



# BAT ASSESSMENT REPORT

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Residential Development  
Ballinasloe, Co. Galway.

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Prepared for:

**Limehill Esker LTD.**

Prepared by:

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## DISCLAIMER

This report provides an assessment as to the likely presence or absence of bats and the potential impacts of proposed development works based upon the survey findings at the time Veon Ecology performed the work. The survey was undertaken at a particular time and should not be regarded as a complete study, rather a 'snapshot' in time. Every effort has been made to provide an accurate assessment of the condition of the site at the time of the survey; however, no liability can be assumed for omissions or changes since the survey.

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## Statement of Authority

All surveying completed by Daniel Connell and Tara Speares. All reporting completed by Tara Speares and Donnachadh Powell. Data collation and analysis completed with the assistance of Molly Penzes.

### Daniel Connell

Daniel Connell is Senior Ecologist and Bat Specialist with Veon Ecology, the ecology and environmental services division of Veon Ltd. He has a comprehensive understanding of environmental law and an in-depth knowledge of woodland, wetlands, freshwater, coastal and marine ecosystems, and the respective botanical, avian, invertebrate, and mammal species which inhabit them.

Prior to joining Veon Ecology, Daniel worked for many years as a Freelance Ecologist and Environmental Correspondent. He has experience working on large infrastructural projects including forestry, flood relief schemes, road projects and oil & gas exploration. He has overseen various projects as Ecological Clerk of Works and has carried out extensive terrestrial, freshwater, and marine ecology fieldwork.

Daniel has conducted Bat Surveys for large infrastructure programmes within Ireland, as well as targeted species-specific and protect species surveys on behalf of private clients and ENGOS; from NIS, EclA, and EIAR ecology reports for construction, infrastructure, forestry, and windfarm projects, to conservation initiatives for National Wildlife Groups and individual clients. He has also volunteered with Bat Conservation Ireland and the Vincent Wildlife Trust, respectively, on a variety of Bat Conservation initiatives, and has advised local ENGOS and Citizen Scientists on appropriate Bat Box Schemes and mitigation measures.

Most recently, Daniel has been commissioned to conduct the Bat Assessment Report for Clondalkin Rugby Club on behalf of SCEG Limited; Bat Activity Surveys at Solar Farm projects in Cork and Offaly on behalf of Entrust Planning Services (2022); and the Pre-construction Bat Survey (2021) for N59 Moycullen Bypass, on behalf of Wills Bros.; including applying for Bat Derogation licences with NPWS Wildlife Licence Unit.

### Tara Speares

Tara is an Ecologist with Veon Ecology. This role involves the preparation of Natura Impact Statements and Pre-Screening Appropriate Assessment reports for various small to large scale infrastructure applications and projects. Any necessary desktop research and Phase 1 surveys are carried out by Tara, in support of these NIS and AA Screening reports.

Tara completed a bachelor's degree in Zoology from the National University of Ireland, Galway from 2017-2021.

Tara is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

### Donnachadh Powell

Donnachadh is a Lead Ecologist with Veon Ecology. This role involves the conducting of various field surveys including Environmental Impact Assessment Reports (EIAR), Ecological Impact Assessment Reports (EclA), Appropriate Assessment screening (AA) and Natura Impact Statements (NIS) with the practical implementation of environmental management on biodiversity and conservation projects. Donnachadh is a licenced surveyor for all bat species and white-clawed crayfish.

Donnachadh completed a bachelor's degree in Ecology and Environmental Biology from the University College Cork from 2015 – 2019.

Donnachadh is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

**Client:** Limehill Esker Limited.

**Project Name & Location:** Proposed Site for Ballinasloe Town Centre Residential Development, Dunlo, Ballinasloe, Co. Galway

## Report Revision History

Veon Ltd. Veon Ecology							
Revision	Description	Author:	Date	Reviewed By:	Date	Authorised by:	Date
1	Draft Report	TS/DP	03/08/2022	-	-	-	-
2	Final Report	TS/DP	05/08/2022		-	-	-

## Purpose

This document has been prepared as a Report for Limehill Esker Limited. Only the most up to-date report should be consulted.

All previous drafts/reports are deemed redundant in relation to the named site.

Veon Ecology accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

## Bat Record Submission Policy

It is the policy of Bat Eco Services to submit all bat records to Bat Conservation Ireland database one-year post-surveying. This is to ensure that a high-level bat database is available for future desktop reviews. This action will be automatically undertaken unless otherwise requested, where there is genuine justification.

## Executive Summary

**Project Name & Location:** Proposed Site for Ballinasloe Town Centre Residential Development, Dunlo, Ballinasloe, Co. Galway

**Proposed work:** The proposed development will see the construction of a new residential development at Dunlo in Ballinasloe Town Centre.

The main elements of the proposed residential development include the following:

- 1-3 Bed Units
- Apartment Blocks
- Car Parking Spaces
- Open Space Areas
- Roadworks
- Footways/cycleways
- Fencing Works
- Drainage Works
- Landscaping Works
- Environmental Mitigation Measures
- Utilities and Services Diversion Works
- All other Ancillary Works

## Bat Survey Results – Summary

Four bat species were recorded foraging and commuting within the grounds of the proposed residential development site. This represents 4 of the 9 Resident bats species known to occur in Ireland and therefore represents a medium bat biodiversity. No roosts were recorded in trees either within or in-close-proximity-to the footprint of the project.

Bat Species	Roosting	Foraging	Commuting
Leisler's ( <i>Nyctalus leisleri</i> )	X	✓	✓
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	X	✓	✓
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	X	✓	✓
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	X	✓	✓

**Bat Survey Duties Completed:** Tree PBR Survey; Dusk Bat Survey; Dawn Bat Survey; Walking Transect.

The primary areas of bat foraging and commuting activity were as follows: Mature Ash Tree, located in the centre of the site at (53.3225390, -8.2264802), hedgerows adjacent to the mature Ash running north to south and east to west. Bats are to be considered in all aspects of the design process and as a result there is an array of bat mitigation measures and compensatory measures presented for consideration in this report.

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## Introduction

Limehill Esker Limited commissioned Veon Ecology to undertake a preliminary roost assessment (PRA) of trees on site to identify any potential roost features (PRFs) and the presence or likely absence of roosting bat species at Dunlo, Ballinasloe, and its surrounding lands.

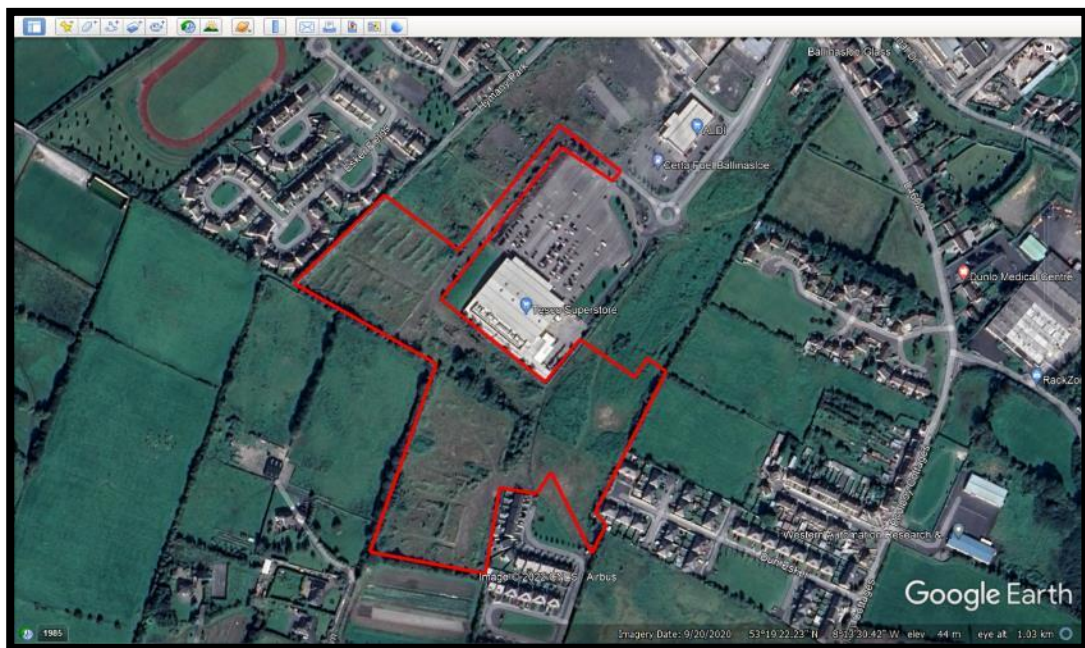
A Bat Activity Assessment was also commissioned, which involved surveyors following set Transect walks across the site using handheld *Anabat Walkabout* omnidirectional Heterodyne bat detectors and the use of passive static bat detectors (BATLOGGER M (Elekon) bat detector) in any areas determined as potential high activity for bats (hotspots), such as feeding, foraging, and/or roosting zones.

A PRA is a detailed inspection of the exterior and interior of a structure or tree to look for features bats could use for entry/exit and roosting and to search for signs of bats.

The absence of bats and/or bat signs during this survey does not equate to evidence that the feature in question is inactive.

To meet the requirements of the brief, the scope of the assessment included the following:

- Detailed inspection and assessment of mature trees for evidence of bat activity carried out by suitably licensed and qualified ecologist to best practice guidelines.
- Recommendations for further survey, and mitigation, compensation, and enhancement measures, as well as licensing requirements, as appropriate.



*Figure 1: Site context map indicating survey area for the Proposed Residential Development*

## Relevant Legislation & Bat Species Status in Ireland

A small number of these animal and plant species are protected under Irish legislation (Nelson, et al., 2019). The principal Irish legislation is the Wildlife Act 1976. Amendments to the Wildlife Act and its Statutory Instruments have enacted and amended protection of individual species, notably to comply with EU legislation or other international agreements. The Birds and Habitats Directives are the primary EU legislation resulting in the legal protection of species in Ireland. The Acts and Statutory Instruments which list species within the broad taxonomic groupings are referred to in the relevant sections.

### Irish Legislation

The Wildlife Act 1976 (Number 39 of 1976) was amended on four occasions up to 2019, the principal being the Wildlife (Amendment) Act 2000 (Number 38 of 2000). The Flora (Protection) Order lists the plant species protected by Section 21 of the Wildlife Acts. The regulations that give rise to the protection of animal species under the Wildlife Acts are detailed in the relevant sections. See [www.npws.ie/legislation](http://www.npws.ie/legislation) for further information.

The codes used for national legislation are as follows:

- WA = Wildlife Act, 1976, Wildlife (Amendment) Act, 2000 and other relevant amendments
- FPO = Flora (Protection) Order, 2015 (S.I. No. 356 of 2015)

### EU Legislation

The primary legislation transposing the Nature Directives (Birds and Habitats Directives) into Irish law is the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended.

The codes used for the EU Nature Directives and Habitats Directives (Council Directive 92/43/EEC) are:

- Annex II Animal and plant species listed in Annex II
- Annex IV Animal and plant species listed in Annex IV
- Annex V Animal and plant species listed in Annex V

The main aim of the Habitats Directive is the conservation of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status. These annexes list habitats (Annex I) and species (Annexes II, IV and V) which are considered threatened in the EU territory. The listed habitats and species represent a considerable proportion of biodiversity in Ireland and the Directive itself is one of the most important pieces of legislation governing the conservation of biodiversity in Europe.

Under Article 11 of the Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes and under Article 17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive. In April 2019, Ireland submitted the third assessment of conservation status for 59 habitats and 60 species. There are three volumes with the third listing details of the species assessed.

## IUCN Red Lists

The International Union for the Conservation of Nature (IUCN) coordinates the Red Listing process at the global level, defining the categories so that they are standardised across all taxa. Red Lists are also produced at regional, national and subnational levels using the same IUCN categories (IUCN 2012, 2019). Since 2009, Red Lists have been produced for the island of Ireland by the National Parks and Wildlife Service (NPWS) and the Northern Ireland Environment Agency (NIEA) using these IUCN categories. To date, 13 Red Lists have been completed. The Red Lists are an assessment of the risk of extinction of each species and not just an assessment of their rarity. Threatened species are those species categorised as Critically Endangered, Endangered or Vulnerable (IUCN, 2019) – also commonly referred to as ‘Red Listed’.

