BAT ASSESSMENT REPORT

Clondalkin Rugby Football Club

Kingswood Farm, Moneenalion Commons Lower,

Clondalkin, Dublin 22.

Prepared for:

SCEG Limited

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

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, EcIA, 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 Pre-construction Bat Survey for Ballinasloe Strategic Housing Project (2022) on behalf of Limshill Ltd; 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.

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

Client:

SCEG Limited.

Project Name & Location:

Kingswood Farm,

Proposed New Site for Clondalkin Rugby Football Club

Moneenalion Commons Lower Clondalkin, Dublin 22.

Report Revision History

Veon Ltd. Veon Ecology							
Revision	Description	Author:	Date	Reviewed By:	Date	Authorised by:	Date
1	Draft Report	DC/MP	22/07/2022	RP	25/07/2022	PS	25/07/2022
2	Final Report	DC/MP	29/07/2022	RP	-	PS	-

Purpose

This document has been prepared as a Report for SCEG 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 Veon Ecology 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:

Clondalkin Rugby Football Club Kingswood Farm, Moneenalion Commons Lower Clondalkin, Dublin 22.

Proposed work:

The proposed development will see the relocation of the existing Clondalkin RFC grounds at Gordon Park to new lands at Kingswood Farm, Moneenalion Commons Lower, Clondalkin, Dublin 22.

- The site will comprise of 4 new rugby playing pitches, including: a high-quality main competition pitch (with modern directional floodlighting comprising 18m high floodlighting columns either side); a high-quality Junior pitch both laid approximately level; and two back pitches as well as various grassed rugby training areas all laid on existing land cross fall levels

- The relocation project will involve: change of use of existing agricultural shed to accommodate new two storey changing facility and storage areas; a new two-storey Clubhouse Pavilion with supporting facilities including dressing rooms, physio rooms, coffee dock, committee rooms, members bar and lounge, plantroom, and toilets; all associated site development sustainability and infrastructure work including connection to existing public foul sewer, SUDs, sedum roof and PV roof panels; new landscaping throughout the site comprising trees, hedges and wildflower areas; and a new cycle track and pedestrian access and stairs off the R136, bicycle shelter, children's playground area, electrical car charging stations, vehicle parking and new vehicle entrance off the Old Country Roadway.

Bat Survey Results – Summary

Seven bat species were recorded foraging and commuting within the grounds of Kingswood Farm. This represents 7 of the 9 Resident bats species known to occur in Ireland and therefore represents a high bat biodiversity. No roosts were recorded in trees, buildings, or other structures either within or in-close-proximity-to the footprint of the project.

Bat Species	Roosting	Foraging	Commuting
Leisler's (*Nyctalus leisleri*)	X	✓	✓
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	X	✓	✓
Common Pipistrelle (*Pipistrellus pipistrellus*)	X	✓	✓
Whiskered (*Myotis mystacinus*)	X	✓	✓
Daubenton's (*Myotis daubentonii*)	X	✓	✓
Nathusius' Pipistrelle (*Pipistrellus nathusii)*	X	✓	✓
Natterer's bat (*Myotis nattereri)*	X	✓	✓

Bat Survey Duties Completed:

Daytime Building Inspection; Tree PBR Survey; Endoscope Inspection; Dusk Bat Survey; Dawn Bat Survey; Walking Transect.

The primary areas of bat foraging and commuting activity were as follows:

Camac River (EPA: 09C02) (FW1), located along the north-western and western perimeter of the site; and Baldonnell Upper (FW4) a stream/drainage ditch, which flows primarily outside of the site parallel to the southern and south-western boundary, partially entering the site in the south-west as a tributary to the Camac River (See *EPA Waterbody Map* in **Appendix**).

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

SCEG Limited commissioned Veon Ecology to undertake a preliminary roost assessment (PRA) of buildings and trees on site to identify any potential roost features (PRFs) and the presence or likely absence of roosting bat species at Kingswood Farm, Moneenalion Commons Lower, Clondalkin, and its surrounding lands.

