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Bat Survey Report For a Residential Scheme



**Cornamaddy,
Athlone
Co. Westmeath**

ASH Ecology & Environmental



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Bat Survey Report – For a Residential Scheme at Cornamaddy, Athlone, Co. Westmeath

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1. INTRODUCTION

1.1 Purpose of the Report

Ash Ecology and Environmental Ltd (AEE) was commissioned to carry out a bat survey on behalf of Enviroguide Consulting during September 2021 and July 2022 as part of a proposed residential development at a site located in Cornamaddy, Athlone, Co. Westmeath, (Grid Ref 53.436974, -7.906666); see Figure 1. An aerial photo with existing layout and surrounding landscape is shown as Figure 2. A proposed site layout is shown as Figure 3. There are no affected buildings on the site.



Figure 1 Site Location Map.



Figure 2 Aerial Photo of Site showing existing layout and surrounding landscape.



Figure 3 Proposed Site Layout.

1.2 Competency of Assessor

This report has been prepared by Ash Ecology & Environmental Ltd (AEE) whose managing director and leading ecologist is Aisling Walsh who is a full member of the Chartered Institute of Ecological & Environmental Management (CIEEM) while the company, AEE, is a Registered Practice by the CIEEM.

Aisling's qualifications include M.Sc. (Dist) in Biodiversity and Conservation (TCD) and B.Sc. (Hons) Zoology (NUIG), a diploma in Applied Aquatic Science (GMIT) and a Certificate in Applied Biology (GMIT). Aisling has over 15 years of experience providing environmental consultancy and environmental assessment services. Aisling has written numerous Ecological Impact Assessments (EclA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statements, chapters for Environmental Impact Assessments/Statements (EIAR), Badger Surveys, Bat Surveys, Bird and Habitat Surveys.

Aisling is a licenced bat ecologist (example of recent: DER/BAT 2020 – 46 EUROPEAN, DER/BAT 2020 – 48 EUROPEAN, DER/BAT 2021 – 89 EUROPEAN, DER/BAT 2022 – 12 EUROPEAN) and a member of Bat Conservation Ireland. In addition she has completed several bat courses to continue her training and CPD with the most recently (May 2021) a Lantra-accredited course, developed by the Bat Conservation Trust and supported by the Arboricultural Association to access bat tree roost features. Over the past 15 years Aisling has completed 100s of bat surveys providing her with more than adequate experience in the profession.

1.3 Bat Legislation

All bat species are protected under the Wildlife Act 1976 to 2021 which make it an offence to wilfully interfere with or destroy the breeding or resting place of these species; however, the Acts permit limited exemptions for certain kinds of situations.

Section 23 of the Wildlife Act 1976 to 2021 contains several exemptions to the protection given to the species listed for protection on Schedule 5 (e.g. for agriculture or construction). In 2005 a further amendment through the European Communities (Natural Habitats) (Amendment) Regulations 2005 (S.I. No. 378 of 2005) removed all of the exemptions provided in Section 23(7) of the Wildlife Act 1976 to 2021 insofar as they relate to Annex IV species, including all species of bats. Those 2005 Regulations were revoked in 2011 except for Regulation 2 which brings about this strengthened protection for bats (and other Annex IV species). All species of bats in Ireland are listed on Schedule 5 of the 1976 Act, and are therefore subject to the provisions of Section 23, which make it an offence to:

- Intentionally kill, injure or take a bat;
- Wilfully interfere with the breeding or resting place of a bat

The Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("the Habitats Directive") seeks to protect rare and vulnerable species, including all species of bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All species of bat found in Ireland are listed on Annex IV of the Directive. Member States are required to put in place a system of strict protection (as outlined in Article 12) for species listed on Annex IV ('European protected species'). The lesser horseshoe bat is further protected under Annex II. This Annex relates to the designation of Special Areas of Conservation (SACs). The Habitats Directive is transposed into Irish law by the European Communities (Birds & Natural Habitats Regulations) 2011 (S.I. No. 477 of 2011) ("the Habitats Regulations"). Under the Habitats Regulations (2011), all bat species are listed on the First Schedule and Regulation 51 makes it an offence to:

- Deliberately capture or kill a bat;
- Deliberately disturb a bat particularly during the period of breeding, hibernating or migrating;
- Damage or destroy a breeding site or resting place of a bat;
- Keep, sell, transport, exchange, offer for sale or offer for exchange any bat taken in the wild.

Across Europe, bats are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn Convention 1979) was instigated to protect migrant species across all European boundaries. EUROBATS (a daughter Agreement under CMS) is of particular relevance in relation to cooperation across international borders for the conservation of bats, many of which are known to migrate long distances. The Irish government has ratified both of these conventions as well as the EUROBATS Agreement.

1.4 Derogation licences

It is an offence, under Regulation 51 of the European Communities (Birds and Natural Habitats) Regulations, 2011 ('the 2011 Regulations') to:

- a) Deliberately capture or kill a bat in the wild;
- b) Deliberately disturb a bat particularly during the period of breeding, rearing, hibernation and migration;
- c) Damage or destroy a bat's breeding site or resting place, or;
- d) Keep, transport, sell, exchange, offer for sale or offer for exchange any bat taken in the wild, other than those taken legally before the Habitats Directive before the Habitats Directive was implemented.

A person may apply to the Minister under Regulation 54 of the 2011 Regulations for a derogation licence to carry out one or more of these prohibited activities. But, the Minister may only grant such a derogation licence if three criteria are met.

Firstly the Minister may only grant a derogation licence if it is for one of the following specified reasons listed in Regulation 54:

- a) In the interests of protecting wild fauna and flora and conserving natural habitats;
- b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property;
- c) 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 the beneficial consequences of primary importance for the environment;
- d) For the purpose of research and education, of repopulating and introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants, or;
- e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of bats.

Secondly, the Minister may only issue a derogation if there is no alternative to carrying out the prohibited activity. The first aim of the developer, whether from a private company or a public authority, working with professional advice, should be to entirely avoid any potential impact of a proposed development on bats and their breeding and resting places. Alternatives may involve redesigning a development so that bat roosts, and associated commuting routes and feeding areas are kept intact and that bats are not disturbed, for example by inappropriate lighting. It should be noted that the European Commission has a specific understanding of satisfactory alternative solution. "An alternative solution cannot be deemed unsatisfactory merely because it would cause greater inconvenience or compel a change in behaviour" (European Commission, 2021, page 13)¹. Decisions about what solution is satisfactory must be science-based and should solve the problem of how to strictly protect the bats in light of the development.

Thirdly the Minister may only grant a derogation if it is not detrimental to the maintenance of the populations of bats at a favourable conservation status (FCS)

¹ <https://op.europa.eu/en/publication-detail/-/publication/bbc7ace0-27e2-11ec-bd8e-01aa75ed71a1/language-en>

in their natural range. There is case law from the Court of Justice of the European Union (CJEU) to back this up. One example is the Finnish Wolf Case C-674/17. The ruling establishes that the Member State must “clearly and precisely” identify in the derogation what the objectives of the derogation are. It must also establish that the derogation is capable of achieving those objectives and demonstrate that there is no satisfactory alternative. Cumulative effects of derogations must be taken into account when issuing derogations. The maximum number of all derogations must not be detrimental to the maintenance or restoration of the population at FCS. Consideration must be given to other human causes of mortality. Any risk to FCS must be ruled out by detailed conditions based on the level of population, its conservation status and its biological characteristics. The conditions must be precisely defined and they must be monitored to ensure they are implemented.

If any of these three criteria are not satisfied, the Minister cannot issue a derogation licence. It must never be assumed that a derogation licence will automatically be granted.

In summary, it is clear that a developer must first look to avoid all impacts on bats. This may mean looking at alternative solutions and redesigning the project accordingly. If this is not possible, the developer needs to check whether there are grounds to apply for a derogation licence, based on the reasons given in Regulation 54 of the Habitats Regulations. When applying for a derogation licence the developer must clearly state the reason and describe in detail all alternative solutions which were given serious consideration. Any mitigation intended to ensure that there is no impact or minimal impact on the bats must be clearly described in detail, giving examples of how it worked in other places.