## Irish Red List – Mammals

Red Lists in Ireland refer to the whole island, i.e. including Northern Ireland, and so follow the guidelines for regional assessments (IUCN, 2012, 2019). The abbreviations used are as follows:

- RE Regionally Extinct
- CR Critically Endangered
- EN Endangered
- VU Vulnerable
- NT Near Threatened
- DD Data Deficient
- LC Least Concern
- NA Not Assessed
- NE Not Evaluated

There are 27 terrestrial mammal species in Ireland, which includes the nine resident bat species listed. The terrestrial mammal, according to Marnell et al., 2019, list for Ireland consists of all terrestrial species native to Ireland or naturalised in Ireland before 1500.

The IUCN Red List categories and criteria are used to assess that status of wildlife. This was recently completed for the terrestrial mammals of Ireland. Apart from the two following two mammal species (Grey wolf *Canis lupus* (regionally extinct) and Black rat (*Rattus rattus*) (Vulnerable)), the remaining 25 species were assessed as least concern in the most recent IUCN Red List publication by NPWS (Marnell et al., 2019).

## Irish Bat Species

All Irish bat species are protected under the *Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010)*. Also, the EC Directive on *The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992)*, seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken.

All Irish bats are listed in Annex IV of the Habitats Directive and the Lesser horseshoe bat (*Rhinolophus hipposideros*) is further listed under Annex II.

Across Europe, they 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 (Bonn Convention 1979, enacted 1983)* was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Also, under existing legislation, the destruction, alteration, or evacuation of a known bat roost is a notifiable action, and a derogation licence must 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 and Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law), issued by 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"* issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

There are eleven recorded bat species in Ireland, nine of which are considered resident, two as Vagrant, namely:

1. Common pipistrelle (*Pipistrellus pipistrellus*)
2. Soprano pipistrelle (*Pipistrellus pygmaeus*)
3. Nathusius' pipistrelle (*Pipistrellus nathusii*)
4. Leisler's bat (*Nyctalus leisleri*)
5. Brown long-eared bat (*Plecotus auratus*)
6. Natterer's bat (*Myotis nattereri*)
7. Whiskered bat (*Myotis mystacinus*)
8. Daubenton's bat (*Myotis daubentonii*)
9. Lesser horseshoe bat (*Rhinolophus hipposideros*)
10. Brandt's bat (*Myotis brandtii*) (**Vagrant**)
11. Greater horseshoe bat (*Rhinolophus ferrumequinum*) (**Vagrant**)

Eight resident bat species and one of the vagrant bat species are vesper bats and all 'vespertilionid bats' have a tragus (cartilaginous structure inside the pinna of the ear). Vesper bats are distributed throughout the island. Nathusius' pipistrelle (*Pipistrellus nathusii*) is a recent addition while the Brandt's bat has only been recorded once to-date (Only record confirmed by DNA testing, all other records has not been genetically confirmed).

The ninth resident species is the lesser horseshoe bat (*Rhinolophus hipposideros*), which belongs to the Rhinolophidea and has a complex nose leaf structure on the face, distinguishing it from the vesper bats. This species' current distribution is confined to the western seaboard counties of Mayo, Galway, Clare, Limerick, Kerry, and Cork. The eleventh bat species, the greater horseshoe bat, was only recorded for the first time in February 2013 in County Wexford and is therefore considered to be a vagrant species. A bat detector record for this species was confirmed for Co. Wicklow in 2020.

A total of 41 SACs have been designated for the Annex II species lesser horseshoe bat (1303), of which nine have also been selected for the Annex I habitat 'Caves not open to the public' (8310).

Irish bat species list is presented in **Table 1** on the next page, along with their current conservation status.



## Conservation status

Table 1: Conservation Status of Irish Bat Species

Species	Irish Status	European Status	Global Status
Resident Bat Species			
Daubenton's Bat <i>Myotis daubentonii</i>	Least Concern	Least Concern	Least Concern
Whiskered Bat <i>Myotis mystacinus</i>	Least Concern	Least Concern	Least Concern
Natterer's Bat <i>Myotis nattereri</i>	Least Concern	Least Concern	Least Concern
Leisler's Bat <i>Nyctalus leisleri</i>	Least Concern	Least Concern	Least Concern
Nathusius' Pipistrelle <i>Pipistrellus nathusii</i>	Least Concern	Least Concern	Least Concern
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	Least Concern	Least Concern	Least Concern
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	Least Concern	Least Concern	Least Concern
Brown Long-eared Bat <i>Plecotus auritus</i>	Least Concern	Least Concern	Least Concern
Lesser Horseshoe Bat <i>Rhinolophus hipposideros</i>	Least Concern	Least Concern	Least Concern
Possible Vagrants			
Brandt's Bat <i>Myotis brandtii</i>	Data Deficient	Least Concern	Least Concern
Greater Horseshoe Bat <i>Rhinolophus ferrumequinum</i>	Data Deficient	Near Threatened	Near Threatened

Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals.

## Relevant Guidance Documents

This report will draw on guidelines already available in Europe and will use the following documents:

- National Roads Authority 2006 Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes
- National Roads Authority Guidelines for the Protection and Preservation Of Trees, Hedgerows And Scrub Prior to, and During the Construction Of National Road Schemes
- 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.
- Hundt, L. 2012 Bat Surveys: Best Practice Guidelines (2nd edition). Bat Conservation Trust, London
- Collins, J. (Editor) 2016 Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust, London
- A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- National Biodiversity Plan. Department of Arts, Heritage, Gaeltacht and the Islands.
- The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

Collins (2016) is the principal document used to provide guidance in relation to survey effort required but the level of surveying is assessed on a case-by-case basis taking into consideration the historical bat records for the survey area, presence of built structures and trees potentially suitable for roosting bats.

Kelleher & Marnell (2006) is referred to for guidance in relation to survey guidance, derogation licences, and mitigation measures.

Based on the information collected during the desktop studies and bat surveys, the bat ecologist assigns, where possible, an ecological value to each bat species recorded based on its conservation status at different geographical scales (**Table 2** below (CIEEM, 2016)). For example, a site may be of national ecological value for a given species if it supports a significant proportion (e.g. 5%) of the total national population of that species.

*Table 2: The six-level ecological valuation scheme used in the CIEEM Guidelines (2016) Ecological Value*

Ecological Value	Geographical Scale of Importance
<b>International</b>	International or European scale
<b>National</b>	The Republic of Ireland or the island of Ireland scale (depending on the bat species)
<b>Regional</b>	Province scale: Connaught
<b>County</b>	County scale: Galway
<b>Local</b>	Proposed development and immediate surroundings
<b>Negligible</b>	None, the feature is common and widespread

Impacts on bats can arise from activities that may result in:

- Physical disturbance of bat roosts e.g. destruction or renovation of buildings
- Noise disturbance e.g. increase human presence, use of machinery etc.
- Lighting disturbance
- Loss of roosts e.g. destruction or renovation of buildings
- Modifications of commuting or foraging habitats
- Severance or fragmentation of commuting routes
- Loss of foraging habitats.

It is recognised that any development will have an impact on the receiving environment, but the significance of the impact(s) will depend on the value of the ecological features that would be affected. Such ecological features will be those that are considered important and potentially affected by the proposed development.

The guidelines consulted recommend that the potential impacts of a proposed development on bats are assessed as early as possible in the design stage to determine any areas of conflicts.

## Assessment Criteria

Different parameters are considered for the assessment of the potential impact(s) of a proposed development on local bat populations. Reporting may consider all or some of the criteria presented below, depending on the nature of the project being assessed.

The ecological value of the bat populations of the survey site will be completed, where possible, according to **Table 3** below (CIEEM, 2016).

With reference to the guidelines listed in Section 1.2 and the judgement of the bat specialist, the impacts of the proposed project on local bat populations will be assessed, where possible, using the following criteria:

- Impact Quality using the parameters Positive, Neutral or Negative Impact (based on EPA, 2017)
- Impact Significance of potential impact parameters on specific bat species in relation to particular elements (e.g. roosting sites, foraging area and commuting routes) are assessed with reference to the following:



- **Table 6** - Kelleher & Marnell (2006)
- the known ecology and distribution of the bat species in Ireland
- bat survey results including type of roosts (if any recorded), pattern of bat usage of the survey area, level of bat activity recorded etc.
- and bat specialist experience

Table 3: Criteria for assessing significance of effects (EPA 2017)

Quality of Effect	Criteria
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

The scale of impact used in this report is divided in five categories (in increasing scale of impact):

1. Minor Impact
2. Minor-Moderate Impact
3. Moderate Impact
4. Moderate to Major Impact
5. Major Impact

Overall Impact Significance of the proposed development on local bat populations maybe determine, where applicable, using the parameters listed in **Table 4** below (EPA 2017).

Table 4: Criteria for assessing significance of effects (EPA 2017)

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics

The following terms will be used, where possible and applicable, when quantifying the duration of the potential effects (selected from EPA, 2017):

- Temporary – effects lasting less than a year
- Short-term – effects lasting 1 to 7 years
- Medium term – effects lasting 7 to 15 years
- Long term – effects lasting 15 to 60 years
- Permanent – effects lasting over 60 years
- Reversible – effects that can be undone, for example through remediation or restoration

Finally, how the impacts differ during the construction and operational phases will be presented, if applicable.

Specific guides utilised in the assessment process and mitigation design are: Kelleher & Marnell (2006); Collins (2016); and NRA (2006).

## Project Description

### Site Location

The site area is located at Dunlo, Ballinasloe, Co. Galway. It is irregularly shaped and is bordered to the north by Tesco Superstore and carparking (BL3); to the east and west by residential housing estates (BL3); and to the south by agricultural fields (GA1).

The site area consists of areas of recolonising bare ground (ED3) with agricultural hedgerows (WL1) and treelines (WL2) making up the north, east, and west boundaries. There are no watercourses onsite. The River Suck (EPA Code: 26S07) is located approximately 840m north-east of the site (See *EPA Waterbody Map* in **Appendix 1**).

Some trees are present within the site and are mostly located within the boundary hedgerows (WL1/WL2). The tree species recorded within the hedgerow habitat include Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Sycamore (*Acer pseudoplatanus*). Dog-rose (*Rosa canina*) and Bramble (*Rubus fruticosus*) also occur frequently in the hedgerows. The trees are not regularly maintained and most of them are covered in Ivy (*Hedera helix*).

