Bat Survey

Barry's Field LRD

Douglas

Co. Cork

Report prepared for Barry's Field Ltd

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Contents

1 Introduction 1
1.1 Proposed Development 1
1.2 Legislative Context 1
1.3 Objectives 1
2 Methodology 2
2.1 Desk Study 2
2.2 Field Survey 2
2.2.1 Surveyor Information 2
2.2.2 Bat Roost Survey 3
2.3 Survey Limitations 5
3 Results 7
3.1 Existing Bat Data 7
3.1.1 Designated Sites 7
3.2 Bat Roost Survey 7
3.2.1 Preliminary Ecological Appraisal 7
3.2.2 Bat Roost Inspection Survey 10
3.3 Activity Survey 10
4 Evaluation of Survey Results 12
5 Impact Assessment 14
5.1 Construction Phase 14
5.1.1 Loss of Roosting Habitat 14
5.1.2 Loss of Foraging and Commuting Habitat 14
5.1.3 Lighting 14
5.2 Operational Phase 14
5.2.1 Lighting 14
6 Mitigation 15
6.1 Construction Phase 15
6.1.1 Loss of Roosting Habitat 15
6.1.2 Lighting 15
6.2 Operational Phase 16
6.2.1 Lighting 16
7 Residual Impacts 18
8 References 19

Appendices

Appendix A Description of Irish bat species

List of Figures

Figure 2-1: Barrys Field: location of passive monitor, August and September 2024 6

List of Tables

Table 2-1: Criteria for Assessing the Potential Suitability of the Proposed Development Site for Bats. 3
Table 2-2: Barrys Field LRD: Bat Activity Survey Dates and Conditions 5
Table 3-1: NBDC bat records from within a 4km radius of the proposed site. 7
Table 3-2: Brief description of Irish bat species (conservation status of each species is derived from NPWS (2019)). 8
Table 3-3: Barrys Field LRD- summary table of total bat passes recorded on the passive monitors in August/September 2024. 11
Table 4-1: Status of Irish Bat Fauna (Marnell et al., 2019). 13

1 Introduction

Greenleaf Ecology was commissioned by Barry's Field Ltd to undertake a bat survey for the proposed Large-scale Residential Development at Barry's Field, Douglas, Co. Cork.

1.1 Proposed Development

Barry's Field Ltd intends to apply for a Large-scale Residential Development (LRD) at Barry's Field which will comprise of the construction of 124 no. residential units (consisting of 120 no. apartments and 4 no. duplexes), providing a mix of 1, 2 and 3 bed units in 2 no. blocks ranging from 1 to 5 storeys, 1 no. cafe unit and 2 no. office units at ground floor (within Block 1) and all associated site development works include footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting, landscaping/amenity areas, ESB substation and switchroom and a plant room at ground floor level at Carrigaline Road and Churchyard Lane, Douglas, Cork. Please refer to the planning documents by McCutcheon Halley Planning Consultants for further details.

1.2 Legislative Context

All Irish bats are protected under the Wildlife Acts. Also, the EU Habitats Directive, and Irish implementing legislation, seeks to protect rare species, including bats, and their habitats, and requires that appropriate monitoring of populations be undertaken. Moreover, the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) exists to conserve all bat species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) protects migrant bat species across all European boundaries. Ireland has ratified both these conventions.

All bats are listed in Annex IV to the Habitats Directive (92/43/EC) and the Lesser Horseshoe bat is further listed under Annex II to the same Directive.

Destruction, alteration or evacuation of a known bat roost is a notifiable action under current legislation and a derogation licence has to be obtained from the National Parks and Wildlife Service (NPWS) before works can commence. Any works interfering with bats and especially their roosts, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by the NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "*Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences*".

1.3 Objectives

The objectives of the bat survey were to:

- Establish the location of any actual or potential bat roosts at the proposed site;
- Establish the value of the proposed site to bats for foraging and commuting;
- Assess the results of the survey and determine the potential impact of the proposed development on any bats that might use the site;
- Provide recommendations for the project design in light of the survey results as appropriate; and
- Provide recommendations for mitigation measures.