If a derogation licence has been refused by the Minister, any aspect of the development for which the derogation licence was sought, must not go ahead, no matter what other permissions are in place.

A derogation licence is required when on the basis of survey information and specialist knowledge, it appears that:

- The site in question is a breeding site or resting place for bats and/or;
- The proposed activity could impact on a breeding site or resting place of a bat.

No licence is required if the proposed activity is unlikely to result in an offence. The advice given in this document (and see also Mullen et al. 2021)² should assist the proponent, or those acting on their behalf, in arriving at a decision on this matter, though it must be recognised that determining whether a particular site is used as a breeding or resting place can be problematic for such mobile animals as bats. Determining whether an activity undertaken near to a roost might impact on that roost (e.g. by removing important flight lines or foraging areas) will also require specialist assessment. Note that if the proposed activity can be timed, organised and carried out so as to avoid committing an offence then no licence is required.

² Mullen, E., Marnell, F & Nelson, B. (2021) Strict protection of animal species. Guidance for public authorities on the application of Articles 12 and 16 of the EU Habitats Directive to development/works undertaken by or on behalf of a public authority. Unpublished Report, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. <https://npws.ie/sites/default/files/files/article-12- guidance-final.pdf>

Examples of works that are likely to need a licence because they may result in the destruction of a breeding or resting place and/or disturbance of bats include:

- Demolition of buildings known to be used by bats;
- Conversion of barns or other buildings known to be used by bats;
- Restoration of ruined or derelict buildings;
- Maintenance and preservation of heritage buildings;
- Introduction of artificial lighting inside a roost or near a roost entrance;
- Change of use of buildings resulting in increased ongoing disturbance;
- Removal of trees known to be used by bats;
- Significant alterations to roof voids known to be used by bats.

Examples of works that, if carefully planned, may not need a licence include:

- Works near to or at roosts (e.g. re-roofing) if carried out while bats are not present and the access points and roosting area are not affected;
- Remedial timber treatment, carried out with the correct (non-toxic to bats) chemicals while bats are not present.

2. METHODOLOGY

2.1 Information Sources

A desk-based review of information sources was completed. Information contained on the websites of the National Parks and Wildlife Service (NPWS)³ and the National Biodiversity Data Centre (NBDC)⁴ was reviewed. The following publications and websites were also reviewed and consulted:

- 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.
- Mullen, E., Marnell, F & Nelson, B. (2021) Strict protection of animal species. Guidance for public authorities on the application of Articles 12 and 16 of the EU Habitats Directive to development/works undertaken by or on behalf of a public authority. Unpublished Report, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. <https://npws.ie/sites/default/files/files/article-12-guidance-final.pdf>
- Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition
- CIEEM (2021) Bat Mitigation Guidelines - A guide to impact assessment, mitigation and compensation for developments affecting bats
- Bat Conservation Ireland <https://www.batconservationireland.org/>
- BTHK (2018) Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Exeter: Pelagic Publishing.
- Bat Conservation Trust (2018) Bats and artificial lighting in the UK Bats and the Built Environment series⁵
- Mitchell-Jones, A.J. & McLeish, A.P. (eds). 2004., 3rd Edition Bat Workers' Manual, JNCC, Peterborough, ISBN 1 86107 558 8
- Bat Conservation Ireland (2012) Bats and Appropriate Assessment Guidelines, Version 1, December 2012. Bat Conservation Ireland, www.batconservationireland.org⁶
- Bat Conservation Ireland (2010) Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers⁷
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority, 2005).
- Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority, 2005).
- Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2011)
- Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2011).

³ The National Parks and Wildlife Services map viewer <http://webgis.npws.ie/npwsviewer/>

⁴ The National Biodiversity Data Centre www.NBDC.ie

⁵ <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

⁶ https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIreland-AA-Guidelines_Version1.pdf

⁷ https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf

- Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland);
- The Eurobats Mitigation of Lighting Document
- Tree Removals Plan (Charles McCorkell, 2020)

2.2 Desk Study

2.2.1 Previous Records

A desktop review was carried out to identify the previous records of Bat species within the Proposed Development Site and its environs. The study area occurs in 10km² Grid Square N04. The website the NBDC (www.nbdc.ie) was accessed on 01/08/2022 to establish any previous bat records and shown below in Table 1.

Table 1 Historical Bat Records in 10km² Grid Square N04 (NBDC website www.nbdc.ie accessed 01/08/2022)

Species Name - Common	Species Name - Latin	Last Documented Record N04
Brown Long-eared Bat	<i>Plecotus auritus</i>	03/04/2002
Daubenton's Bat	<i>Myotis daubentonii</i>	29/07/2009
Leisler's Bat	<i>Nyctalus leisleri</i>	29/07/2009
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	21/08/2013
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	21/08/2013

2.2.2 Species Background

Ireland had ten known bat species until February 2013, when a single live greater horseshoe bat (*Rhinolophus ferrumequinum*) was found roosting in Co. Wexford⁸. On 8th June 2020, a single audio recording was confirmed in the Glendaough area, Co. Wicklow. It was found on two more occasions in the same area in early July 2020 (Bat Conservation Ireland, July 2020).

The ten species (excluding the greater horseshoe) are briefly described overleaf. For a more comprehensive overview see McAney, 2006.⁹

The dependence of Irish bat species on insect prey has left them vulnerable to habitat destruction, land drainage, agricultural intensification and increase use of pesticides. Also, their reliance on buildings as roosting sites has made them particularly vulnerable to renovation works and the use of timber chemical treatment. Buildings are highly important as roosting sites for bats and all Irish bat species use buildings for all roost types. Most significant in terms of roosts in houses are maternity roosts, but cellars and even attics may serve as hibernation sites for bats. Roosts within buildings can far exceed the numbers encountered in trees, bridges, caves or cliffs and roosts of over 1,000 bats have been recorded in buildings.¹⁰

⁸ National Biodiversity Data Centre <http://www.biodiversityireland.ie/new-bat-species-found-in-ireland/>

⁹ McAney, K. (2006) *A Conservation Plan for Irish Vesper Bats*. Irish Wildlife Manual No.20. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

¹⁰ NRA (2005) *Guidelines for the Treatment of Bats Prior to the Construction of National Road Schemes*. National Roads Authority, Dublin

2.2.2.1 Family Vespertilionidae:

Common pipistrelle *Pipistrellus pipistrellus*

This species was only recently separated from its sibling, the soprano or brown pipistrelle *P. pygmaeus*¹¹, which is detailed below. 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 Down¹² and also in Fermanagh, Longford and Cavan. It has also recently been recorded in Counties Cork and Kerry.¹³ 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, caddisflies 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.

¹¹ Barratt, E. M., Deauville, R., Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A., & Wayne, R. K. (1997) *DNA Answers the Call of Pipistrelle Bat Species*. *Nature* 387: 138 - 139.

¹² Richardson, P. (2000) *Distribution Atlas of Bats in Britain and Ireland 1980 - 1999*. The Bat Conservation Trust, London, England.

¹³ Kelleher, C. (2005) *International Bat Fieldcraft Workshop*, Killarney, Co. Kerry. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

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, caddisflies 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.

Daubenton's bat *Myotis daubentonii*

This bat species feeds close to the surface of 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.

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 2005¹⁴ and another in Tipperary in 2006.¹⁵ 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.

2.2.2.2 Family *Rhinolophidae*:

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

¹⁴ Kelleher, C. 2006a *Nathusius pipistrelle* *Pipistrellus nathusii* and Brandt's Bat *Myotis brandtii* - New Bat Species to Co. Kerry – Irish Naturalists' Journal 28: 258.

¹⁵ Kelleher, C. 2006b Brandt's Bat *Myotis brandtii*, New Bat Species to Co. Tipperary. Irish Naturalists' Journal 28: 345.

been designated in Ireland for its protection. Where it occurs, it is often found roosting within farm buildings.