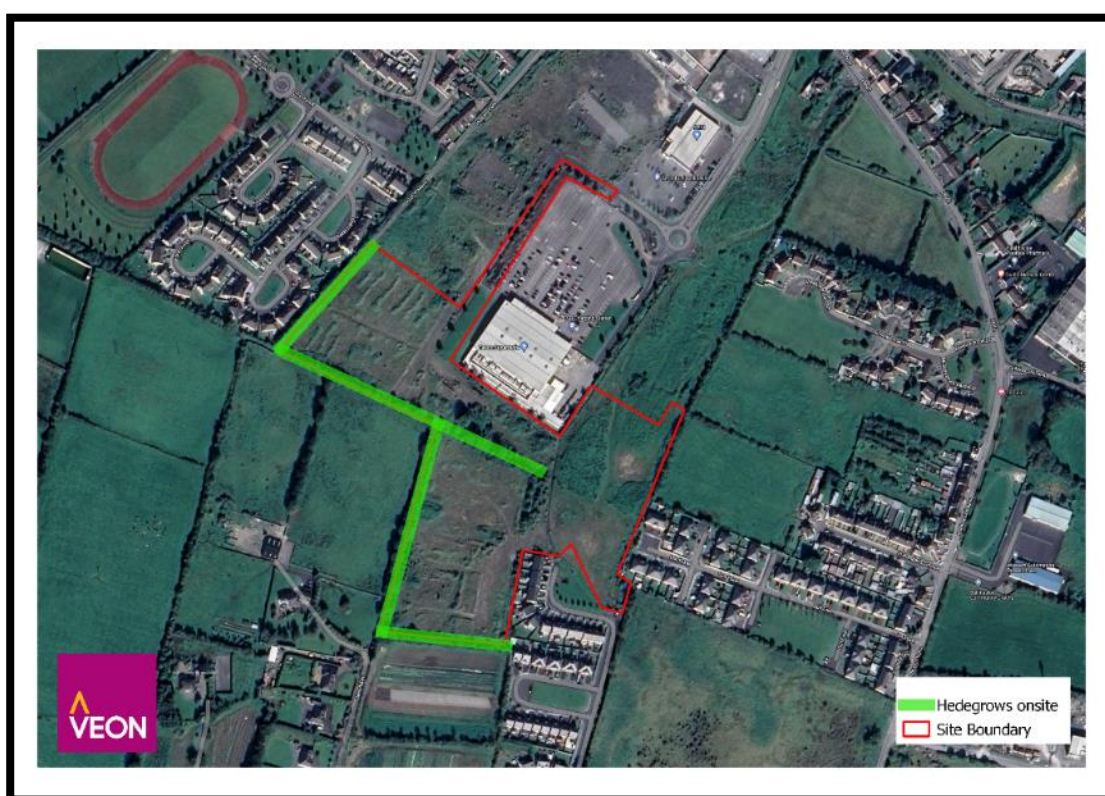


Figure 2: Hedgerow and Treeline network on site

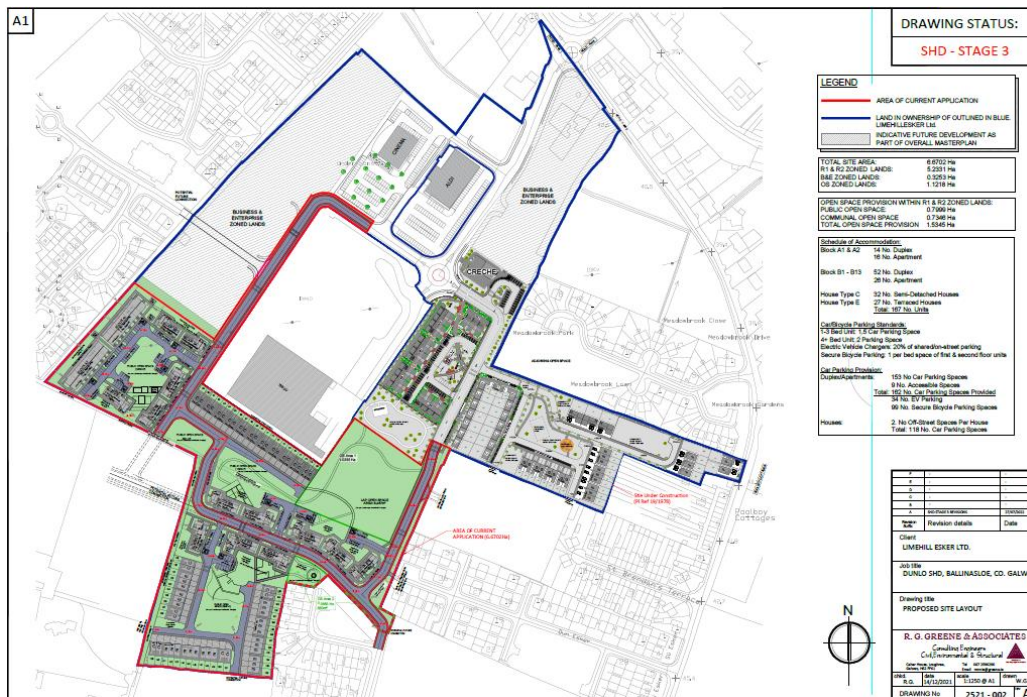
## Proposed Project

The proposed development consists of residential development (c. 15,820 m2 gross floor area), consisting of 165 No residential units and all associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works, including:

The development will consist of :

- Block A1 and A2, each consisting of 6 No Two-Bed Ground Floor apartments, 1 No One-Bed ground Floor apartment, 6 No Three-Bed First Floor Duplex Units, and 1 No Three-Bed Second Floor apartment.
- Blocks B1 to B3 and B6 to B13 inclusive, each consisting of 2 No Two-Bed Ground Floor Duplex Units, 2 No Three-Bed Ground Floor Duplex Units, 1 No Two-Bed Second Floor apartment, and 1 No One-Bed Second Floor apartment,
- Blocks B4 and B5 inclusive, each consisting of 1 No Two-Bed Ground Floor Duplex Unit, 2 No Three-Bed Ground Floor Duplex Units, 1 No Two-Bed Second Floor Apartment and 1 No One-Bed Second Floor apartment.
- House Type C : 32 No Two-Bed units in semi-detached pairs
- House Type E : 27 No Three-Bed units in triplet arrangements
- Provision of 281 No. on-site car parking spaces incorporating 163 No. spaces for residents of the apartment/duplexes, and 118 No in-curtilage car parking spaces for the housing units
- Provision of all water, surface water, foul drainage, utility ducting and public lighting and all associated siteworks and ancillary services.
- All ancillary site development works including access roadways, footpaths, cycle ways, pedestrian links, Bicycle Sheds, waste storage areas, communal and open space, site landscaping, and boundary treatments.

The Proposed Site Development Plan is illustrated in **Figure 3** below.



In summary the proposed works in relation to the scope of the bat survey are as follows:

- To facilitate the proposed development tree and hedge vegetation may need to be removed.
- New landscaping throughout the site comprising trees, hedges, and wildflower areas
- Vehicle parking areas and new vehicle entrance

## Bat Survey Aims

The aims of the bat survey at the proposed project site are as follows:

- Collect robust data following good practice guidelines to allow an assessment of the potential impacts of the proposed project on local bat populations, both on and off-site (where possible)
- Facilitate the design of mitigation, enhancement, and monitoring strategies for local bat populations recorded
- Provide baseline information with which the results of post-construction monitoring surveys can be compared to, where appropriate
- Provide information to enable NPWS and planning authorities to reach robust decisions with definitive required outcomes
- Assist clients in meeting their statutory obligations
- Facilitate the conservation of local bat populations

*Survey types may differ from site to site depending on the goals of the survey.*

*The following is a brief description of main types of surveys that can be completed. The surveys deemed suitable for a particular project is determine on a case-by-case basis.*

- Emergence (dusk) surveys: surveying of buildings or structures to determine whether such building/structure is a bat roost. Undertaken from 30 minutes prior to sunset to 90 minutes after sunset.
- Walking transect: bat surveys completed on-foot where the surveyor(s) walk the survey site from 30 minutes prior to sunset to at least 110 minutes after sunset. Often this survey is completed post an emergence survey and therefore may be undertaken for a longer period after sunset.
- Driving transect: bat survey complete in a car and undertaken according to a strict survey protocol. Surveying is completed from 40 minutes after sunset till the end of the planned survey route. *Please Note - This is only undertaken for large survey area with a well-defined public road structure. Routes are planned and mapped prior to surveying.*
- Dawn surveys: surveying of buildings or structures to determine whether such building/structure is a bat roost. Undertaken from 90 minutes prior to sunrise to 30 minutes after sunrise.
- Static surveys: placement of automated recording devices within the survey area. The units are set up during the daylight hours and left in place to record during the hours of darkness.
- Additional surveys required may include trapping/netting of bats. *Please Note - This type of surveying is only undertaken where specific information is required (e.g. to determine if a roost is a maternity colony).*

## Previous Bat Surveys

To the best of Veon Ecology's knowledge, at the time of report formulation, no previous dedicated Bat surveys were previously commissioned for the survey area. As such, this bat survey provides a baseline for any current and future bat surveys undertaken on the site.

## Supporting Documents

Several reports were consulted during the writing of this report. Please consult these reports for full information on specific topics including:

- McCarthy Keville O'Sullivan Ltd (2019). *Ecological Impact Assessment, Proposed Residential Housing Development, Ballinasloe, Co. Galway*. Report for Galway County Council



# Bat Survey Methodology

## Daytime Inspections

One purpose of daytime inspections was to determine the potential of bat roosts within the survey area.

Due to the transient nature of bats and their seasonal life cycle, there are different types of bat roosts. Where possible, one of the objectives of the surveys was to be able to identify the types of roosts present, if any. However, the determination of the type of roost present depends on the timing of the survey and the number of bat surveys completed. Consequently, the definition of any roost types, in this report, will be based on the following in **Table 5** below:

*Table 5: Bat Roost Types (Collins 2016).*

Roost Type	Definition	Time of Survey
<b>Day Roost</b>	A place where individual bats or small groups of males, rest or shelter in the daytime but are rarely found by night in the summer.	Anytime of the year
<b>Night Roost</b>	A place where bats rest or shelter in the night but are rarely found in the day. May be used by a single bat on occasion or it could be used regularly by the whole colony.	Anytime of the year
<b>Feeding Roost</b>	A place where individual bats or a few bats rest or feed during the night but are rarely present by day.	Anytime of the year
<b>Transitional Roost</b>	A place used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.	Outside the main maternity and hibernation periods.
<b>Swarming Site</b>	Where large numbers of males and females gather. Appear to be important mating sites.	Late summer and autumn
<b>Mating Site</b>	Where mating takes place.	Late summer and autumn
<b>Maternity Site</b>	Where female bats give birth and raise their young to independence.	Summer months
<b>Hibernation Site</b>	Where bats are found, either individually or in groups in the winter months. They have a constant cool temperature and humidity.	Winter months in cold weather conditions
<b>Satellite Roost</b>	An alternative roost found in close proximity to the main nursery colony and is used by a few individuals throughout the breeding season.	Summer months

## Tree Potential Bat Roost (PBRs) Inspection

Trees that may provide potential roosting space for bats were classified using the Bat Tree Habitat Key (BTHK, 2018) and the classification system used is from Collins (2016). The Potential Roost Features (PRFs) listed in this guide are used to determine the Potential Bat Roost (PBR) value of trees.

Trees identified as PBRs 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 on stonework) 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.

- Inspections of trees within the proposed development site that may be suitable as roosting sites for bats are closer examined visually with the aid of a strong torch beam (High-powered Maglite©) and endoscope (Model: Explorer Premium Wireless inspection camera) during the daytime searching for PRFs, if visible.

If a tree is deemed to be a roost site, then further surveying involving dusk and dawn surveys of the actual trees may be recommended to determine what bat species are present, etc.

Table 6: Tree Bat Roost Category Classification System (Collins 2016)

Tree Category	Description
<b>1 (High)</b>	Trees with multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts
<b>2 (Moderate)</b>	Trees with definite bat potential but supporting features (PRFs) suitable for use by individual bats;
<b>3 (Low)</b>	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features (PRFs) which may have limited potential to support bats;
<b>4 (Negligible)</b>	Trees have negligible potential to support roosting bats.

## Bat Habitat & Commuting Routes Mapping

The survey site was assessed during daytime walkabout surveys, in relation to potential bat foraging habitat and potential bat commuting routes. Such habitats were classified according to Fossitt (2000) (See **Figure 8**).

Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs.

## Bat Activity Surveys

### Active Bat Surveys

This section of surveys was completed by bat surveyors with the aid of handheld *Anabat Walkabout* omnidirectional Heterodyne bat detectors. As bats are nocturnal, it is difficult to observe bats visually. As bats use echolocation to hunt and navigate in their environs, echolocation calls are used to identify bat species and therefore bat detectors are the principal tool to aid bat surveys.

Bat detector surveys involve a number of different type of surveys which are deployed to collate information on the bat populations of the survey area.

- Dusk (Emergence) Surveys
- Dawn (Re-entry) Surveys
- Night-time Inspections
- Walking Transects



Dusk emergence times vary by species, see **Table 7** below, therefore any survey should aim to start around 30 minutes before sunset to ensure time for the surveyors to get into position, and continue for up to 2 hours after sunset.

Re-entry times also vary, see **Table 7**, therefore pre-dawn re-entry surveys should start around 1.5-2 hours before sunrise and continue until 30 minutes after sunrise.

Dusk (Emergence) surveys were completed on site from 30 minutes before sunset to at least 90 minutes post sunset. Dawn (Re-entry) surveys were completed from 90 minutes before sunrise to 30 minutes after sunrise.

Surveyors positioned themselves adjacent to mature tree(s) to be surveyed to determine if bats were roosting within, location of roost, number of bats, bat species, etc. As standard, surveyors must not stand more than 50m from potential roost sites to ensure they can see the area in sufficient detail, to ensure all aspects of the tree, building, or structure are viewable at all times during of the survey period, in particular those areas of potential exit/re-entry.

As a rule of thumb if there has been no emergence of one species for around 20 minutes all the bats of that species will have emerged. However, if more than one species is predicted at the roost, the survey must continue beyond this time.

July - August is usually a good timeframe for dawn re-entry surveys of maternity roosts as young bats are inexperienced flyers at this time and are often highly visible when returning to the roost.