2 Methodology

2.1 Desk Study

A pre-survey data search was conducted in order to collate existing information from the footprint of the proposed development site and the surrounding area on bat activity, roosts and landscape features that may be used by bats. The data search comprised the following information sources:

- Collation of known bat records from within a 4km radius[1] of the proposed site from the National Bat Database held by the National Biodiversity Data Centre (www.biodiversityireland.ie);
- Review of Ordnance Survey mapping and aerial photography of the proposed site and its environs;
- Records of European and nationally designated sites from within a 5km radius of the proposed site where bats form part or all of the reason for designation (https://www.npws.ie/protected-sites).

2.2 Field Survey

This bat survey was cognisant of the following guidelines: -

- Andrews, H. (2018) Bat Roosts in Trees. A guide to identification and assessment for tree-care and ecology professionals. Pelagic Publishing.
- Bat Conservation Ireland (2010) Guidance notes for Planners, Engineers, Architects, and Developers;
- Collins, J. (ed.) (2023) Bat Surveys for Professional ecologists: Good Practice Guidelines (4th ed.). The Bat Conservation Trust, London[2]; and
- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

2.2.1 Surveyor Information

The survey was undertaken by Karen Banks, MCIEEM.

Karen is an ecologist with 18 years' experience in the field of ecological assessment. She holds a BSc in Environment and Development from Durham University and is a full member of the Chartered Institute of Ecology and Environmental Management. Karen is an experienced and skilled bat surveyor, first gaining a scientific licence to disturb bats from Natural England, UK in 2008. Karen is trained in bat handling and capture methods and currently holds a bat disturbance licence granted by the NPWS. Karen has undertaken bat survey and assessment for numerous projects, including bridge repair and replacement works, domestic dwelling repair and demolition works, wind farm developments and large-scale infrastructure projects such as flood relief schemes, road developments and pipeline schemes. Karen has also represented Cork County Council as an expert witness for bats at an Oral Hearing.

[1] A 4km radius search distance was selected to encompass records of bat roosts within Core Sustenance Zones (CSZ) of the study area for Irish species of bat. A CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the conservation status of the colony using the roost (Collins, 2016).

[2] *Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th ed*. Was published in September 2023, after the surveys for this project were completed.

2.2.2 Bat Roost Survey

2.2.2.1 Preliminary Ecological Appraisal

A walkover survey of areas within the proposed site identified as potential roosting, foraging and commuting habitats during the desk top study was undertaken on 19th August 2024. Potential bat habitat was assessed using the criteria outlined in Table 2-1[3].

Table 2-1: Criteria for Assessing the Potential Suitability of the Proposed Development Site for Bats

Suitability	Description Roosting habitats in structures	Potential flight paths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/ suitable shelter at all ground/ underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/ protection for flight-lines, or generate/ shelter insect populations available to foraging bats).
Negligible	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity and not a classic cool/stable hibernation site, but could be used by individual hibernating bats).	Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation- the categorisation described in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for flight paths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved

[3] Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn). The Bat Conservation Trust, London.

	status roosts e.g. maternity or classic cool/ stable hibernation site.	woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.2.2.2 Bat Roost Inspection Survey

Trees

A detailed inspection of the exterior of trees was undertaken during the site walkover undertaken on 19th August 2024 to ascertain whether any features that bats could use for roosting (Potential Roost Features, or PRFs) were present. The objective of the survey was to determine the actual or potential presence of bats to carry out an impact assessment and determine the need for further survey and/or mitigation.

A detailed inspection of each potential tree roost within the site was undertaken. The inspection was carried out in daylight hours from ground level, and information was compiled on the tree, PRFs and evidence of bats. Where PRFs were recorded, the tree was numbered and marked on a map and a description of each PRF observed was recorded. PRFs that may be used by bats include:

- Rot holes;
- Hazard beams;
- Other horizontal or vertical cracks or splits (e.g. frost cracks) in stems or branches;
- Lifting bark;
- Knotholes arising from naturally shed branches or branches previously pruned back to the branch collar;
- Man-made holes (e.g. flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers in which cavities have developed;
- Other hollows or cavities;
- Double leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and
- Bat or bird boxes.

Signs of a bat roost (excluding the actual presence of bats), include:

- Bat droppings in, around or below a PRF;
- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather; and
- Staining below the PRF.

