moths Ireland	
insect - moth	Cydia splendana	1	17/08/2021	Moths Ireland	
insect - moth	Dark Spectacle (Abrostola triplasia)	1	17/08/2021	Moths Ireland	
insect - moth	Dingy Shell (Euchoeca nebulata)	1	03/07/2021	Moths Ireland	
insect - moth	Double-square Spot (Xestia triangulum)	1	03/07/2021	Moths Ireland	
insect - moth	Double-striped Pug (Gymnoscelis rufifasciata)	2	08/09/2021	Moths Ireland	
insect - moth	Dun-bar (Cosmia trapezina)	1	17/08/2021	Moths Ireland	
insect - moth	Early Thorn (Selenia dentaria)	1	17/08/2021	Moths Ireland	
insect - moth	Eucosma campoliliana	1	03/07/2021	Moths Ireland	
insect - moth	Eudonia delunella	1	17/08/2021	Moths Ireland	
insect - moth	Eudonia mercurella	2	17/08/2021	Moths Ireland	
insect - moth	Eulia ministrana	1	17/06/2021	Moths Ireland	
insect - moth	Flame (Axylia putris)	1	08/09/2021	Moths Ireland	
insect - moth	Flame Carpet (Xanthorhoe designata)	4	17/08/2021	Moths Ireland	
insect - moth	Flame Shoulder (Ochropleura plecta)	1	08/09/2021	Moths Ireland	
insect - moth	Furness Dowd (Blastobasis adustella)	3	08/09/2021	Moths Ireland	
insect - moth	Garden Carpet (Xanthorhoe fluctuata)	1	17/08/2021	Moths Ireland	
insect - moth	Garden Grass-veneer (Chrysoteuchia culmella)	1	03/07/2021	Moths Ireland	
insect - moth	Garden Rose Tortrix (Acleris variegana)	1	03/07/2021	Moths Ireland	
insect - moth	Ghost Moth (Hepialus humuli)	1	03/07/2021	Moths Ireland	

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
insect - moth	Gold Spot (Plusia festucae)	2	08/09/2021	Moths Ireland	
insect - moth	Golden Argent (Argyresthia goedartella)	2	17/08/2021	Moths Ireland	
insect - moth	Green Arches (Anaplectoides prasina)	1	03/07/2021	Moths Ireland	
insect - moth	Green Carpet (Colostygia pectinataria)	3	08/09/2021	Moths Ireland	
insect - moth	Grey Pug (Eupithecia subfuscata)	2	17/06/2021	Moths Ireland	
insect - moth	Heart & Dart (Agrotis exclamationis)	1	03/07/2021	Moths Ireland	
insect - moth	Holly Tortrix (Rhopobota naevana)	1	17/08/2021	Moths Ireland	
insect - moth	Ingrailed Clay (Diarsia mendica)	1	17/06/2021	Moths Ireland	
insect - moth	Iron Prominent (Notodonta dromedarius)	1	03/07/2021	Moths Ireland	
insect - moth	July Highflyer (Hydriomena furcata)	2	17/08/2021	Moths Ireland	
insect - moth	Large Yellow Underwing (Noctua pronuba)	2	08/09/2021	Moths Ireland	
insect - moth	Lesser Broad-bordered Yellow Underwing (Noctua janthe)	1	17/08/2021	Moths Ireland	
insect - moth	Light Emerald (Campaea margaritata)	1	03/07/2021	Moths Ireland	
insect - moth	Long-horned Flat-body (Carcina quercana)	1	17/08/2021	Moths Ireland	
insect - moth	Map-winged Swift (Hepialus fusconebulosa form gallicus)	2	03/07/2021	Moths Ireland	
insect - moth	Marbled Minor agg. (Oligia strigilis agg.)	1	03/07/2021	Moths Ireland	
insect - moth	Marbled White Spot (Protodeltote pygarga)	2	03/07/2021	Moths Ireland	
insect - moth	Monochroa cytisella	1	03/07/2021	Moths Ireland	
insect - moth	Mottled Beauty (Alcis repandata)	2	03/07/2021	Moths Ireland	
insect - moth	Nut Bud Moth (Epinotia tenerana)	1	03/07/2021	Moths Ireland	
insect - moth	Orange Sallow (Xanthia citrago)	1	08/09/2021	Moths Ireland	
insect - moth	Pale Tussock (Calliteara pudibunda)	2	17/06/2021	Moths Ireland	
insect - moth	Peach Blossom (Thyatira batis)	2	03/07/2021	Moths Ireland	
insect - moth	Peppered Moth (Biston betularia)	2	03/07/2021	Moths Ireland	