Table 7: Mean/Average Dusk and Dawn Emergence/Re-entry times by species

Species	Emergence (Dusk) Timings	Re-Entry (Dawn) Timings
Daubenton's ( <i>Myotis daubentonii</i> )	30-40 mins after sunset	2hrs - 40mins before sunrise
Leisler's ( <i>Nyctalus leisleri</i> )	Usually around 5 mins after sunset but can be 0-	At sunrise
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	10 mins before to 30 mins after sunset	30 mins before to 30 mins after sunrise
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	Usually 20 mins after sunset but can be 10 mins before to 30 mins after sunset	30 mins before to 30 mins after sunrise
Whiskered ( <i>Myotis mystacinus</i> )	30 mins after sunset	30 mins before sunrise
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	10 mins before to 30 mins after sunset	30 mins before to 30 mins after sunrise
Brown Long-eared ( <i>Plecotus auritus</i> )	1 hour after sunset	1 hour prior to sunrise
Lesser horseshoe ( <i>Rhinolophus hipposideros</i> )	30-40 mins after sunset	30 mins before sunrise
Natterer's ( <i>Myotis nattereri</i> )	75 minutes after sunset	1-2 hours prior to sunrise
Species	Emergence (Dusk) Timings	Re-Entry (Dawn) Timings
Daubenton's ( <i>Myotis daubentonii</i> )	30-40 mins after sunset	2hrs - 40mins before sunrise
Leisler's ( <i>Nyctalus leisleri</i> )	Usually around 5 mins after sunset but can be 0-	At sunrise
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	10 mins before to 30 mins after sunset	30 mins before to 30 mins after sunrise
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	Usually 20 mins after sunset but can be 10 mins before to 30 mins after sunset	30 mins before to 30 mins after sunrise
Whiskered ( <i>Myotis mystacinus</i> )	30 mins after sunset	30 mins before sunrise
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	10 mins before to 30 mins after sunset	30 mins before to 30 mins after sunrise
Brown Long-eared ( <i>Plecotus auritus</i> )	1 hour after sunset	1 hour prior to sunrise
Lesser horseshoe ( <i>Rhinolophus hipposideros</i> )	30-40 mins after sunset	30 mins before sunrise
Natterer's ( <i>Myotis nattereri</i> )	75 minutes after sunset	1-2 hours prior to sunrise

Night-time inspections involved the bat surveyors, where possible and safe to do so, walking through the buildings post-dusk survey, prior to dawn survey and/or post-dawn survey to record if bats were visible within the buildings.

This provides additional data on how bats were using the buildings surveyed. The surveyor used a bat detector to alert him/her to the presence of bats and a torch assisted to locating the bat(s) and where possible to record specific roosting areas within the building(s).

Walking transects involved the surveyor(s) walking the survey area, noting the time, location and bat species encountered.

Walking transects were undertaken post dusk surveys and took approximately 2 hours to complete.

Surveys were completed, where possible, during mild and dry weather conditions with air temperature 8°C or greater.

All bat encounters were noted during surveys. Prior to mapping, validation of bat records was completed by the principal bat surveyor.

The following equipment was used by the surveyors:

- Anabat Walkabout Bat Detector
- BATLOGGER M (Elekon) bat detector

### Static Bat Detector Survey

The BATLOGGER M (Elekon) bat detector was placed in a stationary spot beside the mature Ash tree (53.3225390, -8.2264802) which was recorded as having the highest bat potential onsite. This is also at a central location on the site (53.3224427, -8.2266928).

The detector was left to record for the entire duration of the survey. The dusk survey period was between half an hour before sunset to two hours after sunset. The dawn survey period was two hours before sunrise to sunrise.

## Desktop Review

### Bat Conservation Ireland (BCI) Database

Bat Conservation Ireland acts as the central depository for bat records for the Republic of Ireland. Its bat database is comprised of >60,000 bat records. The database primarily contains bat records from the following datasets:

#### Irish Bat Monitoring Programme

The Irish Bat Monitoring Programme is comprised of four surveys (Car-based Bat Monitoring Scheme (2003-), All Ireland Daubenton's Bat Waterways Survey (2006-), Brown Long-eared Bat Roost Monitoring Scheme (2007-) and Lesser Horseshoe Bat Monitoring Scheme (1980s-).

Apart from the latter survey, all monitoring data is stored on the BCI database.

#### BATLAS 2020 & 2010

Bat Conservation Ireland has undertaken two all-Ireland species distribution surveys (2008-2009 for BATLAS 2010 and 2016-2019 for BATLAS 2020) of four target bat species (Common and soprano pipistrelle, Leisler's bats and Daubenton's bat).

#### Ad Hoc Bat Records

Ad hoc bat records from national bat groups, ecological consultants and BCI members are also stored on the BCI database.

### National Biodiversity Data Centre (NBDC)

A review of National Biodiversity Data Centre (NBDC) historical records was undertaken. The NBDC Map Viewer has a 'Bat Suitability Index' (Source: NBDC & Lundy et al. 2011).

The Residential Development proposed site falls within one 10km data grid (M83). This will be referred to where applicable and appropriate in this current survey.

### Photographic Record

A photographic record was completed for the survey and is presented throughout the text where applicable.

## Results

### Tree Surveys

During the bat surveys, specific trees or cluster of trees were checked for Potential Roost Features (PRFs), however the surveys did not identify any trees with active roosts present. Dawn and Dusk activity surveys were conducted along transects correlating to the hedgerow and treelines under investigation. No significant activity, foraging or roosting, was recorded during these surveys.

One tree, a mature ash (53.3225390, -8.2264802) had the highest potential for a bat roost. Located around this tree was a hollow, willow trees and scrub (WS1), all of which attracted a high volume of insects. There are also treelines running east-west and north-south from this tree noted as potential corridors.

Local bat species do use the Hedgerows and treelines within the project area for commuting purposes. Trees surveyed for PRFs are as follows:

Table 8: Trees investigated for PRFs

Co-ordinates	Species	Bat Roost Potential	Notes
53.3217364, -8.2256323	Ash ( <i>Fraxinus excelsior</i> )	3	Mature ash, heavily covered in ivy, potential crevices behind it but ivy very dense
53.3220514, -8.2261755	Ash ( <i>Fraxinus excelsior</i> )	3	Mature ash, heavily covered in ivy, potential crevices behind it but ivy very dense
53.3225390, -8.2264802	Ash ( <i>Fraxinus excelsior</i> )	2	Mature Ash, heavily covered in ivy, potential crevices behind it but ivy very dense, beside hollow and willow trees attracts lots of insects, light spill from tesco also attracts insects
53.3222422, -8.2269184	Hawthorn ( <i>Crataegus monogyna</i> )	3	Mature dead hawthorn tree, some crevices, branches very thin - not much space for bats to crawl into
53.3219811, -8.2270549	Hawthorn ( <i>Crataegus monogyna</i> )	3	Mature dead hawthorn tree, some crevices, branches very thin - not much space for bats to crawl into
53.3206851, -8.2270388	Sycamore ( <i>Acer pseudoplanatus</i> )	3	Mature Sycamore, some ivy cover, some crevices - not very deep
53.3206201, -8.2265510	Hawthorn ( <i>Crataegus monogyna</i> )	3	Mature hawthorn, some ivy cover, no visible crevices in branches/bark
53.3206245, -8.2259914	Ash ( <i>Fraxinus excelsior</i> )	3	Mature dying/dead ash, ivy cover, dead branches very thin

### Walking Transects

Walking transects are a suitable survey method to cover large accessible areas to provide an indication on how local bat populations are utilising habitats within a survey area.

*Please note: Each geo-reference point is a bat observation. Individual bats are often recorded multiple times as the surveyor passes through their foraging/commuting habitat. Therefore, the observations recorded are indicative of levels of bat activity only.*

*Please also note: Bats species that have quiet echolocation calls, such as brown long-eared bats, tend to be under-represented by this type of survey. Loud bat species such as Leisler's bat and Pipistrellus species are easily picked up by bat detectors and therefore this survey type.*

Three walking transects were completed as part of the 2022 surveys:

- 11<sup>th</sup> July 2022
- 15<sup>th</sup> July 2022
- 19<sup>th</sup> July 2022



*Figure 4: Directions of Activity Transect Walks*

The transect walking route covered the hedgerows identified as having bat potential during the day survey. There was no artificial lighting along the walking transects however, there was a small degree of light spill coming from the north and west.

Results of the transect surveys showed the bats stayed within the vicinity of the ash tree. The bats were observed flying in and around the ash tree and adjacent hollow feeding on insects. They were also observed flying along the tree lines in a north to south and east to west direction.

When flying west they followed the treeline as far as the electrical line and back east. Similarly, when flying south, they followed the tree line as far as the dead hawthorn trees (53.3222422, -8.2269184 & 53.3219811, -8.2270549) and flew back north.





*Photograph 1 Walking Transect (East to West)*



*Photograph 2 Walking Transect (North to South)*

### **Walking Transect 1 Dusk – 11.07.22**

**Date:** 11th July 2022

**Start:** 9.30pm

**Finish:** 12:00 am

**Temperature:** 19°C - 24°C

**Weather:** mostly light rain which stopped on occasion, high humidity, 90-100% cloud cover

No species were recorded in flight along the treelines running north to south or east to west. All recordings were noise files.

Common Name	Latin Name	No. Records (AB 1)	No. Records (AB 2)
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	0	0
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	0	0
Leisler's Bat	<i>Nyctalus leisleri</i>	0	0
Nathusius' Pipistrelle	<i>Pipistrellus nathusii</i>	0	0

Table 9 Species Recorded during 1st Dusk Transect Surveys

### Walking Transect 2 Dawn– 15.07.22

**Date:** 15th July 2022

**Start:** 3.00am

**Finish:** 5.30am

**Temperature:** 14 - 16°C

**Weather:** intermittent light rain, high humidity, 100% cloud cover

A total of four species of bat were recorded: Leisler's (*Nyctalus leisleri*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), and Nathusius' Pipistrelle (*Pipistrellus nathusii*).

The most frequently encountered bat species was Common pipistrelle bats. Soprano pipistrelle was the second most frequently recorded, with Nathusius' Pipistrelle a close third. There were only two recordings for Leisler's bats.

Common Name	Latin Name	No. Records (AB 1)	No. Records (AB 2)
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	46	48
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	2	2
Leisler's Bat	<i>Nyctalus leisleri</i>	1	1
Nathusius' Pipistrelle	<i>Pipistrellus nathusii</i>	2	1

Table 10 Species Recorded during Dawn Transect Surveys

### Walking Transect 3 Dusk – 19.07.22

**Date:** 19<sup>th</sup> July 2022

**Start:** 9.00pm

**Finish:** 11.20pm

**Temperature:** 13-18°C

**Weather:** dry, high humidity, 50-70% cloud cover

One bat species of was recorded: Common Pipistrelle (*Pipistrellus pipistrellus*).

There was only one recording for Common Pipistrelle.

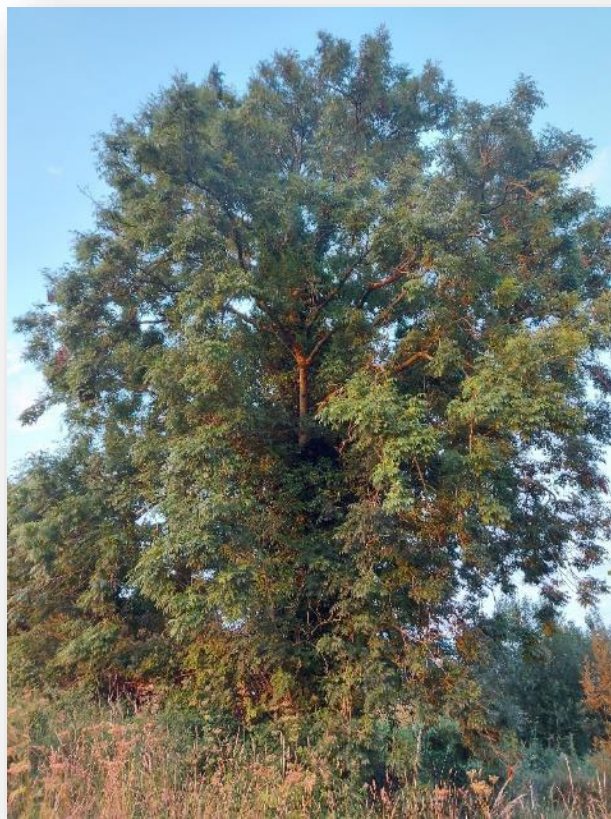
Common Name	Latin Name	No. Records (AB 1)	No. Records (AB 2)
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	0	1
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	0	0
Leisler's Bat	<i>Nyctalus leisleri</i>	0	0
Nathusius' Pipistrelle	<i>Pipistrellus nathusii</i>	0	0

Table 11 Species Recorded during 2nd Dusk Transect Surveys

## Passive Static Bat Detector Survey

A passive bat detector was deployed on site to supplement the data collected during the active bat surveys. Observations during active surveys determined that the Mature Ash tree (53.3225390, -8.2264802) represented a hotspot for Bat Activity on the site. While no roosts were recorded in the trees within the site, the mature ash and hedgerows and treelines running north to south and east to west were identified as important commuting and foraging areas for bats.