2.2.3 Landscape Suitability

The National Biodiversity Data Centre (NBDC) maps landscape suitability bats based on Lundy *et al.* (2011). The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. On average for all bat species the highest range is between 36.44 - 58.56. The overall assessment of bat habitats for the current study area is given as '41.22', deemed 'High' by the author.

Table 2 gives the suitability of the study area for the bat species found in the study area (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2019).¹⁶

Table 2 Suitability of the study area for the bat species found in the Cornamaddy area (based on the NBDC data) with Irish Red list status indicated

Common name	Scientific name	Suitability index	Irish red list status
All bats	-	41.22	Least Concern
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	52	Least Concern
Brown long-eared bat	<i>Plecotus auritus</i>	53	Least Concern
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	58	Least Concern
Lesser-horseshoe bat	<i>Rhinolophus hipposideros</i>	3	Least Concern
Leisler's bat	<i>Nyctalus leisleri</i>	55	Least Concern
Whiskered bat	<i>Myotis mystacinus</i>	29	Least Concern
Daubenton's bat	<i>Myotis daubentonii</i>	43	Least Concern
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	30	Least Concern
Natterer's bat	<i>Myotis nattereri</i>	48	Least Concern

2.2.4 Bat Roosts

Bats were originally cave and tree dwelling animals but many now find buildings just as suitable for their needs. Bats are social animals and most species congregate in large colonies during summer. These colonies consist mostly of females of every reproductive class, with some juvenile males from the previous year. Male bats normally roost individually or in small groups meeting up with the females in the late autumn-early winter, when it is time to mate. In summer, bats seek warm dry buildings in which they can give birth and suckle their young. In winter, they seek out places with a constant low temperature and high humidity where they can become torpid and hibernate during adverse weather conditions. However, bats do not hibernate continuously during winter and will awake and hunt during mild nights when there are insects available, and it is energetically advantageous to forage.

¹⁶ 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.

2.2.4.1 Maternity Roosts

Maternity roosts are the most significant roosts and they are predominantly all-female aggregations that are formed from late May onwards and remain as a relatively cohesive unit until mid to late August. Not all female bats give birth annually. These females that do bear young in a given year avail of a suitable building, tree and sometimes cave (or equivalent). The young are flightless for several weeks and hence are vulnerable to dangers such as tree felling and restoration, reinforcement or demolition of structures such as buildings and bridges.

2.2.4.2 Mating Roosts

Most bat species mate in autumn but pregnancy does not occur until the following spring. During this time males will take possession of a cavity in a building, tree, bridge, cave or mine and attract females to these sites to establish a harem. Male bats call both from a perch and in flight in much the same manner that male birds sing.

2.2.4.3 Hibernation Roosts

Bats have a high metabolic rate and in temperate countries, such as Ireland, flying insects are not available in sufficient numbers during winter to sustain bats. Therefore, bats hibernate during winter. In hibernation sites, bats are often completely inactive for several days and are extremely vulnerable to disturbance by human activities due to the time taken for them to become sufficiently active to allow escape. Hibernation may extend from November to the end of March, during which time bat activity will take place sporadically.

2.2.4.4 Night Roosts

These are roosts which are used as resting places for bats between foraging bouts. They also provide retreats for bats from predators or during inclement weather conditions. They also function as feeding perches and may be important for socialising.

2.3 Bat Survey Methodology

The guidance used for the bat emergence surveys and activity surveys followed Marnell et al (2022)¹⁷ for the July 2022 survey and the older 2006¹⁸ guidelines for the September survey in 2021. The Bat Conservation Trust (2016)¹⁹ Guidelines were used for both September 2021 and July 2022 surveys.

¹⁷ 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.

¹⁸ Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

¹⁹ The Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition

A preliminary general bat activity survey was also undertaken on the 29th September 2021 from 18.45 to 21.15 (sunset was 19.13). A follow up survey was completed during the more optimal time of 28th July 2022 from 21.05 to 23.30 (sunset was 21.35) by walking the Site field boundaries where accessible. The weather was optimal for a bat survey with temperatures on the night was 12-14°C with a gentle breeze in September 2021 and 15°C in July 2022 in calm cloudy conditions. Rain arrived at the end of the survey in September 2021. Bat activity and emergence surveys are best carried out from April to end-September in suitable weather conditions²⁰ which these surveys were.

The equipment used included an Elekon Bat Logger M detector. Visual observations were taken with the aid of a powerful L.E.D. torch (AP Pros-Series 220 Lumens High Performance Spotlight).

The BCT guidelines were followed for the assessment rating²¹ and classified using Table 4.1 of the BCT guidelines (2016) which is shown as Table 3 overleaf for grading foraging and commuting habitats. General Site photos are contained in Appendix A from July 2022.

²⁰ Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

²¹ *Bat Surveys for Professional Ecologists, Good Practice Guidelines (2016)*

Table 3 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of roost features within the landscape, to be applied using professional judgement.

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions^a 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 or hibernation^b).</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.^c</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>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.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ^a and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree 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 ^a and surrounding habitat.	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

^a For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

^b Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

^c This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

2.4 Bat Roost Potential Tree Assessment

Trees that may provide a roosting space for bats were classified using the Bat Tree Habitat Key (BTHK, 2018)²² and the classification system adapted from Collins (2016). The Potential Roost Features (PRFs) listed in BTHK (2018) were used to determine the PBR value of trees, see Table 4. Consideration was also given to the classification of trees according to the British Standard BS8956 - Surveying for bats in trees and woodland, see Table 5.

A Phase 1 inspection was undertaken to make a list of trees within the proposed development site that may be suitable as roosting sites for bats. Inspections were undertaken visually with the aid of a strong torch beam (AP Pros-Series 220 Lumens High Performance Spotlight) and Celestron 12x56 Prism Binoculars during the daytime searching for PRFs, if visible. To aid this Phase 1 inspection, tree reports, where available, were consulted to supplement the data collected. A RIDGID 36848 Micro CA-150 Hand-Held Borescope for inspection of any accessible crevices on trees (3m from ground).

During the survey, the features listed below on the affected trees were sought as they may provide suitable roost sites for bats:

- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.
- Man-made holes (e.g. cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems).
- Cracks/splits in stems or branches (horizontal and vertical).
- Partially detached, loose or bark plates.
- Cankers (caused by localised bark death) in which cavities have developed.
- Other hollows or cavities, including butt rots.
- Compression of forks with included bark, forming potential cavities.
- Crossing stems or branches with suitable roosting space between.
- Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
- Bat or bird boxes.
- Other suitable places of rest or shelter.

Certain factors such as orientation of the feature, height from the ground, the direct surroundings and its location in respect to other features may enhance or reduce the potential value.

²² BTHK (2018) Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Exeter: Pelagic Publishing.

Table 4 Classification and Survey Requirements for Bats in Trees²³

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	<p>A National Parks and Wildlife (NPWS) derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) and nocturnal survey during appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence.</p> <p>Works to tree undertaken under supervision in accordance with the approved good practice method statement provided within the licence.</p> <p>However, where confirmed roost site(s) are not affected by works, work under a precautionary good practice method statement may be possible.</p>
High Potential Category 1	A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.	<p>Aerial assessment by roped access bat workers (if appropriate) and / or nocturnal survey during appropriate period (May to August).</p> <p>Following additional assessments, tree may be upgraded or downgraded based on findings.</p> <p>If roost sites are confirmed and the tree or roost is to be affected by proposals a licence from the NPWS will be required.</p> <p>After completion of survey work (and the presence of a bat roost is</p>

²³ Bat Surveys for Professional Ecologists: Good Practice Guidelines (J., Collins (Bat Conservation Trust), 2016).

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
		discounted), a precautionary working method statement may still be appropriate.
Moderate Potential Category 2	<p>A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status).</p> <p>Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.</p>	<p>A combination of aerial assessment by roped access bat workers and / or nocturnal survey during appropriate period (May to August).</p> <p>Following additional assessments, tree may be upgraded or downgraded based on findings.</p> <p>After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.</p> <p>If a roost site/s is confirmed a licence from the NPWS will be required.</p>
Low Potential Category 3	<p>A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential.</p> <p>Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes.</p>	No further survey required but a precautionary working method statement may be appropriate.
Negligible/No potential – Category 4	Negligible/no habitat features likely to be used by roosting bats	None.