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
insect - moth	Poplar Hawk-moth (Laothoe populi)	1	17/06/2021	Moths Ireland	
insect - moth	Purple Clay (Diarsia brunnea)	2	03/07/2021	Moths Ireland	
insect - moth	Red-green Carpet (Chloroclysta siterata)	2	08/09/2021	Moths Ireland	
insect - moth	Riband Wave (Idaea aversata)	1	03/07/2021	Moths Ireland	
insect - moth	Rosy Rustic (Hydraecia micacea)	2	08/09/2021	Moths Ireland	
insect - moth	Ruddy Highflyer (Hydriomena ruberata)	3	17/06/2021	Moths Ireland	
insect - moth	Sallow Kitten (Furcula furcula)	1	03/07/2021	Moths Ireland	
insect - moth	Scalloped Hazel (Odontopera bidentata)	3	17/06/2021	Moths Ireland	
insect - moth	Scoparia ambigualis	2	03/07/2021	Moths Ireland	
insect - moth	Setaceous Hebrew Character (Xestia c-nigrum)	2	08/09/2021	Moths Ireland	
insect - moth	Shaded Broad-bar (Scotopteryx chenopodiata)	1	17/08/2021	Moths Ireland	
insect - moth	Silver Y (Autographa gamma)	1	17/08/2021	Moths Ireland	
insect - moth	Silver-ground Carpet (Xanthorhoe montanata)	2	17/06/2021	Moths Ireland	
insect - moth	Small Angle Shades (Euplexia lucipara)	1	03/07/2021	Moths Ireland	
insect - moth	Small Clouded Brindle (Apamea unanimis)	1	17/06/2021	Moths Ireland	
insect - moth	Small Engrailed (Ectropis crepuscularia)	1	17/06/2021	Moths Ireland	
insect - moth	Small Fan-foot (Herminia grisealis)	2	03/07/2021	Moths Ireland	
insect - moth	Small Fan-footed Wave (Idaea biselata)	2	17/08/2021	Moths Ireland	
insect - moth	Small Phoenix (Ecliptopera silaceata)	2	17/08/2021	Moths Ireland	
insect - moth	Small Square-spot (Diarsia rubi)	3	08/09/2021	Moths Ireland	
insect - moth	Snout (Hypena proboscidalis)	1	17/08/2021	Moths Ireland	
insect - moth	Square-spot Rustic (Xestia xanthographa)	2	08/09/2021	Moths Ireland	
insect - moth	Straw Grass-veneer (Agriphila straminella)	1	17/08/2021	Moths Ireland	
insect - moth	Tawny-barred Angle (Macaria liturata)	2	03/07/2021	Moths Ireland	
insect - moth	Tinea semifulvella	1	17/06/2021	Moths Ireland	

Species group	Species name	Record count	Date of last record	Title of dataset	Designation
insect - moth	Trachycera advenella	1	17/08/2021	Moths Ireland	
insect - moth	Udea olivalis	3	03/07/2021	Moths Ireland	
insect - moth	Uncertain (Hoplodrina alsines)	1	03/07/2021	Moths Ireland	
insect - moth	V-pug (Chloroclystis v-ata)	1	17/08/2021	Moths Ireland	
insect - moth	Wakely's Dowd (Blastobasis lacticolella)	1	17/06/2021	Moths Ireland	
insect - moth	White Ermine (Spilosoma lubricipeda)	3	03/07/2021	Moths Ireland	
insect - moth	White-pinion Spotted (Lomographa bimaculata)	1	17/06/2021	Moths Ireland	
insect - moth	White-spotted Pug (Eupithecia tripunctaria)	1	17/08/2021	Moths Ireland	
insect - moth	Willow Beauty (Peribatodes rhomboidaria)	1	17/08/2021	Moths Ireland	
insect - true fly (Diptera)	Merodon equestris	1	18/06/2017	Hoverflies (Syrphidae) of Ireland	
insect - true fly (Diptera)	Myathropa florea	1	27/08/2017	Hoverflies (Syrphidae) of Ireland	
liverwort	Dilated Scalewort (Frullania dilatata)	1	09/09/2007	Bryophytes of Ireland	Threatened Species: Least concern
moss	Lyell's Bristle-moss (Orthotrichum lyellii)	1	09/09/2007	Bryophytes of Ireland	Threatened Species: Least concern
moss	Silky Wall Feather-moss (Homalothecium sericeum)	1	09/09/2007	Bryophytes of Ireland	Threatened Species: Least concern
moss	Straw Bristle-moss (Orthotrichum stramineum)	1	09/09/2007	Bryophytes of Ireland	Threatened Species: Vulnerable

9. APPENDIX 2 – BAT ECOLOGY

Bat ecology – general

The bat is the only mammal that is capable of true flight. There are over 1,100 species worldwide, representing almost a quarter of all mammal species. There are 47 species in Europe - in Ireland, ten species of bat are currently known to exist, which are classified into two families, the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats).