As such, the Batlogger was left to record in-situ at the Mature Ash Tree during each survey period: Dusk, 30mins before sunset to 2 hours after sunset; Dawn, 2 hours before sunrise to sunrise.



Photograph 3 Mature Ash Tree with Medium-High Bat Potential (53.3225390, -8.2264802)



## Static 1 Dusk – 11.07.22

**Date:** 11th July 2022

**Start:** 9.30pm

**Finish:** 12:00 am

**Temperature:** 19°C - 24°C

**Weather:** mostly light rain which stopped on occasion, high humidity, 90-100% cloud cover

A total of three species were recorded: Leisler's (*Nyctalus leisleri*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Common Pipistrelle (*Pipistrellus pipistrellus*).

The most frequently encountered bat species was Common pipistrelle bats. Leisler's bats were the second most frequently recorded, with only 2 recordings for Soprano Pipistrelle.

Common Name	Latin Name	No. Records
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	170
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	2
Leisler's Bat	<i>Nyctalus leisleri</i>	87

Table 12 Species Recorded during 1st Dusk Static Survey



Figure 5 1st Dusk Survey Heatmap

## Static 2 Dawn– 15.07.22

**Date:** 15th July 2022

**Start:** 3.00am

**Finish:** 5.30am

**Temperature:** 14 - 16°C

**Weather:** mostly light rain which stopped on occasion, high humidity, 100% cloud cover

A total of two species of bat were recorded: Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Common Pipistrelle (*Pipistrellus pipistrellus*).

The most frequently encountered bat species was Common pipistrelle bats. Soprano pipistrelle was the second most frequently recorded.

Common Name	Latin Name	No. Records
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	71
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	8
Leisler's Bat	<i>Nyctalus leisleri</i>	0

Table 13 Species Recorded during Dawn Static Survey



Figure 6 Dawn Survey Heatmap

### Static 3 Dusk – 19.07.22

**Date:** 19<sup>th</sup> July 2022

**Start:** 9.00pm

**Finish:** 11.20pm

**Temperature:** 13-18°C

**Weather:** dry, high humidity, 50-70% cloud cover

A total of three species were recorded: Leisler's (*Nyctalus leisleri*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Common Pipistrelle (*Pipistrellus pipistrellus*).

The most frequently encountered bat species was Common pipistrelle bats. Leisler's bats were the second most frequently recorded, with only 13 recordings for Soprano Pipistrelle.

Common Name	Latin Name	No. Records
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	162
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	13
Leisler's Bat	<i>Nyctalus leisleri</i>	85

Table 14 Species Recorded during 2nd Dusk Static Survey



Figure 7 2<sup>nd</sup> Dusk Survey Heatmap

*NOTE: The behaviour of bats during commuting and foraging greatly influences the level of bat passes recorded on static units. The number of bat passes do not equate to the number of bats flying past the static unit. Pipistrellus species tend to forage as they commute and therefore are regularly observed flying up and down a treeline or hedgerow before moving on in the landscape. Leisler's bats fly high in the sky and therefore can be observed flying fast through the landscape, occasionally foraging over treetops as they commute. As a consequence, Pipistrellus species bat activity tends to result in a higher number of bat passes recorded on static units compared to Leisler's bats due to the behaviour described above.*

*In relation to other bat species recorded, as they tend to be less common in the landscape compared to Common Pipistrelles, Soprano pipistrelles and Leisler's bats, their recorded presence is notable. Exceptions to this would include Daubenton's bats on a waterway (if the static unit is located at the riverbank) or a static located adjacent to a known bat roost.*

Four species of bat were recorded on the static unit over 3 nights of surveillance: Leisler's (*Nyctalus leisleri*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), and Nathusius' Pipistrelle (*Pipistrellus nathusii*).

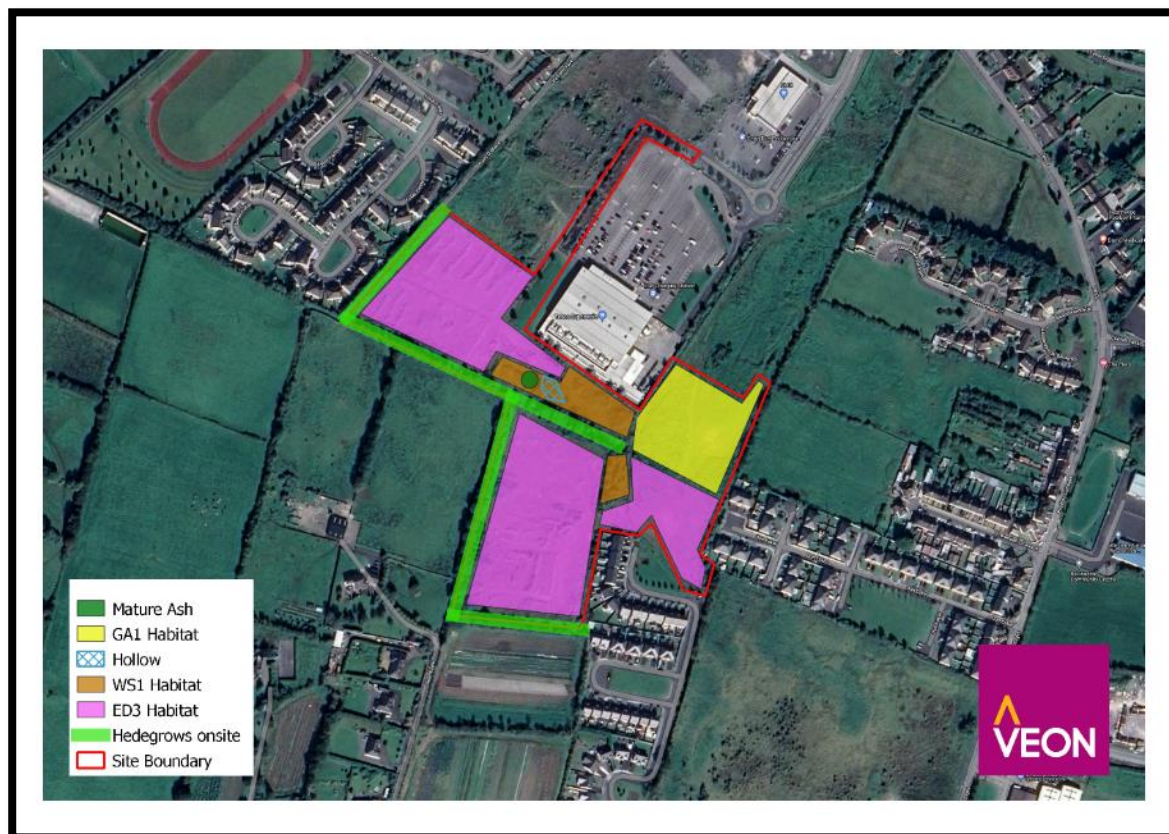
This is a moderate level of bat biodiversity, and this reflects the suitable habitats for bats located within the proposed development area. The static unit location is representative of the array of habitat types present within project area (tree lines and hedgerows).

The location of the static unit represents the main area of potential bat activity in view of the proposed development and bat survey scope, namely the Mature Ash tree.

## Habitat Survey

The study area has been mapped in detail following an Ecological walkover. A habitat map is presented below (See **Figure 7**). This provides essential information on the array of habitats found on site and within the footprint of the project.

Habitat identification follows: Fossitt (2000). *A Guide to Habitats in Ireland*, The Heritage Council, Kilkenny. The Mature Ash Tree and the adjacent hollow where high levels of foraging activity were observed are also displayed in **Figure 7** below:



*Figure 8: Habitat Map of site*

The principal habitats recorded on site include:

- Recolonising Bare Ground: ED3
- Hedgerow, Treeline & Scrub WL1, WL2, WS1
- Grassland: GA1

## Bat Survey Results Summary

The following table summarises all of the bat survey results collated by Veon Ecology in 2022.

Table 15: Summary of 2022 Bat Survey Results.

Species	Present	Roosts Present	Foraging Habitat	Commuting Routes
Leisler's ( <i>Nyctalus leisleri</i> )	✓	X	Along Broadleaf hedgerows and Treelines. Open Spaces on site. Around Mature Ash Tree	Along Broadleaf hedgerows and Treelines beside Mature Ash.
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	✓	X	Along Broadleaf hedgerows and Treelines. Open Spaces on site. Around Mature Ash Tree	Along Broadleaf hedgerows and Treelines beside Mature Ash.
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	✓	X	Along Broadleaf hedgerows and Treelines. Open Spaces on site. Around Mature Ash Tree	Along Broadleaf hedgerows and Treelines beside Mature Ash.



Whiskered ( <i>Myotis mystacinus</i> )*	X	X	N/A	N/A
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	✓	X	Along Broadleaf hedgerows and Treelines. Open Spaces on site. Around Mature Ash Tree	Along Broadleaf hedgerows and Treelines beside Mature Ash.
Brown Long-eared ( <i>Plecotus auritus</i> )	X	X	N/A	N/A
Lesser horseshoe ( <i>Rhinolophus hipposideros</i> )	X	X	N/A	N/A
Natterer's ( <i>Myotis nattereri</i> )*	X	X	N/A	N/A

## Species Recordings

Table 16: Total number of Bat Passes across surveys by Species

Species	DK1	DK2	DW1	Collective Total
Leisler's ( <i>Nyctalus leisleri</i> )	87	85	2	174
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	2	13	12	27
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	170	163	165	498
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	0	0	3	3
<b>Total recordings per survey</b>	<b>259</b>	<b>261</b>	<b>182</b>	<b>702</b>

## Hotspot

A 'Hotspot' for Bat activity was identified at the Mature Ash tree (53.3225390, -8.2264802) in the centre of the site.

Higher activity was recorded here consistently, with up to four species present on any given night, namely: Leisler's, Soprano Pipistrelle, Common Pipistrelle, and Nathusius' Pipistrelle).

Desktop Review

National Biodiversity Data Centre (NBDC)

Bat Suitability Index

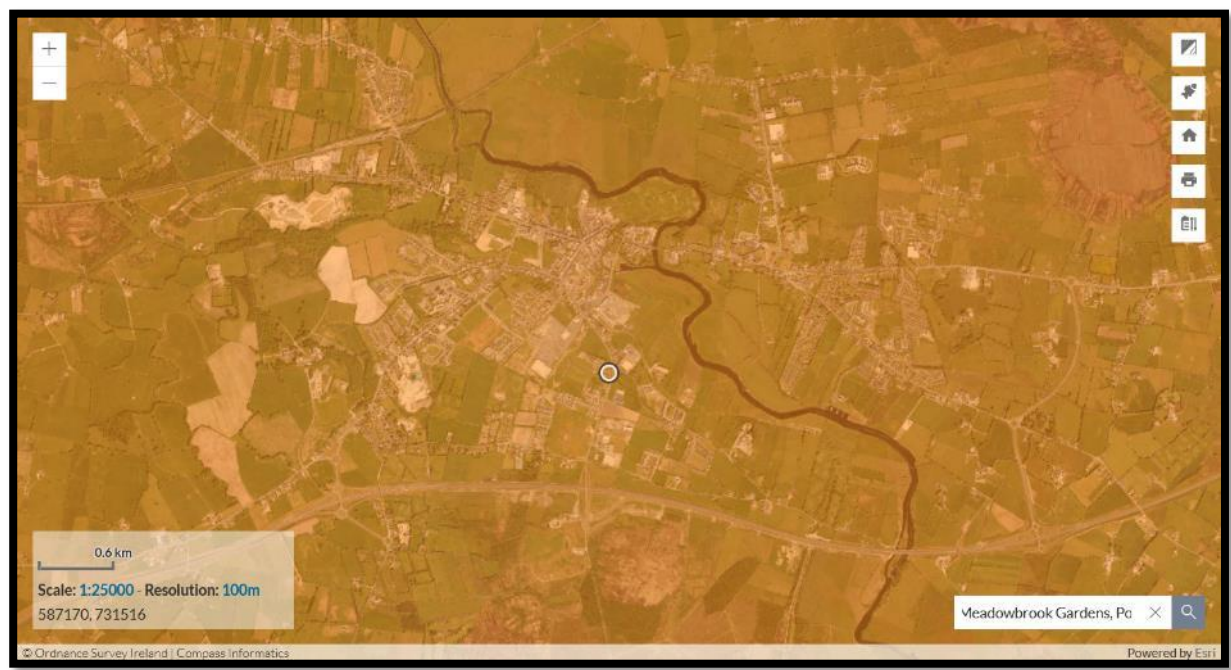


Figure 9: Bat Suitability Index (BSI) (NBDC 2022)

The National Biodiversity Data Centre (NBDC) has a Bat Suitability Index (BSI) for the nine resident species of Bats in Ireland within the proposed site.