Table 5 Classification of Trees for Risk of Bat Roost Presence

Tree category and description (following scoping survey)	Secondary (non-specialist) survey recommendations	Secondary (specialist) survey recommendations
Known or confirmed roost	Initially consider if work to tree(s) can be avoided. If not, a specialist bat roost assessment should be undertaken to establish bat species, numbers and the nature of the roost.	
High/medium risk Trees with a suitable potential roost feature, or with several features with some bat roost potential.	<ul style="list-style-type: none"> Secondary (non-specialist) assessment to examine potential roost features previously identified. If roosts cannot reasonably be ruled out a bat specialist should be consulted. Following this assessment the tree could be up-graded or down-graded (see column 1 categories). 	<ul style="list-style-type: none"> Specialist bat roost assessment should be undertaken if work to a tree cannot be avoided. Assessment to include techniques such as endoscope use and dusk/pre-dawn surveys should be undertaken. Following this assessment the tree could be up-graded or down-graded.
Low risk Trees of sufficient size and age to contain bat roosts but with no obvious potential roost features seen during the scoping survey, or features seen with limited roosting potential only, e.g. small amounts of ivy.	No further assessment is required unless sufficient new evidence is found to upgrade the category.	None
Negligible/no risk Trees with apparently no potential to support bats.		
<i>NOTE Risk equates to the likelihood of bat roost presence.</i>		

The Tree Removal Plan (Charles McCorkell, 2022) identifies 18 trees for removal, see Figure 4. Enviroguide advised AEE that a further 6 trees, plus a tree group will be removed to facilitate the proposed works. See Table 6 below for list assessed for bat roost potential in July 2022. Photos of the affected trees onsite are contained in Appendix A.

The categories in Table 6 correspond to the 'BS5837: 2012 - Category Retention Rating':

- Category A Trees - Trees of high quality/value with a min. of 40 years life expectancy.
- Category B Trees – Trees of moderate quality/value with a min. of 20 years life expectancy.
- Category C Trees - Trees of low quality/value with a min. of 10 years life expectancy.
- Category U Trees - Trees in such a condition that any existing value would be lost within 10 years or being recommended for removal sound arboricultural practice.

Table 6 Affected Tree List

Species	Tree No.	Category	Shown on Figure 4 as Shaded
Ash	T881	C2	Yes
Ash	T879	C2	Yes
Ash	T880	C2	Yes
Ash	T878	C2	Yes
Ash	T877	C2	Yes
Ash	T876	C2	Yes
Ash	T875	C2	Yes
Ash	T874	C2	Yes
Ash	T872	C2	Yes

Haw	T915	C2	Yes
Beech	T914	U	Yes
Sycamore	T913	C2	Yes
Ash	T912	C2	Yes
Ash	T911	C2	Yes
Ash	T908	U	Yes
Ash	T885	C2	Yes
Ash	T886	C2	Yes
Ash	T887	C2	Yes
Beech	T864	B2	Additional
Beech	T865	B2	Additional
Ash	T840	C2	Additional
Beech	T839	B2	Additional
Beech	T838	C2	Additional
Ash	T837	C2	Additional
Group - Haw, Hazel, Elder	G843	B2	Additional

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Trees, if identified as Potential Bat Roosts, were inspected during the daytime, where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

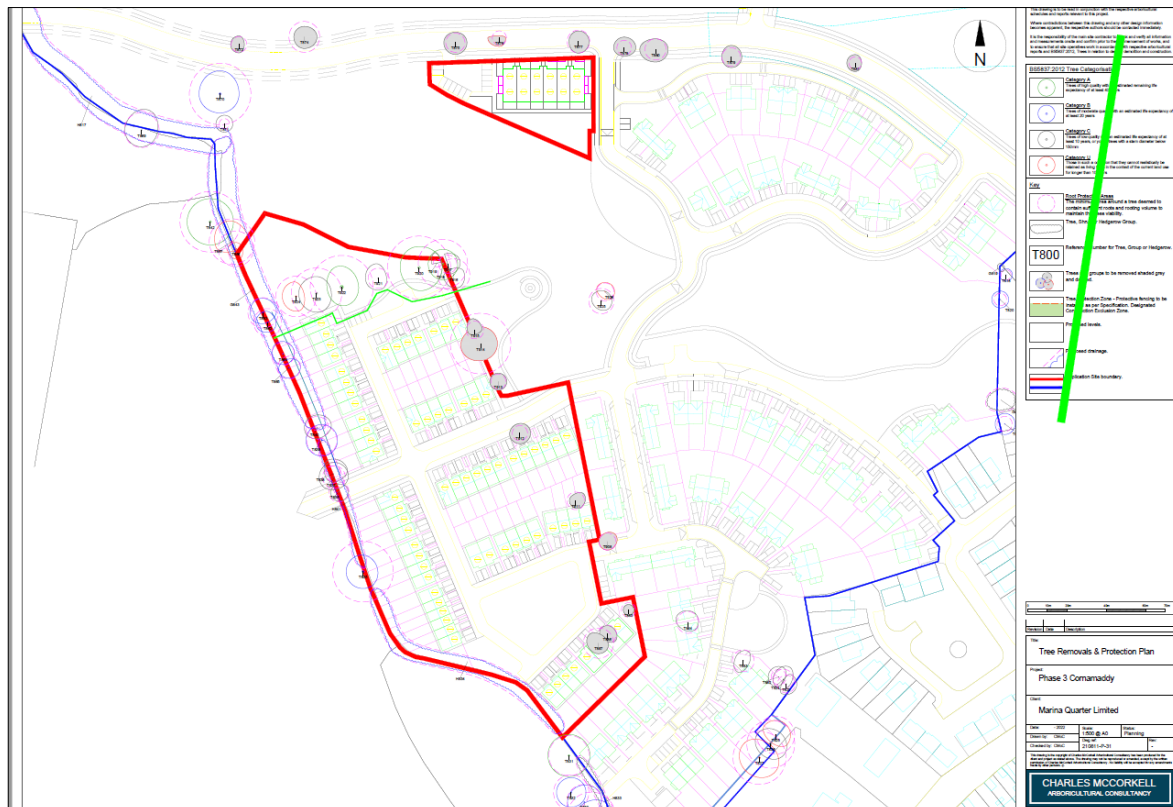


Figure 4 Tree Removal Plan (Charles McCorkell, 2022)

2.5 Landscape Evaluation

Ecological survey results were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local (from NRA, 2009). The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into two categories: local importance (higher value) and local importance (lower value).

3. RESULTS

3.1 Bat Activity Survey

In total three species of bat were detected during September 2021 and July 2022. The tabulated results are summarized in Table 7, with the complete dataset of bat species identified in real time in the field using the Elekon Batlogger M detector presented in Appendix B.

The visual results of the bat surveys (September 29th 2021 & 28th July 2022) are shown as Figures 5 and 6. The activity during the surveys could be considered Moderate-High given the optimal weather conditions on both occasions.

The passes are indicative of bat activity, and not absolute bat number. Bats tended to passed up and down repeatedly along a treeline which can suggest there are more bats present than is the case.