A Bat Activity Assessment was also commissioned, which involved with surveyors, following set Transect walks across the site, using handheld *Anabat Walkabout* omnidirectional Heterodyne bat detectors, and the use of passive static bat detectors (Sing Meter Mini Bat) in any areas determined as potential high activity for bats (hotspots), such as feeding, foraging, and/or roosting zones. **Figure 1** below details the transect areas walked for the PRA within the context of the wider site survey.

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 assessment also aims to evaluate the overall importance of any building and the immediate environs for bats and thereby identify any constraints that will need to be considered during the proposed works.

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 external and internal inspection and assessment of the proposed barn 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: Transect lines and survey area within the site for the PRA

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 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 (*Plecutus 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 ferrumerquinum*) (**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** below, along with their current conservation status.

Conservation status

Table 1: Conservation Status of Irish Bat Species

Species		Irish Status	European Status	Global Status
Daubenton's bat	*Myotis daubentonii*	Least Concern	Least Concern	Least Concern
Whiskered bat	*Myotis mystacinus*	Least Concern	Least Concern	Least Concern
Natterer's bat	*Myotis nattereri*	Least Concern	Least Concern	Least Concern
Leisler's bat	*Nyctalus leisleri*	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle	*Pipistrellus nathusii*	Least Concern	Least Concern	Least Concern
Common pipistrelle	*Pipistrellus pipistrellus*	Least Concern	Least Concern	Least Concern
Soprano pipistrelle	*Pipistrellus pygmaeus*	Least Concern	Least Concern	Least Concern
Brown long-eared bat	*Plecotus auritus*	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat	*Rhinolophus hipposideros*	Least Concern	Near Threatened	Least Concern
Brandt's bat (V)	*Myotis brandtii*	Data deficient	Least Concern	Least Concern
Greater horseshoe bat (V)	*Rhinolophus ferrumequinum*	Not Accessed	Near Threatened	Least Concern

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 CIEM Guidelines (2016) Ecological Value

Ecological Value	Geographical Scale of Importance
International	International or European scale
National	The Republic of Ireland or the island of Ireland scale (depending on the bat species)
Regional	Province scale: Leinster
County	County scale: Dublin
Local	Proposed development and immediate surroundings
Negligible	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).

Project Description

Site Location

The site area is located at Kingswood Farm, Moneenalion Commons, Lower Clondalkin, Dublin 22. It is irregularly shaped and is bordered to the north by the public road (R136) (BL3); to the east by an off ramp from the public road (N7) (BL3); to the south by a private farm (located centrally) (BL3) and a public road outside of this farm (BL3); and to the west by agricultural fields in grass (GA1).

The site area consists of three fields in grass (GA1/GA2) with agricultural hedgerows (WL1) making up the boundaries along with a small size tree line (WL2) along the northern and eastern boundaries. There is a river (Camac River (EPA: 09C02) (FW1)), located along the north-western and western perimeter of the site; and a smaller stream/drainage ditch (FW4) Baldonnell Upper, which flows primarily outside of the site parallel to the southern and south-western boundary, partially entering the site in the south-west as a tributary to the Camac River (See *EPA Waterbody Map* in **Appendix**).

There are trees within the site area, growing out of the boundary hedgerows (WL1/WL2). 'Hedgerow 1' extends east to west along the southern boundary of the site area and consists of species such as Hawthorn (*Crataegus monogyna*), Dog-rose (*Rosa canina*), Bramble (*Rubus fruticosus*), Honeysuckle (*Lonicera periclymenum*) and Elder (*Sambucus nigra*). It has received regular maintenance to contain its spread and there is a c.1m grass verge on the public roadside (GA2). This hedgerow is not continuous, with gaps and structural differences apparent throughout.

At the eastern end of 'Hedgerow 1' there is a small group of early-mature Ash (*Fraxinus excelsior*) and Alder (*Alnus glutinosa*), the Alder trees have potential for the long-term tree cover in this area, but the Ash trees will likely succumb to 'ash dieback' (*Hymenoscyphus fraxineus*). At the western end of 'Hedgerow 1', the Camac River (FW1) extends north-east to south-west and makes up the western boundary of the site area with the adjoining field. There is also an open wet drainage ditch (FW4) (Baldonnell Upper) running parallel with 'Hedgerow 1', on the site side that connects with this stream.