Table 17: BSI by Species (NBDC 2022)

Species (LN)	Species (CN)	BSI
All Bats		35.22
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	52
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	50
<i>Nyctalus leisleri</i>	Leisler's (Lesser noctule)	50
<i>Plecotus auritus</i>	Brown Long-Eared Bat	46
<i>Myotis nattereri</i>	Natterer's bat	43
<i>Myotis daubentonii</i>	Daubenton's	42
<i>Myotis mystacinus</i>	Whiskered Bat	30
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe bat	2
<i>Pipistrellus nathusii</i>	Nathusius' pipistrelle	2

The species of bats recording during the surveys generally correlate with the NBDC BSI, especially with regards to Leisler’s, Common pipistrelle and Soprano pipistrelle, with a higher BSI and Nathusius’ pipistrelle with lower BSI.



The one exception being that during the survey, the presence of Brown long-eared bat (*Plecotus auratus*) was not recorded across the site, despite the area having a higher BSI for these species.

## NDBC 10km<sup>2</sup> Record

The 10km radius of the Ballinasloe residential Development lies within NDBC 10km Grid Square M83.



Figure 10: NDBC 10kmx10km Grid Square

The NDBC Records for within 10kmx10km of the project site, are as follows:

### M83:

Table 18: NDBC Bat Records within M83 10kmx10km Grid Square

Species Name	Record Count	Date of Last Record	Title of Dataset
Brown Long-eared Bat ( <i>Plecotus auritus</i> )	1	18/06/2008	National Bat Database of Ireland
Daubenton's Bat ( <i>Myotis daubentonii</i> )	10	27/04/2005	National Bat Database of Ireland
Lesser Noctule ( <i>Nyctalus leisleri</i> )	1	18/06/2008	National Bat Database of Ireland
Pipistrelle ( <i>Pipistrellus pipistrellus sensu lato</i> )	4	11/06/2009	National Bat Database of Ireland
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	2	18/06/2008	National Bat Database of Ireland
Brown Long-eared Bat ( <i>Plecotus auritus</i> )	1	18/06/2008	National Bat Database of Ireland

Historic NDBC Bat Presence records in geographical relation to the site at Ballinasloe are as follows:



Figure 11: Historic Brown Long-eared Bat (*Plecotus auritus*) records (NBDC 2022)



Figure 12: Historic Daubenton's Bat (*Myotis daubentonii*) records (NBDC 2022)





Figure 13: Historic Leisler's Bat (*Nyctalus leisleri*) records (NBDC 2022)



Figure 14: Historic Natterer's Bat (*Myotis nattereri*) records (NBDC 2022)





Figure 15: Historic Common Pipistrelle Bat (*Pipistrellus pipistrellus*) records (NBDC 2022)



Figure 16: Historic Soprano pipistrelle Bat (*Pipistrellus pygmaeus*) records (NBDC 2022)

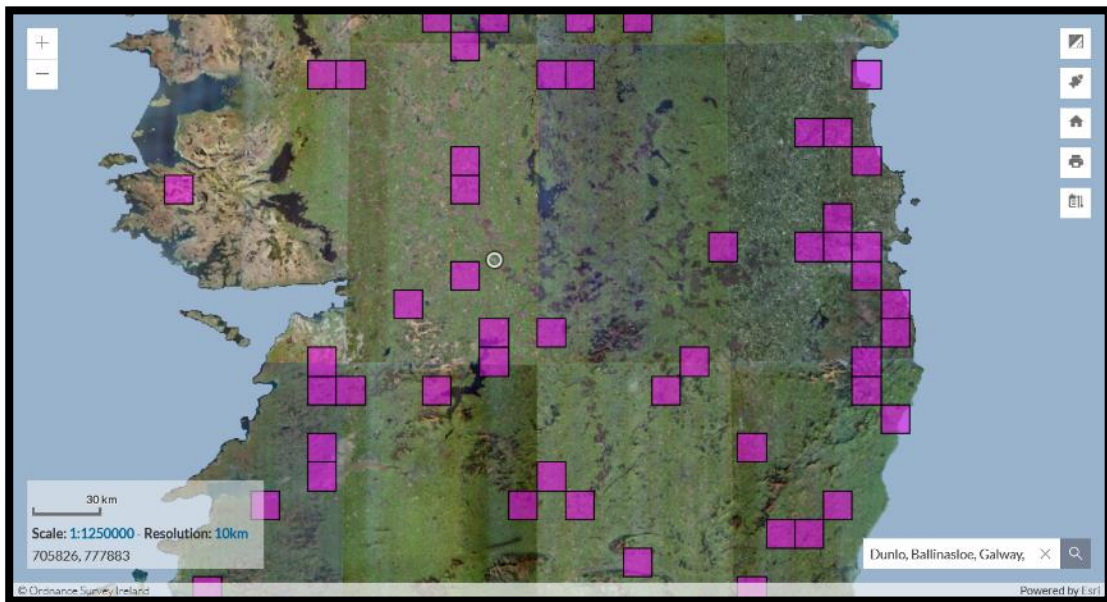


Figure 17: Historic Whiskered Bat (*Myotis mystacinus*) records (NBDC)

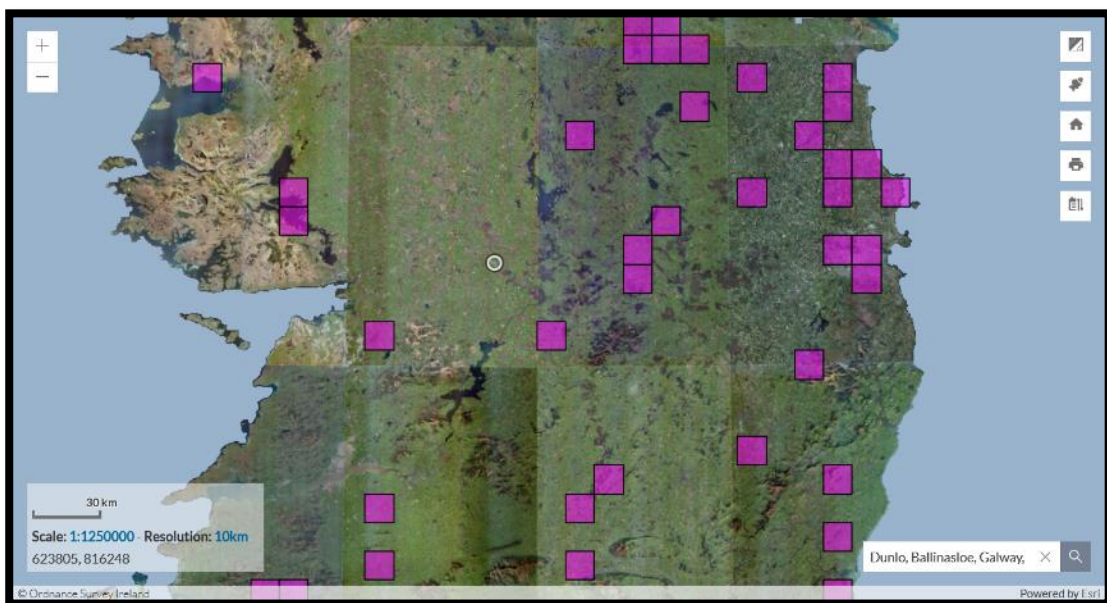


Figure 18: Historic Nathusius' pipistrelle Bat (*Pipistrellus nathusii*) records (NBDC 2022)





Figure 19: Historic Lesser horseshoe Bat (*Rhinolophus hipposideros*) records (NBDC 2022)

## Survey Effort, Constraints & Survey Assessment

The following table details any Survey Constraints encountered and a summary of Scientific Assessment completed.

Table 19: Survey Effort, Constraints & Survey Assessment

Category	Discussion
<b>Timing of surveys</b>	The bulk of the surveys were completed during the summer maternity season (June to July 2020).
<b>Survey Type Completed</b>	Tree PBR Survey Static Detector Survey Dusk Bat Survey Dawn Bat Survey Walking Transect Endoscope Inspection
<b>Weather conditions</b>	Ideally, the surveys were to be conducted when weather conditions were dry and above 7 degrees Celsius. During the survey period from 11 <sup>th</sup> to 19 <sup>th</sup> July, although temperatures remained relatively stable and above 13 degrees Celsius, there were pronounced bouts of precipitation locally most nights and during the daytime, which could have affected bat activity levels.
<b>Constraints</b>	The main source of light spill comes from Tesco Superstore. There is light spill from the back of Tesco shining towards the south onto scrub (WS1). This has potential to deter bats from using this area.

	<p>The light however appears to attract insects around the mature Ash tree (53.3225390, -8.2264802) and the hollow beside it. There is also light spill from Tesco Superstore Carpark. These lights are on a sensor system, coming on when there is activity in the car park. Activity in the car park typically ceases around 11:00/11:30pm. At the west and east boundaries there are residential estates. Here there is a lot of human activity as well as streetlights which may deter bat activity.</p> <p>Tree PBR inspected from ground level only</p> <p>Noise and human disturbance affected some recordings</p>
<b>Survey Effort 2022 (Veon Ecology only)</b>  <b>Daytime Surveys hrs</b> 8hrs <b>Night-time Surveys hrs</b> 8hrs <b>Static Surveillance hrs</b> 8hrs (maximum) (3 Nights) <b>Total hrs</b> 24hrs	<b>Summer Survey</b> Daytime Inspection of Tree lines and Hedgerows (07.07.2022) Dusk Surveys (11.07.2022, 19.07.2022) Dawn Surveys (15.07.2022) Walking Transects (11.07.2022, 15.07.2022, 19.07.2022) Static Surveys: (11.07.2022, 15.07.2022, 19.07.2022)
<b>Extent of survey area</b>	Proposed Residential Development Site, Dunlo, Ballinasloe
<b>Equipment</b>	All in good working order.

The purpose of the surveys undertaken were to determine:

- Presence/absence of bats within the survey area
- A bat species list for the survey area
- Extent and pattern of usage by bats within the survey area

Survey work was undertaken using multiple survey methods during the appropriate survey season. It is therefore deemed that the Scientific Assessment undertaken is Appropriate in order to complete the aims of the bat survey.

### Noise Files

Due to human activity in the area, some handheld Bat Detector files were corrupted with Noise, meaning the species could not readily be identified via the software. Noise files have not been mapped. Where field observations have been noted for the presence of a bat species where a noise file has caused a loss of data, this has been manually added. Noise files were generated across different areas of the site, which can be a commonality when using bat detectors.



## Bat Ecological Evaluation

### Bat Species Recorded & Sensitivity

A total of four bat species were recorded foraging and commuting within the proposed development site at Dunlo, Ballinasloe, Co. Galway.

Table 20: Bat Species Activity on Site (R/F/C)

Bat Species	Roosting	Foraging	Commuting
Leisler's ( <i>Nyctalus leisleri</i> )	X	✓	✓
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	X	✓	✓
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	X	✓	✓
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	X	✓	✓

Three of the bat species recorded were Common Pipistrelle, Leisler's bat, and Soprano Pipistrelle. These species are common and widespread in Ireland (Roche *et al.*, 2014).

These three bat species were also the most frequently recorded bat species on the static units and during the walking transects completed in 2022.

No active roosts were recorded within the trees, treelines, and hedgerows surveyed. Some PRFs were identified in some of the more mature trees on site, mainly Ash trees.

### Bat Foraging Habitat & Commuting Routes

Although there is an absence of bat roosts within the proposed development site, the study area is utilised as a foraging and commuting area for local bat populations of at least four species of bat.

The following commuting routes were recorded (See **Mapped commuting routes** below), while foraging was recorded at the mature ash tree (53.3225390, -8.2264802) and around the hollow/willow trees.

All bat species recorded generally commuted via linear land features such as hedgerows and treelines, mostly in an east/west and north/south direction.

The east to west route only went as far as the electricity pole. The electrical lines may deter bats flying across. There was also light spill coming from the residential estate along the western boundary which may also deter the bats from flying further west.

When flying north to south, they followed the tree line as far as the dead hawthorn trees (53.3222422, -8.2269184 & 53.3219811, -8.2270549) before flying back north.

Light spill coming from Tesco onto the north of the site appeared to attract insects around the hollow as well as the surrounding willow trees. The hollow provided a dark area for the bats to fly around and feed on the insects attracted by the neon lights and willow trees.

This indicates that there are well-connected commuting and foraging habitats in the centre of the site. Low activity of bats (singular passes) was recorded crossing East to West or North to South across the open spaces (recolonising bare ground) within the wider footprint of the project site.