Prey

All the European bat species feed exclusively on insects. A Pipistrelle, weighing only 4 to 8 grammes, will eat up to 3000 insects every night, ensuring a build up of fat in the bat's body to allow it to survive the winter deep in hibernation.

Breeding and longevity

Irish bats can produce one young per year but, more usually, only one young is born every two years (Boyd & Stebbings, 1989). This slow rate of reproduction inhibits repopulation in areas of rapid decline. Although bats have been known to live for twenty or more years, this is rare as most die in their first and the average lifespan, in the wild, is four years.

Threats

In general bat species have been in decline as they face many threats to their highly developed and specialised lifestyles. Many bats succumb to poisons used as woodworm treatments within their roosting sites (Racey & Swift, 1986). Agricultural intensification, with the loss of hedgerows, treelines, woodlands and species-rich grasslands have impacted bat species also. Habitual roosting or hibernation sites in caves, mines, trees and disused buildings are also often lost to development. Summer roosts are prone to disturbance from vandals. Agricultural pesticides accumulate in their prey, reaching lethal doses (Jefferies, 1972). Chemical treatments in cattle production sterilise dung thus ensuring that no insects can breed within it to be fed upon by bats. Likewise, river pollution, from agricultural runoff, reduces the abundance of aquatic insects. Road building, with the resultant loss of foraging and roosting sites is a significant cause in the reduction of bat populations across Europe.

Extinction

As recently as 1992, the greater mouse-eared bat *Myotis myotis* became the first mammal to become extinct in Britain since the wolf in the 18th century.

Description of bat species known from Ireland

Common pipistrelle *Pipistrellus pipistrellus*
This species was only recently separated from its sibling, the soprano or brown pipistrelle *P. pygmaeus*, which is detailed below (Barratt *et al*, 1997). The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland.

Soprano pipistrelle *Pipistrellus pygmaeus*
The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle on detector. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings but tree holes and heavy ivy are also used. Roost numbers can exceed 1,500 animals in mid-summer.

Nathusius' pipistrelle *Pipistrellus nathusii*
Nathusius' pipistrelle is a recent addition to the Irish fauna and has mainly been recorded from the north-east of the island in Counties Antrim and Down (Richardson, 2000) and also in Fermanagh, Longford and Cavan. It has also recently been recorded in Counties Cork and Kerry (Kelleher, 2005). However, the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. The status of the species has not yet been determined.

Leisler's bat *Nyctalus leisleri*
This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddis-flies and beetles. The echolocation calls are sometimes audible to the human ear being around 15 kHz at their lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. This species is uncommon in Europe and as Ireland holds the largest national population the species is considered as Near Threatened here.

Brown long-eared bat *Plecotus auritus*
This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey. Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversize ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector. Furthermore, keeping within the foliage, as it does, it is easily overlooked. It prefers to roost in old buildings.

Natterer's bat *Myotis nattereri*
This species has a slow to medium flight, usually over trees but sometimes over water. It usually follows hedges and treelines to its feeding sites, consuming flies, moths, caddis-flies and spiders. Known roosts are usually in old stone buildings but

they have been found in trees and bat boxes. The Natterer's bat is one of our least studied species and further work is required to establish its status in Ireland.

Whiskered bat *Myotis mystacinus*
This species, although widely distributed, has been rarely recorded in Ireland. It is often found in woodland, frequently near water. Flying high, near the canopy, it maintains a steady beat and sometimes glides as it hunts. It also gleans spiders from the foliage of trees. Whiskered bats prefer to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and sometimes bat boxes. The whiskered bat is one of our least studied species and further work is required to establish its status in Ireland.

Brandt's bat *Myotis brandtii*
This species is known from five specimens found in Counties Wicklow (Mullen, 2007), Cavan, and Clare in 2003, a specimen in Kerry in 2005 (Kelleher, 2006b) and another in Tipperary in 2006 (Kelleher, 2006a). No maternity roosts have yet been found. It is very similar to the whiskered bat and cannot be separated by the use of detectors. Its habits are similar to its sibling.