Table 7 Bat Results Summary Data– September 29th 2021 and July 28th 2022

Species Name – Common	Species Name – Latin	Number of Passes	Peak Frequency (kHz)
September 29th 2021			
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	15	46.5
Leisler's Bat	<i>Nyctalus leisleri</i>	5	26.9
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	12	56.5
July 28th 2022			
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	19	46.5
Leisler's Bat	<i>Nyctalus leisleri</i>	6	26.9
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	22	56.5

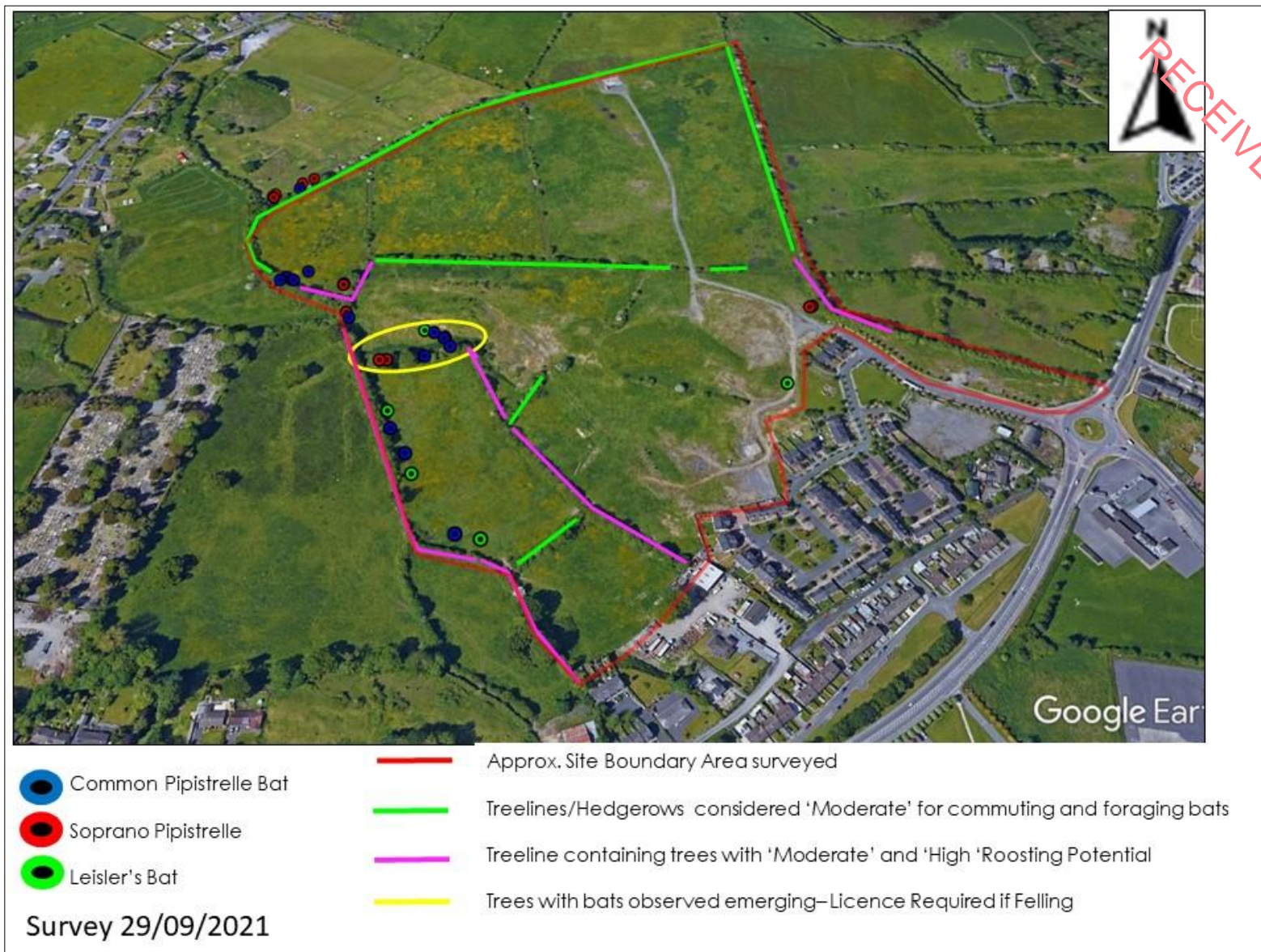


Figure 5 Bat Results with Legend – September 29th 2021

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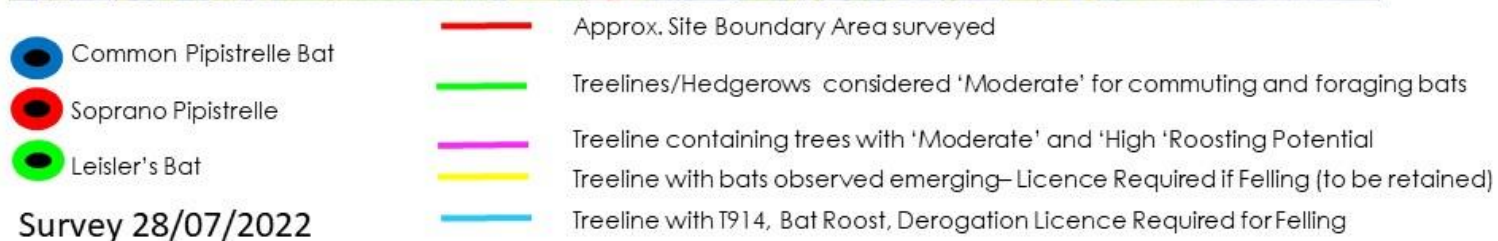
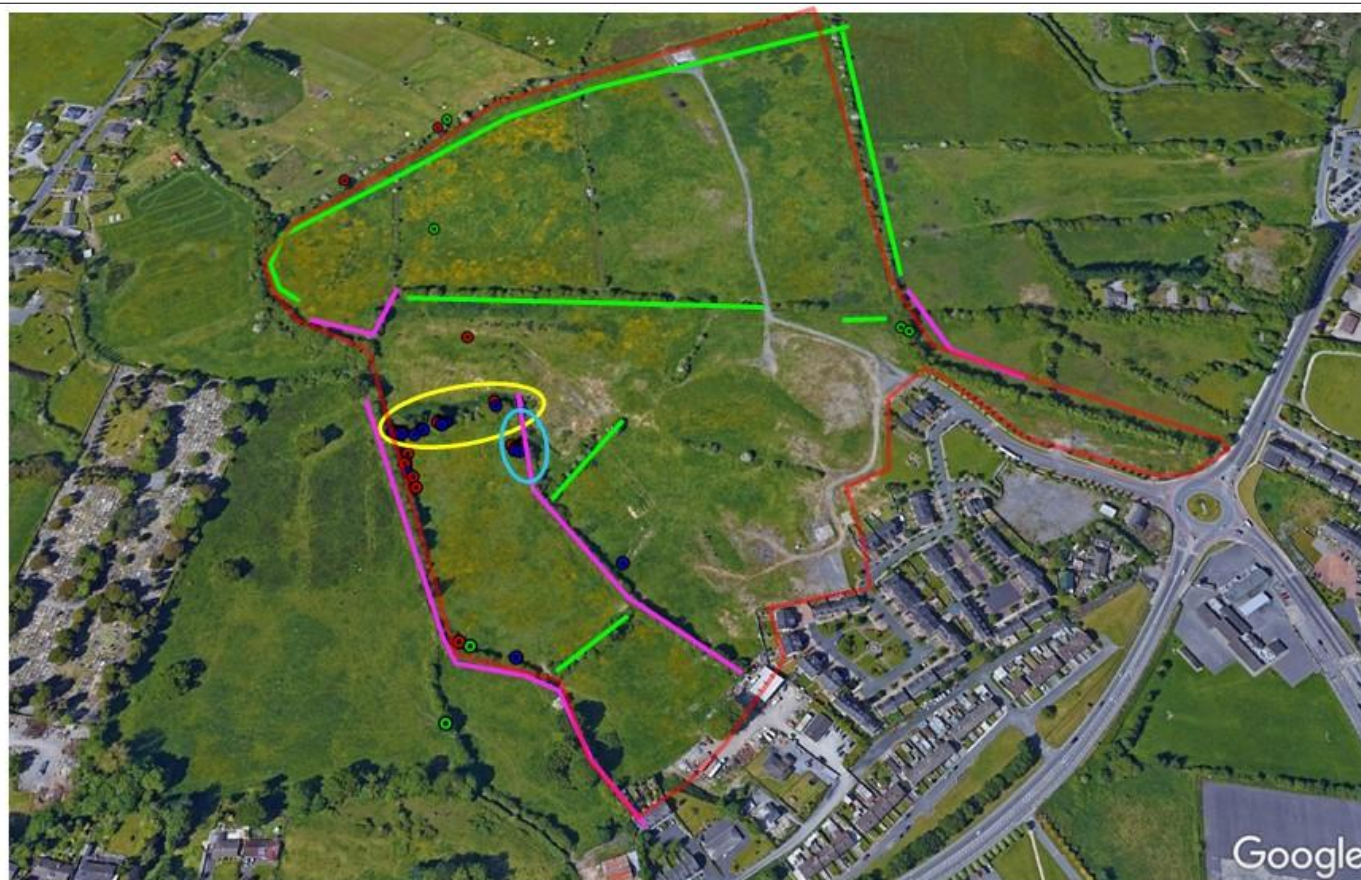


Figure 6 Bat Results with Legend – July 28th 2022

3.2 Bat Potential Tree Assessment

The 24 x Trees and Tree Group affected by the development are mature. These were assessed July 28th 2022 for their bat roost potential features along with risk for same and classified as per Tables 8 and 9. Photos of the affected trees and tree group are shown in Appendix A. Figure 7 gives a visual breakdown.