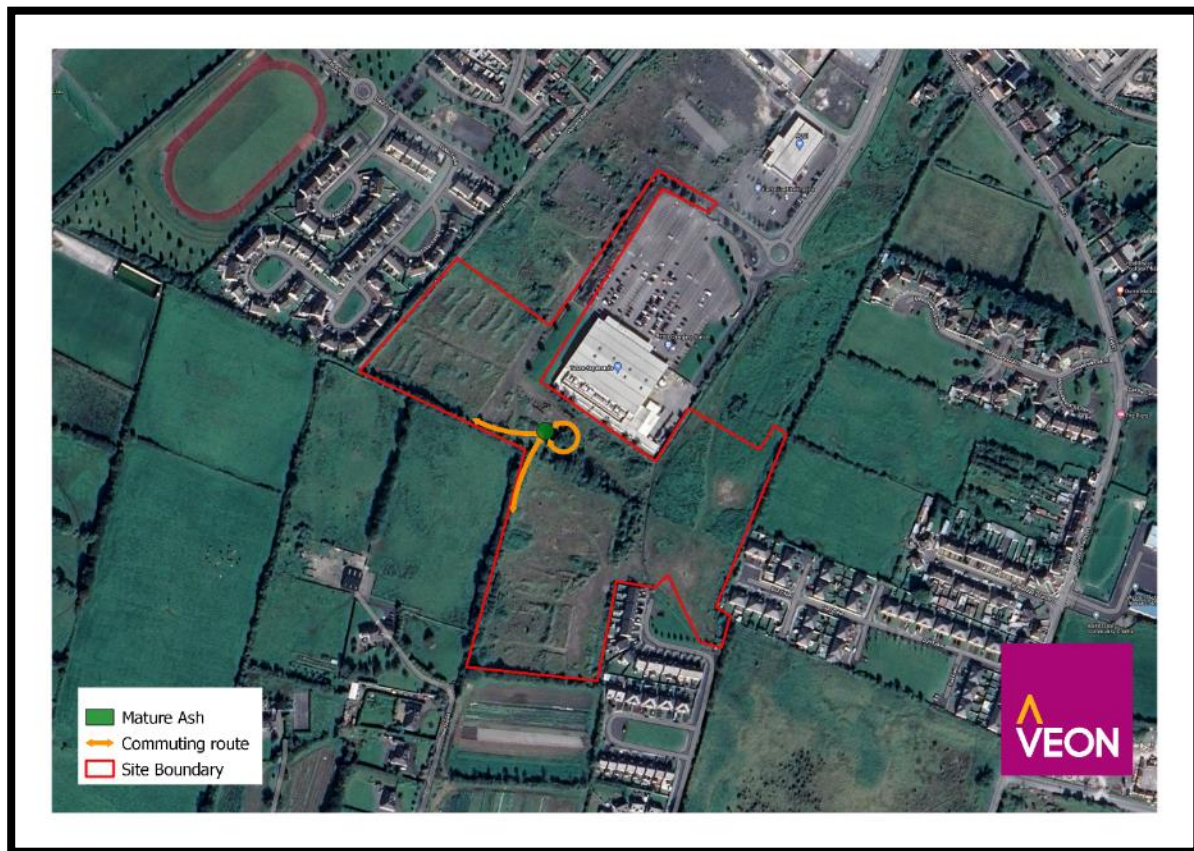


Figure 20: Mapped Bat commuting routes at Dunlo, Ballinasloe

### Zone of Influence – Bat Landscape Connectivity

The presence of linear hedgerow and treeline habitats within the proposed development site at Dunlo, Ballinasloe provides important commuting habitat for local bat populations.

A 'Hotspot' for Bat activity was identified at the Mature Ash tree (53.3225390, -8.2264802) in the centre of the site, with up to four species present on any given night, namely: Leisler's, Soprano Pipistrelle, Common Pipistrelle, and Nathusius' Pipistrelle).

The neon light from 'Dark area' created by the hollow beside the mature ash tree has promoted increased insect activity (and therefore increased bat activity) along the public road to the South and outside the boundary of the site.

## Bat Ecological Evaluation Results

According to Marnell *et al.*, 2019, the Irish status of the bat species recorded within the study area are all of “Least Concern” (**Table 1**).

The bat ecological evaluation of Dunlo, Ballinasloe is presented for each of the bat species recorded during the bat surveys. Due to the moderate bat biodiversity recorded during surveys, this site is considered to be of Local Importance for local foraging and commuting bats species, but low to negligible for roosting local bat species, due to the absence of roosts on site both current and historic.

Table 21: Bat Ecological Evaluation Results for Kingswood Farm according to referenced criteria

Bat Species	Survey Results	Evaluation Value
Leisler's ( <i>Nyctalus leisleri</i> )	Foraging habitat Commuting routes	Local importance – Ballinasloe and immediate surroundings, County Galway
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )	Foraging habitat Commuting routes	Local importance – Ballinasloe and immediate surroundings, County Galway
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )	Foraging habitat Commuting routes	Local importance – Ballinasloe and immediate surroundings, County Galway
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )	Foraging habitat Commuting routes	County Importance – County Galway

## Bat Habitat Ecological Assessment

For this ecological assessment, the habitats adjacent to the proposed development may be considered in terms of extent, diversity, naturalness, rarity, fragility, typicalness, recorded history, position, potential value, and intrinsic appeal (Regini, 2000). The potential of these habitats for bat fauna is considered in this framework also.

No Bats roosts were recorded in the trees on site, however some Mature Trees, such as Ash, and instances of dead or dying trees, such as the Hawthorns in the hedgerows provide current and future Potential Roost Features - suitable for use by individual bats, at least.

Foraging and commuting areas were recorded within the proposed development site primarily along the hedgerows and treelines within the site. The bat species recorded during the surveys are reliant on habitats for commuting through the landscape. The exception to this is Leisler's bats, which is a bat species that fly

high over the landscape. They are not a reliant on linear habitats to traverse through the landscape. Leisler's were the most bat species recorded on site, accounting for approximately 24% of all bat recordings.

### Agricultural grasslands

This habitat is present within the survey area as agricultural fields surrounded by linear habitats. These agricultural fields and associated hedgerows/treeline boundaries provide foraging habitats for all of the bat species recorded and may be considered as Medium ecological value.

### Hedgerows, scrub, and treelines

These habitat types are present within and around the boundaries of the site. Such features provide wildlife corridors and foraging areas for many bat species. While no bat roosts are present in mature trees, there are some individual trees on site that have PRFs for individual bats at least. These linear habitats are also essential for commuting bats. May be considered as High ecological value.

There are proposals within the Landscape plan for this project to replant hedgerows and augments existing tree lines on site to compensate for this loss.

### Buildings and structures

There are no derelict buildings or structures located within the proposed site which could be potential bat roosts.

## Impact Assessment & Mitigation

The following bat species have been recorded during this bat survey:

Table 22: Bat Species considered for Impacts and Mitigation

Leisler's ( <i>Nyctalus leisleri</i> )
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )

This represents four of the nine resident bat species known to Ireland. All bat species recorded during this bat survey are Annex IV species under the EU Habitats Directive and all have a Favourable Status in Ireland.

## Potential Impacts

Bat fauna within the survey area will be affected by both the construction phase and operational phase of the proposed development.

The proposed development will see the construction of a new residential development at Dunlo in Ballinasloe Town Centre including:

- 1-3 Bed Units
- Apartment Blocks
- Car Parking Spaces
- Open Space Areas
- Roadworks
- Footways/cycleways
- Fencing Works
- Drainage Works
- Landscaping Works
- Environmental Mitigation Measures
- Utilities and Services Diversion Works
- All other Ancillary Works

The Proposed Site Development Plan is illustrated in **Figure 21** on the next page.



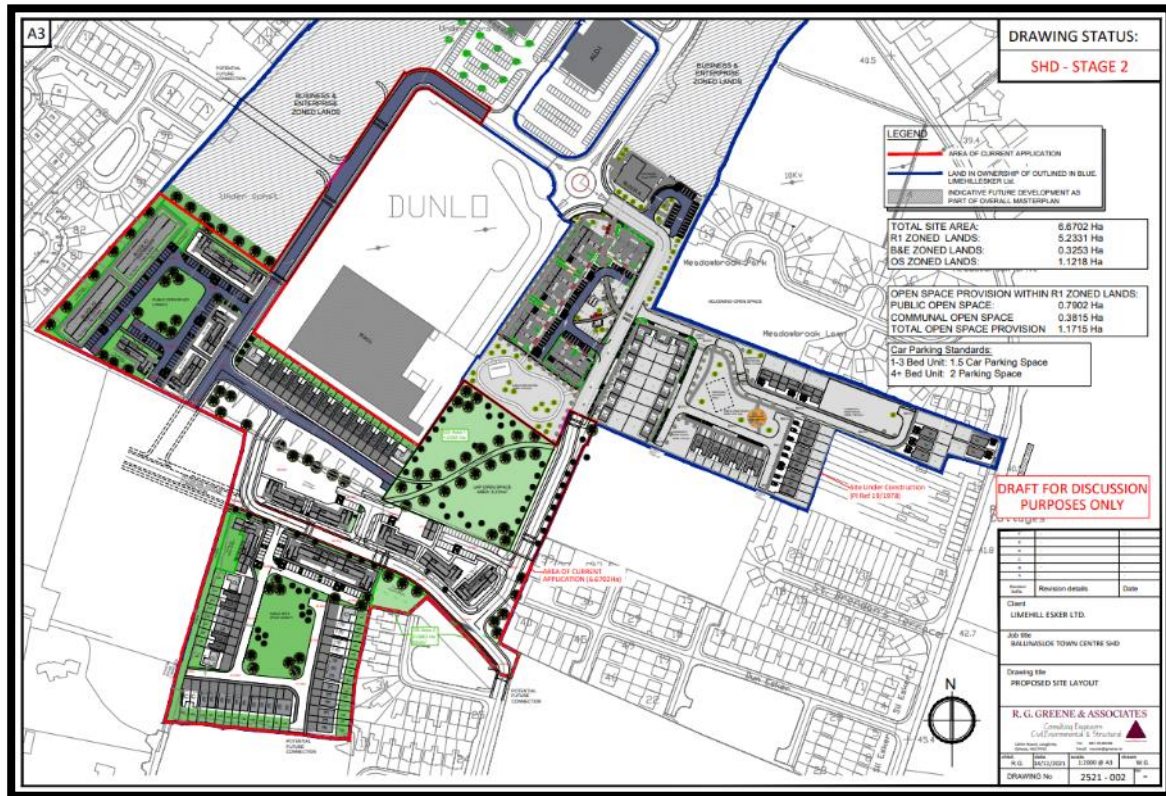


Figure 21: Proposed Site Development

In summary the proposed works in relation to the scope of the bat survey are as follows:

- To facilitate the proposed development tree and hedge vegetation may need to be removed.
- New landscaping throughout the site comprising trees, hedges, and wildflower areas
- Vehicle parking areas and new vehicle entrance

Therefore, the proposed works will result in the possible fragmentation of some confirmed bat foraging and commuting routes and cause temporary disturbance to commuting and foraging bats on site. No bat roosts were present on site or within the project area, so roost impact is predicted as negligible.

Table 23: Potential impact of the proposed development on the different bat species recorded during survey work

Works and Resulting Impacts	SP	CP	NP	Leis
<b>Removal of linear habitats</b> Loss of foraging and commuting habitat	<b>Minor</b>	<b>Minor</b>	<b>Minor</b>	<b>Minor</b>
<b>Removal of trees</b> Loss of tree roosts	<b>Not Applicable</b> (No Roosts)	<b>Not Applicable</b> (No Roosts)	<b>Not Applicable</b> (No Roosts)	<b>Not Applicable</b> (No Roosts)
<b>Operation of the development site</b> Increased lighting and human activity (noise levels).	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates
<b>Infrastructure</b> Including new Carparks and public open spaces	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates	<b>Minor-Moderate</b> Site is already impacted by light spill and noise from Tesco commercial buildings, and nearby residential housing estates
<b>Lighting of development area</b> Reduced foraging Reduced commuting	<b>Moderate-Major</b> Artificial lighting to be installed at various locations on site	<b>Moderate-Major</b> Artificial lighting to be installed at various locations on site	<b>Moderate-Major</b> Artificial lighting to be installed at various locations on site	<b>Moderate</b> Artificial lighting to be installed at various locations on site

SP = Soprano Pipistrelle, CP = Common Pipistrelle, Leis = Leisler's bat, NP = Nathusius's Pipistrelle



## Principle potential impacts of the proposed project are as follows:

*Loss of treelines and hedgerows or other linear features during construction will impact on commuting and foraging bats*

The removal of foraging and commuting habitat would have a direct, significant adverse impact on bats at the local level. In the absence of mitigation this impact would be permanent and irreversible

*Loss or fragmentation of foraging habitats (such as hedgerows, treelines and woodlands) may reduce the available insect prey species and also reduce feeding area for bats in some locations*

The reduction of foraging habitat would have a direct, significant adverse impact on bats at the local level. In the absence of mitigation this impact would be permanent and irreversible

*Loss of mature trees may reduce actual and potential roosting sites for individual bats*

While no bat roosts were identified site, occupation of roosts in trees by bats may be very transient and there is potential that the mature broadleaved trees in the hedgerows/treelines may be used occasionally as roosting or resting places by individual/ small numbers of bats. Therefore, there is potential for significant direct adverse impacts to individual bats should mature broadleaved trees be removed during the construction phase. This would be significant at the local level.