'Hedgerow 2'extends parallel with the Camac River along the western boundary, the vegetation is predominantly on the adjoining landside, outside of the site area, with some isolated clumps on the site side. The hedge vegetation consists of Hawthorn (*Crataegus monogyna*), Dog-rose (*Rosa canina*), Bramble (*Rubus fruticosus*), Elder (*Sambucus nigra*) and Blackthorn (*Prunus spinosa*), with an upper canopy of Ash (*Fraxinus excelsior*), Crack Willow (*Salixxfragilis*) and Sycamore (*Acer pseudoplatanus*). A lot of the Ash trees shows signs of being suppressed by Ivy (Hedera helix) and showing symptoms of 'ash dieback' (Hymenoscyphus fraxineus). At the northern end of this hedge there is a concrete bridge (BL3) providing access into the adjoining field.

'Hedgerow 3' connects with 'Hedgerow 2' and extends east to west along the northern boundary of the site area. It contains Hawthorn (*Crataegus monogyna*) and Honeysuckle (*Lonicera periclymenum*). There is a tree line (WL2), located outside of the site area, growing on an ascending sloped bank behind 'Hedgerow 3'.

This tree line makes up the northern boundary with the adjoining public road (R136) (BL3). They are of a semi-mature age and the species present include Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Cherry (*Prunus avium*) and Birch (*Betula pendula*). 'Hedgerow 3' (WL1) and the associated treeline (WL2) provide screening along this boundary with the public road (R136) and will provide the long-term tree cover in this area.

'Hedgerow 4' connects with 'Hedgerow 3' and extends north to south, creating an internal boundary within the site area between two fields. There is a gap at the southern end of this hedge providing access into the adjoining field (GA2). It contains Hawthorn (*Crataegus monogyna*), Dog-rose (*Rosa canina*), Bramble (*Rubus fruticosus*) and Elder *(Sambucus nigra*) with an upper canopy of Ash (*Fraxinus excelsior*) and Elm (*Ulmus glabra*).

This hedgerow also lacks definitive structure and features Ash trees suppressed by Ivy (*Hedera Helix*) and showing symptoms of 'ash dieback' (*Hymenoscyphus fraxineus*), while two of the elm trees are standing dead, likely due to 'Dutch elm disease' (*Ophiostoma* spp.)

'Hedgerow 5' extends north-west to south-east through the site area, and it forms an internal boundary between two fields (GA2), with the farm and its associated buildings (BL3) located in the field to the south. The hedge is well structured and has received regular maintenance to contain its height and spread, it is comprised of Hawthorn (*Crataegus monogyna*), Dog-rose (*Rosa canina*), Bramble (*Rubus fruticosus*), Elder (*Sambucus nigra*) and Ash (*Fraxinus excelsior*). There are two wider openings in this hedge, at the northern and southern end, allowing access into the adjoining field (GA2).

'Hedgerow 6' extends north to south along the eastern boundary of the site area with an established tree line (WL2) growing outside of it. The hedge is comprised of Hawthorn (*Crataegus monogyna*), Honeysuckle (*Lonicera periclymenum*), Elder (*Sambucus nigra*) and Blackthorn (*Prunus spinosa*). The Tree line and hedgerow form a linear buffer between the site area and the off ramp of the public road (N7) to the east.

The Farm Buildings (BL3) located centrally to the south of the site comprise of agricultural sheds and buildings, currently not in use. Two of which are the agricultural sheds subject to change of use as part of the project; namely to accommodate new two-storey changing facility and storage areas. These two structures (henceforth Structure 2 and Structure 3) both comprise of a concrete base-wall with prefabricated steel sheet materials and/or wooden timbers on the walls and roofs, respectively.