It should be noted that bats or bat droppings are the only conclusive evidence of a roost and many roosts have no external signs. In the current survey, potential roost sites were viewed by a bat specialist working from ground level. Trees were categorised according to the highest suitability PRF present.

Structures

There are no buildings present within the proposed site.

2.2.2.3 Bat Activity Survey

Bat activity surveys were conducted within the proposed site using an Anabat Walkabout detector, which records bat echolocation calls directly on to an internal SD memory card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded. Data were then downloaded and all recordings were analysed using the Anabat Insight spectrogram sound analysis software Version 2.0.1. Dusk activity surveys (from sunset, for a minimum of 90 minutes) were conducted. These surveys enable a determination of the approximate numbers and species of bats present within the site, areas used for foraging and commuting routes to and from roosts. The approximate flying height and direction taken by bats were estimated and detailed where possible.

Assessment of bat activity was undertaken in August and September 2024. A total of 2 dusk activity surveys were completed and were undertaken on 19th August 2024 and 11th September 2024. Both surveys were conducted in appropriate weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (10°C).

Table 2-2: Barrys Field LRD: Bat Activity Survey Dates and Conditions

Survey Date	Times	Weather conditions
19/08/2024	20:45- 22:30, sunset 20:48	Precipitation: short spell of light drizzle at 21.05, temperature at sunset: 15°C, wind F4
11/09/2024	19:50- 21:45, sunset 19:56	Precipitation: none, temperature at sunset: 13°C, wind F3

In order to supplement the information gathered from the manual activity surveys, a passive monitoring system of bat detection was also deployed for this survey scheme (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for later analysis). This results in a far greater sampling effort over a shorter period of time. Bats are identified by their ultrasonic calls. The passive detectors record bat ultrasonic calls on a continuous basis and store the information onto an internal SD card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded.

Passive monitoring was completed in August and September 2024 using an Anabat Swift bat monitor. The passive monitoring survey was undertaken in accordance with *Bat Surveys for Professional ecologists: Good Practice Guidelines* (Collins, J. (2023). Weather conditions were favourable during the monitoring. One Anabat Swift monitor was deployed for the survey and was positioned in a treeline at the north-east of the site (location illustrated in Figure 2-1). The detector was set to record from approximately 30 minutes before sunset until sunrise and recorded for 18 nights. Data were then downloaded and bat echolocation calls were later analysed by the Anabat Insight software analysis programme version 2.0.1. Each time-stamped file was analysed and the species of bat recorded was noted as a bat pass.

2.3 Survey Limitations

Brown long-eared bats can be difficult to detect as they echolocate at a low-amplitude and foraging bats often make no sound. The survey design aimed to increase the likelihood of recording these species by the employment of full spectrum monitoring and the positioning of passive monitors at a commuting route, a natural corridor through or adjacent to vegetation and suitable brown long-eared bat habitats (such as treelines).

Figure 2-1: Barrys Field: location of passive monitor, August and September 2024



3 Results

3.1 Existing Bat Data

The review of existing records of bat species in the area of the site indicates that five of the ten known Irish species of bat have been recorded within a 4km radius of the proposed site (last checked September 2024). These bats include common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), Leisler's bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*) and Daubenton's bat (*Myotis daubentonii*) as shown in Table 3-1 below. Of these species, soprano pipistrelle and Leisler's bat have been recorded roosting in the environs of the site, outside of the site boundary.

Table 3-1: NBDC bat records from within a 4km radius of the proposed site.

Common Name	Scientific Name	Present (Y/N)	Known Roost (Location to 1km grid ref)	Date of Last Record
Pipistrelle sp.	*Pipistrellus pipistrellus sensu lato*	Y	None	15/06/2021
Common Pipistrelle	*Pipistrellus pipistrellus*	Y	None	22/09/2015
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Y	W7171	22/09/2015
Nathusius's Pipistrelle	*Pipistrellus nathusii*	N	N/A	N/A
Leisler's Bat	*Nyctalus leisleri*	Y	W7171, W7069	14/07/2008
Brown Long-eared Bat	*Plecotus auratus*	Y	None	27/08/2022
Daubenton's Bat	*Myotis daubentonii*	Y	None	24/08/2019
Whiskered Bat	*Myotis mystacinus*	N	N/A	N/A
Natterer's Bat	*Myotis nattereri*	N	N/A	N/A
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	N	N/A	N/A
Brandt's Bat	*Myotis brandtii*	N	N/A	N/A

The bat landscape association model (Lundy *et al,* 2011) suggests that the proposed site is part of a landscape that is of moderate to high suitability for common pipistrelle, soprano pipistrelle, brown long-eared, Leisler's, Daubenton's, Natterer's and whiskered bat. The proposed site and its environs are of low suitability for Nathusius' pipistrelle and is outside of the core range for lesser horseshoe bat.