*Disturbance of bats due to lighting during the construction phase*

Studies have also found that lighting can cause avoidance of an area for commuting bats and can prevent or reduce foraging for slower flying bats such as Brown Long-eared bats or *Myotis* bats. Faster-flying species are less impacted by light (Pipistrelles and Leisler's bat) and have been recorded feeding around white metal halide streetlights that attract insects (Blake *et al.*, 1994; Rydell and Racey, 1995). Conversely, bats taking feeding on insects swarming around artificial lighting may be more prone to collision with traffic (Voigt and Kingston, 2016).

Habitat loss (potential foraging/ commuting habitat) effects on all bat species during operational phase are assessed as: **Permanent Slight to Moderate Negative Effects.**

Disturbance and/or displacement effects on all bat species during the construction phase are assessed as: **Short-term Slight to Moderate Negative Effects**

## Bat Compensatory & Mitigation Measures

To reduce the potential impact of the proposed development on local bat populations, some bat compensatory and mitigation measures are required.

To ensure that all proposed renovation works have consideration for potentially foraging and commuting bats, the site ecologist, clerk of works, conservation architects, design architects and contractors may be required to draw up a "Work Plan" to ensure that the steps undertaken take into consideration the bat mitigation and compensatory measures detailed in this report prior to construction.

## Landscaping plan (Linear habitats)

It is important to ensure that the majority of existing treelines/hedgerows are retained within the project area.

For any trees proposed for retention, all necessary mitigation measures will need to be put in place to prevent or reduce impact to its very minimum.

In general, the following should also be followed:

- Any semi-natural habitats will be protected from potential damage construction phase and post-construction.
- The use of chemicals (weed killers, *etc.*) will be kept to a minimum within the development zone and will not be used in near treelines and hedgerows.

As part of bat mitigation measures, it is recommended that the following is undertaken:

- It is recommended that a Bat Box scheme is designed and implemented to facilitate the continuity of any fragmented corridors, were feasible.

## Lighting plan

Lighting plans should be designed for the site to ensure that there will minimum impact on local bat populations, post works. It is important that this is implemented and complimented with the lighting plans for the current proposed development

This element of the proposed planning application is an extremely important aspect in relation to local bat populations.

All European bat species, including Irish bat species, are nocturnal. They usually hide in roosts during the daytime, while fly to feeding areas or drinking sites using commuting routes during the night. Annually bats will hibernate in the winter, swarm in the autumn, and give birth in the summer months.

In all aspects of the bat lifestyle, Artificial Light at Night (ALAN) may significantly change their natural behaviour in relation to roosting, commuting, and feeding. While bats are naturally exposed only to very low lighting levels produced by moonlight, starlight and low intensity twilight, light levels greater than natural light levels can impact on the lifestyle of bats.

### Construction Lighting

Where construction lighting is required, lighting shall be directed away from all woodland, hedgerow, and linear habitats to be retained. This can be achieved by the use of 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.

Lighting shall be minimised in known foraging and commuting areas, and the times during which the lighting is on should be limited to provide some dark periods. Should security lighting be necessary, directional lighting shall be used to prevent overspill. Lights shall be positioned to avoid sensitive areas and restricted so that there are dark areas i.e. away from the hollow and Mature Ash tree discussed previously.

The timing of lights shall be restricted to avoid bat activity (i.e. from dusk until dawn).

### Street lights

Rydell (2006) divides bats into four categories in terms of their characteristic behaviours at street lights.

The four categories are based on bat size, wing morphology and echolocation call characteristics which were highlighted by Norberg and Rayner (1987) to determine flight speed, manoeuvrability, and prey detection capabilities of bats.

Rydell (2006) stated that the large, fast flying bats, which are confined to open airspace, fly high over lit areas, and are rarely observed near ground level. None of these bat species are found in Ireland.

The second category are the medium-sized fast flying species, including the *Nyctalus* species, which patrol the street well above the lights and can be seen occasionally as they dive for prey into the light cone. This group includes the Leisler's bat, which is found in Ireland.

Rydell's third category describes the small but fast flying bats that are manoeuvrable enough to forage around light posts or under the lights and includes the small *Pipistrellus* species recorded within the survey area.

The fourth category includes broad-winged slow flyers, most of which are seldom or never observed at lights. Slow flying bat species may be more vulnerable to predation by diurnal birds of prey, and this may restrict their exploitation of insects around artificially illuminated areas.

There are also the concerns that some bat species are more light sensitive and therefore actively avoid lit up areas. This is particularly relevant for the four remaining bat species recorded within the survey area.

Therefore from this, we can categorise Irish bats species as follows in **Table 24** on the next page:

Table 24: Potential light sensitivity of the Irish bat fauna using categories described by Rydell (2006)

Species	Rydell Category 1-4
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	3
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	3
Nathusius' pipistrelle ( <i>Pipistrellus nathusii</i> )	3
Leisler's bat ( <i>Nyctalus leisleri</i> )	2
Brown long-eared bat ( <i>Plecotus auratus</i> )	4
Natterer's bat ( <i>Myotis nattereri</i> )	4
Whiskered bat ( <i>Myotis mystacinus</i> )	4
Daubenton's bat ( <i>Myotis daubentonii</i> )	4
Lesser horseshoe bat ( <i>Rhinolophus hipposideros</i> )	4

Bats are light sensitive bats species, hence their nocturnal activities. Of the four bat species recorded foraging and commuting within the survey area, three of the bat species are Semi-Tolerant (Rydall Category 3):

Common, Soprano, and Nathusius' pipistrelle

One is 'Light-Tolerant' (Rydall Category 2):

Leisler's

Artificial lighting is a barrier to bats, consequently strict lighting guidelines are required to reduce the potential impact of the proposed development on local bat populations.

Nocturnal mammals are impacted by lighting. Therefore, it is important that lighting installed within the proposed development site is completed with sensitivity for local wildlife while still providing the necessary lighting for human usage.

The principal areas of concern are the treelines/hedgerows remaining within the proposed development area.

In summary the following principles should be followed in the lighting plan for the proposed development:

Lighting design should be flexible and be able to fully consider the presence of protected species. Therefore, appropriate lighting should be used within a proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas.

- LED lighting should be used where possible as these emit minimal UV light
- Peak wavelengths should not exceed 550nm (approximately 2700°K)

Dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. This should be used for habitat features noted as foraging areas for bats.

Buffer zones can 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.

- Consider additional landscaping measures to create buffers

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 should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT 2018).

- All luminaires used will lack UV/IR elements to reduce impact.
- LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins will be used to reduce the blue light component of the LED spectrum).
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible. Ballard lighting should be considered for pedestrian and greenway areas, if deemed necessary.
- Only luminaires with an upward light ratio of 0% and with good optical control will be used.
- Luminaires will be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting will be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.

The lighting plan for the proposed development should strictly follow the above guidelines and these should be strictly implemented during construction and operation phase of the proposed development.

A bat survey shall be undertaken annually at the site of the proposed artificial lighting, for a period of three years following commencement of operation of the development.

The survey shall be undertaken by an ecologist with appropriate qualifications, training and experience in bat surveys, and shall be undertaken in accordance with the provisions of the “Bat Mitigation Guidelines for Ireland - Irish Wildlife Manuals No. 25”, issued by the Department of the Environment, Heritage and Local Government (2006) or any document that might supersede it.

Surveys shall incorporate appropriate time periods during which the development is in operation and otherwise.

The survey reports shall be submitted to, and agreed in writing with, the planning authority within three months of completion of each annual survey.

**Reason:** To monitor bat species in the area during times of activity.

Leisler’s bat are one of the few bat species that feed around strong lighting, due to large moth and other insect food items being attracted to the light.

Most bat species will show a negative correlation between illumination and activity.

Artificial lighting pointed towards buildings can have a devastating effect on the bats that live in the illuminated buildings.

Waterways, such as canals, streams, and rivers, are important flyways and feeding sites for a diversity of bats strong floodlight and found a negative effect on the drinking activity of all local bats.

### *Lighting of Access Roads*

The main area of concern of outdoor lighting in relation to local bat populations is the impact on foraging and commuting bats.

Lighting can act as a physical barrier to movement. Therefore, the lighting of any access routes needs to be designed to ensure that there are dark corridors to allow bat movement between habitats on either side of any access road.

### **Monitoring**

Bats are transient mammals and can roost in any type of shelter, therefore constant vigilance is required during proposed development works.

If a bat is encountered, please contact the bat specialist or local NPWS Conservation Officer for advice.

As part of toolbox talks during construction phase, the contractor will be made aware of the procedure to follow if a bat is encountered.

If proposed bat mitigation measures are strictly adhered to, the potential impact of the proposed development is likely to be reduced overall:

*Table 25: Potential impact of the proposed development on the different bat species recorded during survey work, if mitigation measures and compensatory are strictly adhered to*

Mitigation Measures	SP	CP	NP	Leis
Removal of linear habitats	Minor	Minor	Minor	Minor
Removal of trees	Not Applicable (No Roosts)	Not Applicable (No Roosts)	Not Applicable (No Roosts)	Not Applicable (No Roosts)
Operation of the development site	Minor-Moderate	Minor-Moderate	Minor-Moderate	Minor
Lighting of development area	Minor-Moderate	Minor-Moderate	Minor-Moderate	Minor
Infrastructure	Minor-Moderate	Minor-Moderate	Minor-Moderate	Minor-Moderate

SP = Soprano Pipistrelle, CP = Common Pipistrelle, Leis = Leisler's bat, NP = Nathusius's Pipistrelle

With full and proper implementation of the mitigation and compensatory measures the residual impacts of the proposed development in relation to commuting and foraging habits, will be:

***Medium-term, Slight to Moderate Negative Effects.***



## Survey Conclusions

The following bat species have been recorded during this bat survey:

Leisler's ( <i>Nyctalus leisleri</i> )
Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> )
Common Pipistrelle ( <i>Pipistrellus pipistrellus</i> )
Nathusius' Pipistrelle ( <i>Pipistrellus nathusii</i> )

- This represents four of the nine resident bat species known to Ireland.
- All bat species recorded during this Bat Survey are Annex IV species under the EU Habitats Directive and all have a Favourable Status in Ireland.
- Three of the bat species recorded were Leisler's bat, Soprano pipistrelle, and Common Pipistrelle and these are the three most common bat species in Ireland. These three bat species were also the most frequently recorded bat species on the static units and during the walking transects.
- No roosts were found to present on site, either within structure or trees surveyed with PRFs.

Without bat mitigation measures, the proposed development will have a Moderate -Major impact on local bat populations. The following assessment is:

Habitat loss (potential roosting/foraging/ commuting habitat) effects on all bat species are assessed as: **Permanent Slight to Moderate Negative Effects.**

Disturbance and/or displacement effects on all bat species during the construction phase are assessed as: **Short-term Slight to Moderate Negative Effects.**

In order to reduce the potential impact of the proposed development on local bat populations, bat mitigation and compensatory measures are required.

These bat mitigation and compensatory measures, in summary include:

- Bat sensitive Lighting Plan
- Additional landscaping
- Bat box Scheme (recommended)

If proposed bat mitigation measures are strictly adhered to, the potential impact of the proposed development is likely to be reduced to Moderate for specific areas but Minor-Moderate for the majority of parameters examined.

With full and proper implementation of the mitigation and compensatory measures the residual impacts of the proposed development in relation to commuting and foraging habits, will be:

**Medium-term, Slight to Moderate Negative Effects.**

Therefore, with full and proper implementation of bat mitigation measures and compensatory measures, the proposed development will have a reduced impact on local bat populations.

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# Appendix 1: MAPS

Figure 22 Watercourses in Vicinity of the Proposed Development



Figure 23 SPAs Within Vicinity of the Proposed Development