List of Irish bat species and adjudged status on site

Bats		Status on site
Chiroptera[7]		
Common Pipistrelle[8]	*Pipistrellus pipistrellus*	Present
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Present
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Possibly present
Brown Long-eared	*Plecotus auritus*	Present
Leisler's	*Nyctalus leisleri*	Present
Lesser Horseshoe	*Rhinolophus hipposideros*	Absent
Greater Horseshoe	*Rhinolophus ferruginous*	Absent
Whiskered	*Myotis mystacinus*	Present
Natterer's	*Myotis nattereri*	Possibly present
Daubenton's	*Myotis daubentonii*	Present
Brandt's	*Myotis brandtii*	Possibly present

7 Bat distribution records from O'Sullivan (1994) and Richardson (2000).
8 Two common species of pipistrelle bat are present in Ireland, recent taxonomic revision. The species are identified by the frequency they use for echolocation (46Hz [Common] and 55Hz [Soprano]), and both occur in similar habitats. Roosts occur in buildings and trees.

10. APPENDIX 3 – BAT DEROGATION LICENCE – 2023

An Roinn Tithíochta,
Rialtas Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

Licence No.: DER/BAT 2023 – 61

EUROPEAN COMMUNITIES (BIRDS AND NATURAL HABITATS) REGULATIONS, 2011 (S.I. No 477 of 2011)

DEROGATION LICENCE

Granted under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011, hereinafter referred to as "the Habitats Regulations".

The Minister for Housing, Local Government and Heritage, in exercise of the powers conferred on him by Regulation 54 of the Habitats Regulations hereby grants to **Jackie Portland, The Commissioners of Public Works in Ireland, The Office of Public Works, Jonathan Swift Street, Trim, Co Meath, C15 NX36** supervised by **Faith Wilson of Faith Wilson Ecological Consultant, Kestrel Ridge, Tigroney West, Avoca, Wicklow, Y14 PT82**, a licence. It is stated that:

(A) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment

(B) There is no satisfactory alternative, and the action authorised by this licence will not be detrimental to the maintenance of the population of bats referred to below at a favourable conservation status in their natural range.

The licence is issued in respect of the following **bat species**:

• **brown long-eared bat**	**Plecotus auritus**
• **natterer's bat**	**Myotis nattereri**
• **common pipistrelle**	**Pipistrellus pipistrellus**
• **soprano pipistrelle**	**Pipistrellus pygmaeus**
• **leisler's bat**	**Nycatalus leisleri**
• **daubenton's bat**	**Myotis daubentonii**
• **whiskered bat**	**Myotis mystacinus**

This licence authorises the following:

(a) Roost disturbance;

(b) Actions authorised within the licence

This licence is subject to the terms and conditions set out overleaf.

Terms and Conditions

1. This licence is granted solely to allow the activities specified in connection with the **works** located at **National Botanic Gardens, Kilmacurragh House, Kilbride, Wicklow**, for **The Commissioners of Public Works in Ireland.**

2. All activities authorised by this licence, and all equipment used in connection herewith, shall be carried out, constructed and maintained (as the case may be) so as to avoid unnecessary injury or distress to any species of **BAT**.

3. This licence may be modified or revoked, for stated reasons, at any time.

4. The mitigation measures outlined in the application report (**Kilmacurragh House & Tunnel Ecological Surveys, pgs.50-65**), together with any changes or clarification agreed in correspondence between NPWS and the agent or applicant, are to be carried out. Strict adherence must be paid to all the proposed measures in the application.

5. No work can begin before **1 September 2023** and must be completed by **31 December 2023.**

6. The works will be supervised by bat ecologist **– Faith Wilson of Faith Wilson Ecological Consultant.**

7. This licence shall be produced for inspection on a request being made on that behalf by a member of An Garda Síochána or an authorised NPWS officer appointed under Regulation 4 of the Habitats Regulations.

8. The local National Parks and Wildlife Service field officer **John Griffin,** john.griffin@npws.gov.ie, should be contacted prior to the commencement of any activity, and if bats are detected on site during the course of the work, under the terms of this licence.

9. On completion of the activities authorised by this licence, a report will be submitted to Wildlife.reports@NPWS.gov.ie as well as wildlifelicence@npws.gov.ie detailing results of works and success of mitigation.

10. On completion of the actions which this licence authorises, all recordings of Annex IV species affected will be made using the standardised data form provided below and must be submitted to the NPWS. Included with the below returns form, a report will also be submitted to Wildlife.reports@NPWS.gov.ie as well as wildlifelicence@npws.gov.ie detailing results of works and success of mitigation. Both documents must be submitted to constitute a licence return.

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Claire Crowley
(a person authorised by the Minister to sign on his behalf)

08/06/2023

Wildlife Licensing Unit
National Parks and Wildlife Service
Housing, Local Government and Heritage
R. 2.03
90 North King Street
Smithfield
Dublin 7
D07 N7CV

NOTES (1 to 2).

- This licence is granted for the period specified and subject to compliance with the conditions specified. Anything done other than in accordance with the terms of this licence may constitute an offence.
- This licence applies to **bats** and to no other species.

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