3.1.1 Designated Sites

There are no European or nationally designated sites located within a 5km radius of the proposed site which include bats as a Qualifying Interest (QI).

3.2 Bat Roost Survey

3.2.1 Preliminary Ecological Appraisal

The proposed site comprises a field of neutral unmanaged grassland bound by treelines.

The treelines at the proposed site provide connectivity to other foraging habitats within the wider landscape, such as St Luke's Cemetery and Douglas Park. In accordance with the criteria outlined in Table 2-1, the commuting and foraging habitats over the site are of moderate suitability for bats.

A summary of foraging and roosting habitats for Irish bats is included in Table 3-2.

Table 3-2: Brief description of Irish bat species (conservation status of each species is derived from NPWS (2019)[4]).

Species	Description
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. The conservation status of this species is Favourable.
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. The conservation status of this species is Favourable.
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 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 conservation status of this species is Favourable.
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. The conservation status of this species is Favourable.
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,

[4] For a more comprehensive overview see Roche *et al* (2014).

	keeping within the foliage, as it does, it is easily overlooked. It prefers to roost in old buildings. The conservation status of this species is Favourable.
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. The conservation status of this species is Favourable.
Daubenton's bat (*Myotis daubentonii*)	This bat species prefers feeding close to the surface of smooth water, either over rivers, canals, ponds, lakes or reservoirs but it can also be found foraging in woodlands. Flying at 15 kilometres per hour, it gaffs insects with its over-sized feet as they emerge from the surface of the water - feeding on caddis flies, moths, mosquitoes, midges etc. It is often found roosting beneath bridges or in tunnels and also makes use of hollows in trees. The conservation status of this species is Favourable.
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 conservation status of this species is Favourable.
Brandt's bat (*Myotis brandtii*)	According to NPWS (2013), whiskered and Brandt's bats are cryptic species and can only be told apart using DNA techniques. Brand't bat has been confirmed only once from Ireland; a single specimen found in 2003 in Wicklow (Mullen, 2006). Following this discovery, an intensive re-survey, involving DNA testing, was undertaken of all known whiskered bat roosts in Ireland, by the Centre for Irish Bat Research. Woodland mist-netting was also conducted for the species. Despite the extensive survey-work, no further Brandt's bats were identified. The most recent Red Data List for Irish Mammals (Marnell *et al*. 2009) lists Brandt's bat as data deficient. There is no evidence of any roosts for this species in the country and at present the single record for the species is considered an anomaly. Boston *et al*., (2010) concluded that "*M. brandtii* cannot currently be considered a resident species. This species is now considered a vagrant to the country and consequently, a detailed assessment has not been carried out.
Lesser horseshoe bat (Rhinolophus hipposideros)	This species is the only representative of the Rhinolophidae or horseshoe bat family in Ireland. It

	differs from our other species in both habits and looks, having a unique nose leaf with which it projects its echolocation calls. It is also quite small and, at rest, wraps its wings around its body. Lesser horseshoe bats feed close to the ground, gleaning their prey from branches and stones. It often carries its prey to a perch to consume, leaving the remains beneath as an indication of its presence. The echolocation call of this species is of constant frequency and, on a heterodyne bat detector, sounds like a melodious warble. The species is confined to six counties along the Atlantic seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork. The current Irish national population is estimated at 12,500 animals. This species is listed on Annex II of the EC Habitats Directive and 41 Special Areas of Conservation have been designated in Ireland for its protection. Where it occurs, it is often found roosting within farm buildings. The conservation status of this species is Inadequate.