Two other agricultural buildings are present adjacent to Structures 2 and 3, which themselves are to be retained 'as-is' and are not subject to development and do not form part of this project. One is a two-storey building, previously used as a Dairy Shed (hereafter Structure 1) with concrete walls and prefabricated steel sheet materials for the roof. The fourth structure on site (hereafter Structure 4), is an agricultural building currently housing hay bales, situated on private property within an active farm courtyard.

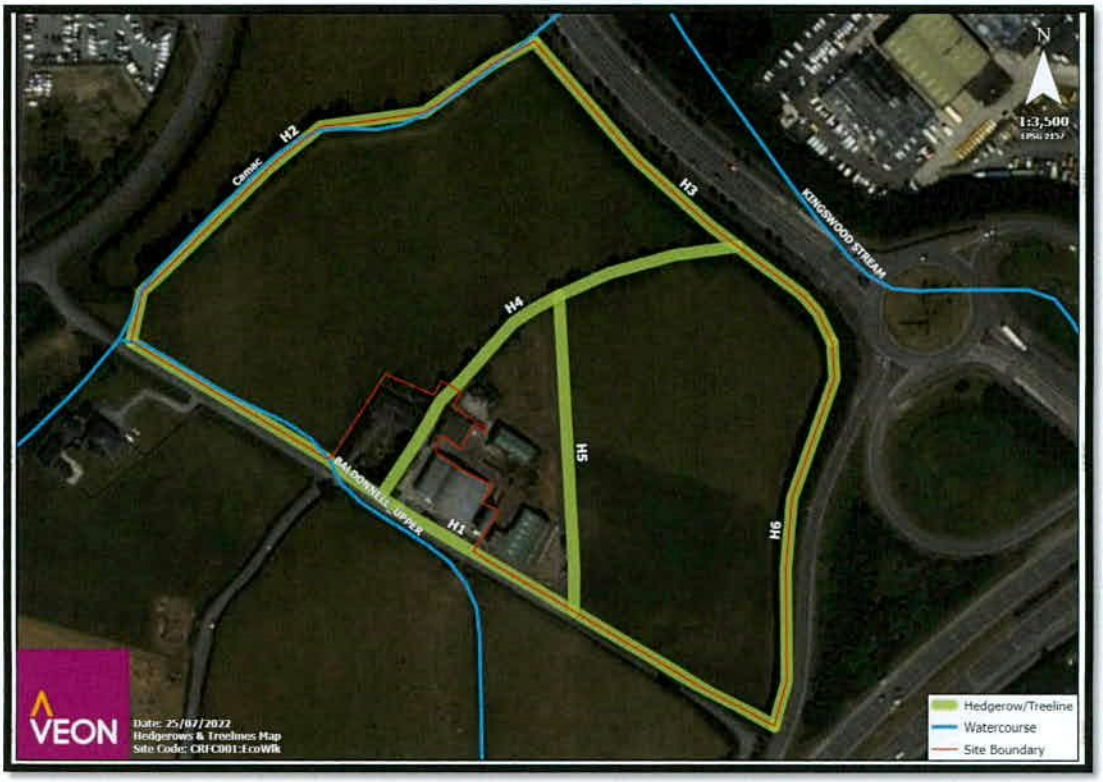

Figure 2: Hedgerow and Treeline network on site subject to PRA

Proposed Project

The proposed development will see the relocation of the existing Clondalkin RFC grounds at Gordon Park to new lands at Kingswood Farm, Moneenalion Commons Lower Clondalkin and comprising of four new rugby playing pitches, including:

- a high-quality main competition pitch (with modern directional floodlighting comprising 18m high floodlighting columns either side)
- a high-quality Junior pitch both laid approximately level
- and two back pitches as well as various grassed rugby training areas all laid on existing land cross fall levels

The project also involves:

- change of use of existing agricultural shed to accommodate new two storey changing facility and storage areas
- a new two storey Clubhouse Pavilion with supporting facilities including dressing rooms, physio rooms, coffee dock, committee rooms, members bar and lounge, plantroom, and toilets
- all associated site development sustainability and infrastructure work including connection to existing public foul sewer, SUDs, sedum roof and PV roof panels
- new landscaping throughout the site comprising trees, hedges, and wildflower areas
- new cycle track and pedestrian access and stairs off the R136, bicycle shelter, children's playground area, electrical car charging stations, vehicle parking and new vehicle entrance off the Old Country Roadway