Trees to be retained but noted as having bats emerge, or being trees with high roost potential are shown in Plates Appendix, notably Trees T916, T917, T918, T919, T920, T921, T922, T923 and T924. In the survey of September 2021 Tree T922 was noted with Soprano Pipistrelle bat emerging. This tree is to be retained according to recent site layout.

Tree T914 was noted as having Soprano and Common Pipistrelle emerge during July 28th 2022. The tree alongside it, T915 was noted as High Bat roost potential and bats emerging may have been missed. It is recommended a Licence is acquired for both T914 and T915 if justification is found for their removal.

Table 8 Assessment of Affected Trees for Bats, see Tables 4 & 5

No.	Tree No.	Photo Number	Category	Bat Roost Potential	Classification of Trees for Risk of Bat Roost Presence as per Table 5
1	T881	1	C2	Negligible	No Risk
2	T879	2	C2	Negligible	No Risk
3	T880	3	C2	Low	Low Risk
4	T878	4	C2	Negligible	No Risk
5	T877	5	C2	Negligible	No Risk
6	T876	6	C2	Negligible	No Risk
7	T875	7	C2	Negligible	No Risk
8	T874	8	C2	Low	Low Risk
9	T872	9	C2	Low	Low Risk
10	T915	10	C2	High	High Risk
11	T914	11	U	Bat Roost	High Risk
12	T913	12	C2	Negligible	No Risk
13	T912	13	C2	Negligible	No Risk
14	T911	14	C2	Negligible	No Risk
15	T908	15	U	Negligible	No Risk
16	T885	16	C2	Low	Low Risk
17	T886	17	C2	Low	Low Risk
18	T887	17	C2	Low	Low Risk
19	T864	18	B2	Low	Low Risk
20	T865	18	B2	Low	Low Risk
21	T840	19	C2	Low	Low Risk
22	T839	20	B2	Moderate	Medium/High Risk
23	T838	21	C2	Low	Low Risk
24	T837	21	C2	Low	Low Risk
25	G843	22	B2	Negligible	No Risk

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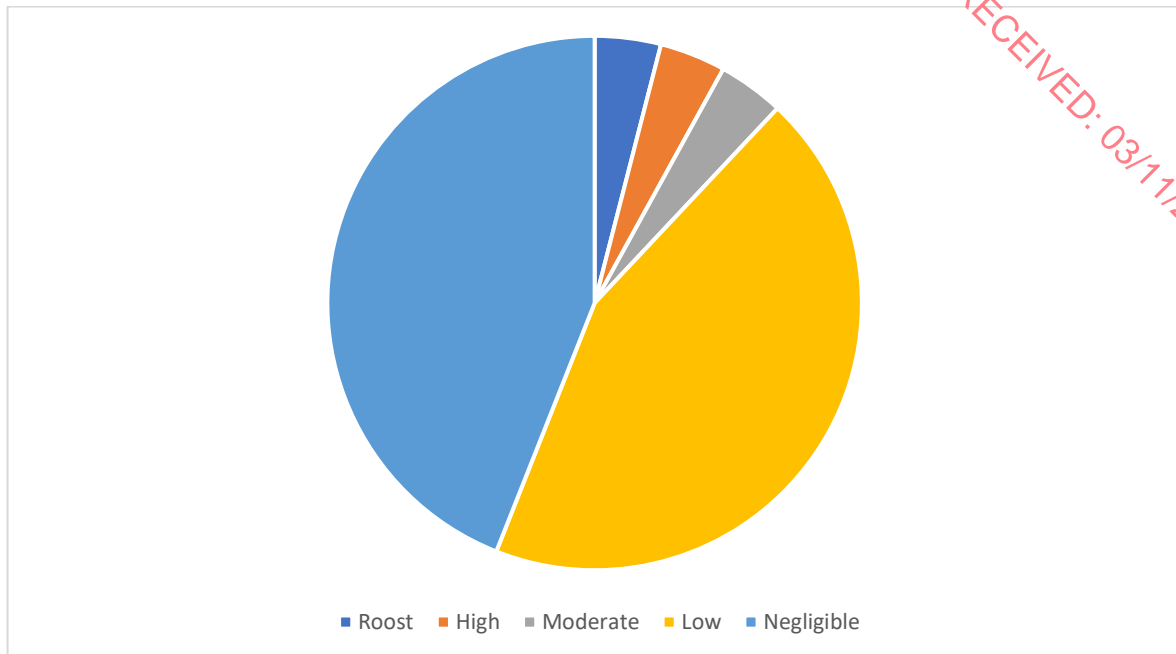


Figure 7 Pie Chart of Bat Roost Potential (n = 25 to include Tree Group G843 as 1 entity)

3.3 Landscape Evaluation

The landscape is considered of local importance (Higher value) for bats a 'High' score for landscape suitability for bats. The treelines and hedgerows radiating out from the site provide commuting and foraging corridors to other important habitats for bats in the wider landscape and are considered to be of 'Moderate' habitat value (see Table 3).

4. RECOMMENDATIONS

4.1 Lighting for Bats

In order to minimise disturbance to bats utilising the site in general, the lighting and layout of the proposed development should be designed to minimise light-spill onto habitats used by the local bat population foraging or commuting. This can be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers '*Bats and Lighting in the UK - Bats and Built Environment Series*', the Bat Conservation Trust '*Artificial Lighting and Wildlife Interim Guidance*' and the Bat Conservation Trust '*Statement on the impact and design of artificial light on bats*'. Therefore, where possible, the lighting scheme should include the following:

- The avoidance of direct lighting of proposed areas of habitat creation / landscape planting, or on trees planted.
- Retained treelines should not incur an increase in the current lux level due to the new development.
- Unnecessary light spill controlled through a combination of directional lighting and hooded / shielded luminaires or strategic planting to provide screening vegetation.
- Lights should be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area.
- Narrow spectrum lighting should be used with a low UV component. Glass also helps reduce the UV component emitted by lights.
- The colour rendering of the selected light fitting should be 3000k making the LED fittings a warmer light, helping to further minimize the impact on the local wildlife
- Where lighting is necessary, it shall be of limited height and targeted downwards to prevent overspill.
- A Bat Ecologist (with lighting expertise) should assess the lighting report for the area contained trees which are identified roosts e.g., the area containing Trees T916 to T924, and T914 and T915 to ensure no lighting disturbance to roosts, or potential bat roost trees. They should advise further lighting mitigation as required.

4.2 Bat Roost Potential Tree Assessment

Tree felling protocol should include the following:

- A dedicated bat survey of Tree T915 is required to assess if there is bat usage. Inspection at height may be required.
- A Bat Derogation licence is required for T914. If this is granted conditions for felling will be stated within. The Tree T914 will also need a dedicated bat

emergence survey to assess level of bat usage for the licence application. Inspection at height may be required.