3.2.2 Bat Roost Inspection Survey

Trees

No trees within the proposed site were recorded as being used as roost sites during the surveys undertaken in 2024. There are several mature trees within the site boundary that were categorised as being of low suitability for roosting bats (as defined in Table 2-1) as they contained one or more potential roosting features that are of limited suitability for roosting bats (for example Ivy growth, lifting bark and shallow knot holes). No features of moderate to high suitability for roosting bat were recorded within the proposed site. No features suitable to support multiple numbers of roosting bat were recorded within trees at the proposed site.

3.3 Activity Survey

Three bat species were recorded during passive monitoring undertaken over 18 nights in August and September 2024. The most frequently recorded species was common pipistrelle, followed by soprano pipistrelle then Leisler's bat. Leisler's bat was recorded at sunset and common pipistrelle was recorded 18 minutes after sunset on the monitor; a small number of pipistrelle social calls were also recorded (Table 3-3).

The calls recorded on the passive monitors are summarised in Table 3-3. The location of the passive detectors is illustrated in Figure 2-1.

Table 3-3: Barrys Field LRD- summary table of total bat passes recorded on the passive monitors in August/September 2024.

Species	PM1 (19/08/2024-05/09/2024)
Common Pipistrelle	1,833 (64%)
Soprano Pipistrelle	784 (27%)
Pipistrelle Species[5]	66 (2%)
Leisler's	195 (7%)
Total	2,878 (100%)

The bat activity transect surveys undertaken in August 2024 and September 2024 recorded three species of bat within the proposed site: common pipistrelle, soprano pipistrelle and Leisler's bat.

A single common pipistrelle was recorded 17 minutes after sunset at the north-eastern corner of the proposed site. Common and soprano pipistrelle foraged along the site boundary in low numbers and Leisler's bat was recorded occasionally commuting overhead. No bat roosts were recorded within the proposed site; it is likely that a minor common pipistrelle roost is present within a building to the north-east of the site.

[5] *Pipistrellus* spp. which have frequency of maximum energy, FMAXE, of c. 50kHz which cannot reliably be assigned to Common Pipistrelle (typical FMAXE of c. 45kHz) or Soprano Pipistrelle (FMAXE c. 55kHz)

4 Evaluation of Survey Results

A review of existing bat records from within a 4km radius of the proposed site indicates that five of the ten known Irish species of bat have been recorded within a 4km radius of the proposed site: common pipistrelle, soprano pipistrelle, Leisler's bat, brown long-eared bat and Daubenton's bat. Of these species, soprano pipistrelle and Leisler's bat have been recorded roosting in the environs of the site, outside of the site boundary.

Habitats within the proposed site that are of potential use by foraging and commuting bats include linear features such treelines, which provide connectivity between the site and other foraging areas in the wider landscape. Overall, the study area is considered to be of moderate suitability for foraging and commuting bats due to the presence of connectivity to other suitable habitats in the wider landscape. However, there is low potential for roosting within mature trees in the field boundary that support potential opportunistic roosting features for individual bats such as Ivy growth.

Results from the bat surveys undertaken in August and September 2024 indicate that three species of bat, namely soprano pipistrelle, common pipistrelle and Leisler's bat commute to the site to forage. A low level of activity and a low diversity of bat species was recorded within the proposed site. Leisler's bat and common pipistrelle were recorded early in the evening; it is likely that a minor summer roost for common pipistrelle is present in the environs of the north-east of the site and it is considered likely that a summer roost for Leisler's bat is present close to the site, but outside of the site boundary.

In relation to the foraging and commuting bat species recorded at the site, the bat populations are considered to be of Local Interest (in accordance with CIEEM, 2018).

The status of Irish bat species (Marnell *et al*., 2019) is summarised in Table 4-1. The bat species recorded at the site are all of Least Concern.

The conservation status of the bats recorded at the site is Favourable (NPWS, 2019).

Table 4-1: Status of Irish Bat Fauna (Marnell et al., 2019).