- Tree-felling of trees with Low, Moderate and High Bat Roost Potential should be undertaken during September and October. During this period bats are capable of flight and this may avoid risks associated with tree-felling. It is also outside the bird nesting season. Felling in the winter months creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. 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.
- Tree-felling should be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. In order to ensure the optimum warning for any roosting bats that may still be present, an affected tree should be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. Any affected trees should then be pushed to the ground slowly and should remain in place for a period of 48 hours to allow bats/other wildlife to escape.
- Trees felled should NEVER be sawn up or mulched immediately in case protected wildlife is present.
- Trees used for future landscaping should comprise of semi-mature native Irish species.
- If bats are found to be using any affected trees as a roost, a derogation licence from the National Parks and Wildlife and Services (NPWS) will be required and any felling postponed until a licence is acquired.

Table 9 below summaries recommendations for affected trees identified.

Table 9 Summary of Recommendations for Affected Trees

No.	Presence of Bat Potential Features as per Table 4	Classification of Trees for Risk of Bat Roost Presence as per Table 5	Recommendation
T881	Negligible	No Risk	Trees should ideally be removed as per Section 40 of the Wildlife Act 1976 - 2021 (as amended)
T879			
T878			
T877			
T876			
T875			
T913			
T912			
T911			
T908			
G843			
T880	Low	Low Risk	Pre-Felling Bat Survey the night before and trees to be soft felling between September and October. Trees to be left lie for 48 hours.
T874			
T872			
T885			
T886			
T887			

No.	Presence of Bat Potential Features as per Table 4	Classification of Trees for Risk of Bat Roost Presence as per Table 5	Recommendation
T864			
T865			
T840			
T838			
T837			
T839	Moderate	Medium Risk	A further dedicated survey to assess if there is bat usage is recommended. Inspection at height may be required.
T915	High	High Risk	
T914	Bat Roost	Derogation Licence from NPWS Required for felling	Needs a dedicated survey to assess level of bat usage for the licence application. Inspection at height may be required.

4.3 Bat Roosting Opportunities

The design of the Proposed Development should incorporate integrated 10 x bat boxes spread across the site over 4m high (if possible) onto retained mature trees. The trees in which they are placed should not be illuminated. See Appendix C for examples.

5. CONCLUSION

The site was surveyed twice, during September 2021 and July 2022. Three species of bats were detected with a moderate amount of activity, especially in the area contained the mature Beech trees to the west of the site, shown on Figures 5 and 6. In this area there were several trees with High Bat Roost potential and T922 was noted to have bats emerge in September 2021 (Tree T922) and T914 was noted to have bats (approx. 10 recordings) emerge in July 2022. A derogation licence will be required from the NPWS to fell Tree T914. Tree T922 will be retained.

Positive impacts for bats will be via the supplementary planting of native Irish species and the erection of bat boxes around the site. It was noted that certain areas of the site had higher levels of bat activity and this is possibly attributed to a selection of over mature, standing dead and veteran specimen trees being present which have high bat potential due to features such as hollow cavities and thick ivy growth. For affected trees with 'Low' and 'Moderate' Bat Roost Potential, it is recommended they have a bat survey performed the night before to ensure no bats are using these trees. For the tree with High Bat Roost Potential T915 (beside T914) a further dedicated survey to assess if there is bat usage is recommended. Inspection at height may be required. Finally, in order to preserve the roost potential of the treelines/hedgerows to be retained on site and to minimise disturbance to bats utilising the site in general, the lighting and layout of the proposed works will be designed to minimise light-spill onto habitats both within and adjacent to it that are used by the local bat population foraging or commuting. In that regard the guidelines²⁴ for lighting and bats will be taken into account for the lighting layout.

²⁴ Bat Conservation Trust (2018) Bats and artificial lighting in the UK Bats and the Built Environment series

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APPENDICES

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APPENDIX A



Plate 1 Tree T881 (Negligible Bat Roost Potential (BRP))



Plate 2 Tree T879 (Negligible BRP)



Plate 3 Tree T880 (Low BRP)



Plate 4 Tree T878 (Negligible BRP)



Plate 5 Tree T877 (Negligible BRP)



Plate 6 Tree T876 (Negligible BRP)



Plate 7 Tree T875 (Negligible BRP)



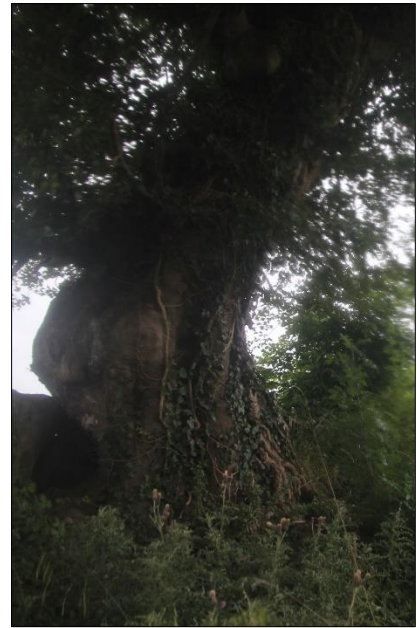
Plate 8 Tree T874 (Low BRP)



Plate 9 Tree T872 (Low BRP)



Plate 10 Tree T915 (High BRP)



Plates 11 Tree T914 (Bat Tree Roost, Licence Required for Felling)



Plate 12 Tree T913 (Negligible BRP)



Plate 13 Tree T912 (Negligible BRP)



Plate 14 Tree T911 (Negligible BRP)



Plate 15 Tree T908 (Negligible BRP)



Plate 16 Tree T885 (Low BRP)



Plate 17 Tree T886 and T887 (Low BRP)



Plate 18 Tree T865 and T864 (Low BRP)



Plate 19 Tree T840 (Low BRP)

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Plate 20 Tree T839 (Moderate BRP)



Plate 21 Tree T838 and T837 (Low BRP)



Plate 22 Group G843 (Negligible BRP)

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Trees with High BRP or Tree Roosts (Retained), Trees T916-T924



Plate 23 Trees with High BRP (to be retained)



Plate 24 Trees with High BRP (to be retained)



Plate 25 Tree T922 Bat Tree Roost (to be retained)

General Site Photos (July 2022)



Plates 26 General Site Photos.

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APPENDIX B

29/09/2021	Species Text	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
19:23:10	Common Pipistrelle	4	47.4	54.2	47	6	100	14	53.43664	-7.91005
19:25:34	Soprano Pipistrelle	1	54.7	56.3	53.8	3.3	246	14	53.43664	-7.91004
19:26:12	Leisler's Bat	1	28.2	28.4	26.2	6.2	179	14	53.4362	-7.90601
19:35:29	Leisler's Bat	2	27.2	28.4	26.2	6.2	179	14	53.43492	-7.90938
19:35:59	Common Pipistrelle	1	43.6	44.5	43.6	7.2	0	14	53.43496	-7.90965
19:37:53	Leisler's Bat	1	28.2	28.4	26.2	6.2	179	14	53.43542	-7.91019
19:38:21	Common Pipistrelle	1	43.9	44.8	43.5	5	399	14	53.43559	-7.91029
19:39:27	Common Pipistrelle	2	45.8	62.2	45.2	5	95	14	53.4358	-7.9105
19:41:52	Leisler's Bat	2	27.2	28.4	26.2	6.2	179	14	53.43595	-7.91057
19:43:58	Soprano Pipistrelle	1	53.4	56.4	53.1	3.3	0	14	53.43642	-7.91077
19:44:37	Soprano Pipistrelle	4	54.1	58.3	53.9	3.5	353	14	53.43642	-7.91069
19:50:30	Common Pipistrelle	1	46.2	50.1	45.1	7.8	214	14	53.43646	-7.91025
19:51:19	Common Pipistrelle	2	46.6	49.2	45.8	2.8	738	14	53.43655	-7.90996
19:53:55	Leisler's Bat	1	27.5	28.7	25.3	5.9	0	14	53.43671	-7.9103
19:55:35	Common Pipistrelle	1	47.8	52.5	47.4	3	90	14	53.43669	-7.91018
19:56:21	Common Pipistrelle	17	46.1	60	45.9	5	93	14	53.43684	-7.91125
19:58:47	Soprano Pipistrelle	1	52.8	55.5	52.8	3.3	0	14	53.4369	-7.9113
20:05:26	Soprano Pipistrelle	13	53.7	67.5	53.5	5	80	13	53.43719	-7.91141
20:07:47	Common Pipistrelle	22	44.8	62	44.5	4	90	13	53.4372	-7.91141

29/09/2021	Species Text	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
20:11:47	Common Pipistrelle	17	46.7	65.1	46.5	5	90	13	53.43734	-7.91189
20:22:25	Common Pipistrelle	3	45.6	50.4	45.1	8.7	135	13	53.43725	-7.91208
20:23:42	Common Pipistrelle	11	46.7	58.4	46.3	4	90	13	53.43724	-7.91222
20:29:50	Common Pipistrelle	19	46.8	64.8	46.5	5	90	13	53.43724	-7.91205
20:34:58	Sorpano Pipistrelle	28	52.3	69.1	52.1	5	84	13	53.43822	-7.91264
20:36:23	Sorpano Pipistrelle	1	54.3	58	54	3.9	0	13	53.43823	-7.91266
20:45:04	Common Pipistrelle	11	46.4	55.4	45.8	5	145	13	53.43834	-7.91233
20:48:19	Sorpano Pipistrelle	18	51.1	66	50.8	5	85	13	53.43841	-7.91231
20:50:55	Common Pipistrelle	19	44	58.5	43.6	6	95	13	53.43728	-7.91214
20:56:34	Sorpano Pipistrelle	47	52.1	65.1	51.6	6	80	13	53.43827	-7.91263
21:08:42	Sorpano Pipistrelle	18	54.6	64.2	54.3	6	80	12	53.43847	-7.91217
21:10:38	Sorpano Pipistrelle	34	50.2	65.4	49.8	7	85	12	53.43696	-7.90557
21:13:12	Sorpano Pipistrelle	44	54.9	69	54.6	5	80	12	53.43695	-7.9056

28/07/2022	Species Text	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
21:22:21	Common Pipistrelle	7	43	52.7	38.7	2	90	15	53.43625	-7.9096
21:23:07	Soprano Pipistrelle	11	53.1	53.8	52.3	7	90	15	53.43627	-7.9096
21:30:30	Common Pipistrelle	4	48.7	50.5	48	5.9	365	15	53.43646	-7.9104
21:31:25	Common Pipistrelle	13	45.3	53.2	44.7	3	144	15	53.43644	-7.9104
21:32:47	Leisler's Bat	2	29.1	30.8	27.9	4.9	164	15	53.43922	-7.911
21:33:02	Common Pipistrelle	7	46.5	60	42	2	132	15	53.43544	-7.9084
21:35:25	Common Pipistrelle	9	43.6	43.9	42.9	8	262	15	53.43629	-7.9096
21:36:50	Common Pipistrelle	8	46.5	50.6	45.8	5	257	15	53.43606	-7.9107
21:37:08	Soprano Pipistrelle	32	56.4	67.3	55.8	4	84	15	53.43604	-7.9106
21:44:34	Common Pipistrelle	5	46.8	47.9	46.2	7	131	15	53.43623	-7.9096
21:47:53	Soprano Pipistrelle	14	57.3	70.8	56.5	3	80	15	53.43596	-7.9106
21:50:32	Soprano Pipistrelle	25	56.5	67	56	3	80	15	53.43494	-7.9099
21:51:07	Soprano Pipistrelle	2	48.6	55.8	48	6.9	84	15	53.43613	-7.9107
21:52:43	Common Pipistrelle	3	45.9	47.7	45.1	7	800	15	53.43622	-7.9096
21:53:32	Common Pipistrelle	9	46.4	51.3	45.6	6	395	15	53.43627	-7.9096

28/07/2022	Species Text	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
21:54:26	Soprano Pipistrelle	16	55	67.9	53.6	4	90	15	53.43624	-7.9096
21:56:14	Leisler's Bat	2	24.4	24.7	23.3	15.4	473	15	53.43446	-7.9099
21:56:21	Common Pipistrelle	12	45.3	53.2	44.7	3	148	15	53.43637	-7.9109
21:59:04	Common Pipistrelle	5	46.8	47.9	46.2	7	131	15	53.43636	-7.9108
21:59:59	Common Pipistrelle	9	43.6	43.9	42.9	8	262	15	53.43638	-7.9106
22:02:11	Common Pipistrelle	3	45.9	47.7	45.1	7	800	15	53.43484	-7.9094
22:02:47	Soprano Pipistrelle	18	55.1	55.6	54.3	6	270	15	53.43661	-7.9099
22:03:02	Leisler's Bat	2	29.1	30.8	27.9	4.9	164	15	53.43491	-7.9098
22:23:31	Soprano Pipistrelle	1	58.3	59.5	56.4	12.5	0	15	53.43637	-7.9108
22:25:19	Soprano Pipistrelle	1	58.6	58.9	56.4	9.2	0	15	53.43637	-7.9108
22:25:36	Soprano Pipistrelle	26	58.7	71	57.8	4	80	15	53.43637	-7.9109
22:27:00	Soprano Pipistrelle	20	55.5	59.7	54.7	6	100	15	53.43636	-7.9108
22:29:41	Common Pipistrelle	7	41.8	56.9	37.8	2	199	15	53.43635	-7.9107
22:30:31	Common Pipistrelle	44	42.8	44.3	42.2	7	104	15	53.43642	-7.9104
22:31:01	Common Pipistrelle	34	47.1	55.9	46.1	3	85	15	53.43645	-7.9104
22:32:32	Common Pipistrelle	2	43.5	44.8	43	7.2	363	15	53.43657	-7.9099
22:34:32	Soprano Pipistrelle	23	54.7	62.2	54.1	5	95	15	53.43624	-7.9096
22:36:59	Leisler's Bat	1	24.4	26.5	22.6	3.3	160	15	53.4381	-7.9109

28/07/2022	Species Text	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
22:37:34	Soprano Pipistrelle	1	54.9	55.2	54.6	13.1	80	15	53.43626	-7.9096
22:38:15	Soprano Pipistrelle	24	55.1	65.7	54.2	6	83	15	53.43626	-7.9096
22:40:24	Soprano Pipistrelle	30	54.4	64.8	53.3	5	80	15	53.43627	-7.9097
22:42:22	Soprano Pipistrelle	10	55.5	68.9	54.8	5	80	15	53.43713	-7.9103
22:43:55	Soprano Pipistrelle	23	55.5	66.8	54.9	3	80	15	53.43644	-7.9105
22:55:59	Soprano Pipistrelle	14	57.2	77.6	56.2	3	125	15	53.43639	-7.9106
23:00:11	Soprano Pipistrelle	18	57.1	66.7	56.5	3	80	15	53.43614	-7.9107
23:06:20	Soprano Pipistrelle	1	54.3	56.1	51.2	13.1	84	15	53.43621	-7.9107
23:10:03	Soprano Pipistrelle	3	54.9	55.5	54.6	5.2	197	15	53.43858	-7.912
23:13:15	Soprano Pipistrelle	14	58.1	71.3	56.7	4	85	15	53.43913	-7.911
23:14:31	Common Pipistrelle	8	49.6	72.1	42.4	3	107	15	53.43642	-7.9104
23:15:36	Common Pipistrelle	13	45.3	53.2	44.7	3	144	15	53.43638	-7.9109
23:16:39	Leisler's Bat	1	23.5	24.1	23.2	11.1	200	15	53.43718	-7.9055
23:30:10	Leisler's Bat	2	23.8	23.9	23.2	10.2	36	15	53.43721	-7.9055

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APPENDIX C



Woodcrete 1FF Bat Box x 10 - To be placed on retained trees in a unlit area over 4m high



Optional - Example of a 4m Pole Mounted Double Large Colony Bat Box, could be placed in an area of open space in a dark area with limited potential for disturbance.



Optional - Integrated Bat brick could be incorporated into the building design

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