Species: Common Name	Irish Status	European Status	Global Status
Resident Bat Species			
Daubenton's bat (*Myotis daubentonii*)	Least Concern	Least Concern	Least Concern
Whiskered bat (Myotis mystacinus)	Least Concern	Least Concern	Least Concern
Natterer's bat (*Myotis nattereri*)	Least Concern	Least Concern	Least Concern
Leisler's bat (Nyctalus leisleri)	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle (*Pipistrellus nathusii*)	Least Concern	Least Concern	Least Concern
Common pipistrelle (Pipistrellus pipistrellus)	Least Concern	Least Concern	Least Concern
Soprano pipistrelle (*Pipistrellus pygmaeus*)	Least Concern	Least Concern	Least Concern
Brown long-eared bat (*Plecotus auritus*)	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat (Rhinolophus hipposideros)	Least Concern	Near threatened	Least Concern
Possible Vagrants			
Brandt's bat (*Myotis brandtii*)	Not Assessed	Least Concern	Least Concern
Greater horseshoe bat (Rhinolophus ferrumequinum)	Not Assessed	Near threatened	Least Concern

5 Impact Assessment

5.1 Construction Phase

5.1.1 Loss of Roosting Habitat

Roosting opportunities at the site are limited to trees within the site boundary that support low suitability for individual bats to roost opportunistically within features such as Ivy growth and shallow knot holes. One Sycamore supporting a potential roosting feature for individual bats within a shallow knot hole will require felling on the eastern site boundary. Felling of this tree would result in the loss of a potential/ actual bat roost, which would represent a minor adverse effect at the site geographic scale.

5.1.2 Loss of Foraging and Commuting Habitat

The results of the bat activity survey undertaken for the proposed development indicate that the site supports three species of foraging and commuting bat (soprano pipistrelle, common pipistrelle, and Leisler's bat) in low numbers.

The proposed clearance works will result in the removal of grassland. This habitat is of low suitability as foraging and commuting habitat for bats. The existing treelines at the northern, western and southern site boundaries will be retained and tree felling will be limited to trees on the eastern site boundary that require removal for arboricultural reasons or to facilitate site access. It is also proposed to offset tree removal on at least a one-to-one basis. In view of these factors, there will be a loss of foraging and commuting habitat for a low number of foraging bats in the short-term; with the successful implementation of the landscaping plan, the long-term effect will be neutral.

5.1.3 Lighting

When bats emerge from roosts they tend not to echolocate but rely on eyesight to fly from the roost to adjoining treelines or hedgerows. Various studies have shown that bats' eyesight works best in dim light conditions; where there is too much luminance bats' vision can be reduced resulting in disorientation. Too much luminance at bat roosts may cause bats to desert a roost. Light falling on a roost exit point can delay bats from emerging and miss peak levels of insect activity at dusk: any delays of emergence can reduce feeding periods. In the absence of mitigation, the use of lighting in the vicinity of the minor common pipistrelle roost to the north-east of the proposed site (outside the site boundary) during the construction phase has the potential to result in a direct, significant negative impact on a bat roost considered to be of local conservation importance. The impact would be temporary and would persist for the duration of construction.

Woodland edge habitat provides important flyways and feeding sites for a diversity of bats. Artificial lighting at night may have an adverse effect on foraging bats as light-averse bats may be repelled from lit areas and restrict their use of commuting or feeding space. In the absence of mitigation, disturbance of bats due to lighting used during the construction phase, should it be required, would have a significant adverse effect at the local (site) level. The effect would be temporary and would persist for the duration of construction.

5.2 Operational Phase

5.2.1 Lighting

The street and domestic lighting proposed for the development will increase light levels within the proposed development area. As noted in Section 5.1.3, increased lighting may delay bats from emerging from roosts and reduce the availability of feeding sites for bats and would be a long-term significant adverse impact at the local (site) geographic scale.

6 Mitigation

6.1 Construction Phase

6.1.1 Loss of Roosting Habitat

Pre-construction Potential Roost Feature (PRF) inspection/presence absence surveys of all trees scheduled for felling shall be undertaken. Following this examination, should any of the trees be identified as a bat roost then a derogation licence application will be made to the NPWS to exclude the bats and fell the tree.

Where bats are recorded roosting in the trees scheduled for felling, the following mitigation will be required:

- Timing: tree-felling can be undertaken from late August to late October/early November and all works should ideally be undertaken in this period. During this period bats are still capable of flight having not entered hibernation and undertaking works in this period may reduce the risks of tree-felling if proper measures are undertaken. To carry out the works any later in the bat season creates an additional risk that bats may be in hibernation and thus unable to fly out from a tree that is being felled, although bats can be removed by hand by a licenced bat handler if required. Additionally, disturbance during winter may reduce the likelihood of survival as the bats' body temperature is too low and they may have to consume too much body fat to survive.

Trees to be felled under the supervision of the bat specialist (as identified during the pre-construction survey) will be examined and where bats are found, they will be translocated to an area where bat boxes will already be installed on appropriate trees within the proposed site.

The proposed process for felling the trees with PRFs is outlined below:

- The bat specialist will be present during the tree felling works;
- Works will be undertaken in mild weather to ensure that if bats are found during works that they can be released or safely removed;
- Tree(s) identified as having potential to support bats will be surveyed during the daytime for bats prior to felling, on the day the felling is due to take place. The bat specialist will inspect all potential bat roost features of the tree, including those above ground level. This will require the services of a qualified arborist to climb the trees/ use a cherry picker and fell the tree in sections and lower potential roost features slowly to the ground to allow the bat specialist to inspect them. This will include visual inspection as well as use of an endoscope to inspect cavities/crevices;
- The arborist will be briefed on the technique to be followed prior to the commencement of operations. Felling will follow best practice and mitigation measures, including wedging open cracks/crevices prior to load removal and cutting limbs in sections and lowering to the ground. Trees will only be felled in longer sections if the bat worker is satisfied that there are no potential roost features present;
- When using a chainsaw, the rate of fall of branches will not be accelerated by the use of a chain and vehicle;
- Any bats found in the trees will be removed by hand to a bat box and will then be relocated to the bat boxes installed in advance of works. Notes of any such activities will be maintained;
- The tree and/or tree sections will be left on the ground for a minimum period of 24 hours to enable any unidentified bats residing in deeper crevices to make good their escape during night time hours.

6.1.2 Lighting

To minimise disturbance to bats and other fauna that are active at night, construction operations during the hours of darkness will be kept to a minimum. If construction lighting is required during the

bat activity period (April to September), lighting shall be directed away from the roost to the north-east of the site and woodland habitats to be retained. This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby countryside) to prevent overspill. This shall be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.

6.2 Operational Phase

6.2.1 Lighting

The protection of dark refuges is essential for bats, particularly in urban and suburban areas. Careful design of the lighting will be important to ensure that the residential development does not create a reduction in foraging habitat or barrier for commuting bats at the site, while maintaining health and safety requirements for human use. This is particularly important for bat foraging/commuting habitat along treelines at the site boundary and the location of the minor soprano pipistrelle roost to the north-east of the proposed site.

The following general principals will be followed in relation to the overall lighting plan for the proposed development site:

- Lighting design will be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting shall be used within the proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas, including the minor pipistrelle roost to the north-east of the site and foraging areas for bats along treelines.
- Dark buffer zones will be used to separate habitats or features from lighting by forming a dark perimeter around them. This shall be used for the minor pipistrelle roost to the north-east of the site and habitat features noted as foraging areas for bats; light spill onto foraging habitat (i.e. treelines) shall be avoided.
- Buffer zones will be used to protect dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected. This will apply to the north-eastern boundary of the site and foraging habitat (treelines).

Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following will be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2023).

- All luminaires used will lack UV elements to reduce impact.
- LED luminaires will be used due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins) is recommended to reduce the blue light component.
- Light sources shall feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges.
- Column heights shall be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.

- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered - See ILP GN01.
- Luminaires shall always be mounted horizontally, with no light output above 90° and/or no upward tilt.
- Where appropriate, external security lighting shall be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1 or 2 minute timer is likely to be appropriate.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely.

The lighting for the operational phase of the proposed residential development at Barrys Field has been designed so that lux levels at the treeline at the north-east of the site are low (1.5 lux), thereby retaining a dark buffer around the minor pipistrelle roost recorded adjacent to the proposed site.

7 Residual Impacts

The proposed development will result in an increase in artificial lighting at night within the site. The proposed lighting design has included a dark buffer around the minor pipistrelle roost recorded just outside the north-eastern boundary of the site, therefore, the proposed development will not result in disturbance to roosting bats as a result of inappropriate lighting. Low numbers of pipistrelle and Leisler's bat were recorded foraging at the proposed site; these species are not noted to be highly sensitive to lighting. In view of these factors, an increase in lighting at the proposed site during the operational phase may potentially result in a slight adverse effect on small numbers of foraging bats in the long-term but will not represent a significant effect on bat populations.

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