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

Figure 3: 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 the following tree and hedge vegetation will need to be removed.
    - c.8m of 'Hedgerow 1' to allow for a vehicular entrance to the new car park on the southern boundary
    - c.8m of combined Treeline and Hedging along 'Hedgerow 3' combined to allow for the pedestrian entrance on the northern boundary
    - c.45m of 'Hedgerow 4' to allow for the sports field to the east
    - 5 ash trees within the treeline of 'Hedgerow 4' to allow for access to the sports field to the east
    - c.110m of 'Hedgerow 5' to allow for the two sports field to the east and access to the new clubhouse
- New landscaping throughout the site comprising trees, hedges, and wildflower areas
- Change of use of existing agricultural shed to accommodate new two storey changing facility and storage areas
- Construction of a new two-storey Clubhouse Pavilion with supporting facilities including dressing rooms, physio rooms, coffee dock, committee rooms, members bar and lounge, plantroom, and toilets.
- Vehicle parking areas and new vehicle entrance off the Old Country Roadway

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

Surveys are comprised of many different types may differ from site to site depending on the gaols 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 transects: 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:

- *Clondalkin Rugby Club Tree Report* prepared by Ethan Gannon, Veon Arboricultural Division (June 2022)
- *Clondalkin RFC Lighting Report* prepared by Lighting Designer Conor O'Bryne for Cummins & Voortman Ltd. Architects (July 2022)

to name but a few.

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
Day Roost	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
Night Roost	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
Feeding Roost	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
Transitional Roost	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.
Swarming Site	Where large numbers of males and females gather. Appear to be important mating sites.	Late summer and autumn
Mating Site	Where mating takes place.	Late summer and autumn
Maternity Site	Where female bats give birth and raise their young to independence.	Summer months
Hibernation Site	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
Satellite Roost	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

Building & Structure Inspection

Structures, buildings, and other likely places that may provide a roosting space for bats were inspected during the daytime 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 were undertaken visually with the aid of a strong torch beam (High-powered Maglite©) and endoscope (Model: Explorer Premium Wireless inspection camera).

Buildings were assessed to determine their suitability as a bat and described using the parameters Negligible, Low, Medium, or High suitability (Kelleher & Marnell (2006)) in line with **Table 6** below.

Surveying was carried out within the preferred months of May to September (Collins, 2016). The level of suitability informed the level of surveying required, where deemed necessary to gather information on any bat roosts present.

Table 6: Roost Classification, features, suitability descriptions, and survey effort (compiled from Collins (2016) and Kelleher & Marnell (2006)).

Suitability	Description of Roosting Habitats	Description of Commuting and Foraging Habitats	Survey Effort (Timings)
Negligible	Negligible habitat features on site, unlikely to be used by roosting bats.	Negligible habitat features on site, unlikely to be used by commuting or foraging bats.	No surveys required.
Low	A structure with one or more potential roost sites that could be used opportunistically by individual bats. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by a small number of commuting bats such as isolated hedgerows with substantial gaps in them or un-vegetated streams that are not very well connected to the surrounding landscape by other habitats. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.	One dusk or dawn survey.
Moderate	A structure or tree with one or more potential roost location that could be used be by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost	Continuous habitat connected to the wider landscaper that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitats that are connected to the wider landscape that could be used by bats for	At least one survey in May to August, minimum of two surveys (one dusk and one dawn).

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 9** 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 9**, 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 the building9S)/structure(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 9: Mean/Average Dusk and Dawn Emergence/Re-entry times by species

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

Passive Static Bat Detector Survey

A Passive Static Bat Survey involves leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified period of time (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for analysis post surveying).

The bat detector is effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time.

Bat detectors with ultrasonic microphones are used as the ultrasonic calls produced by bats cannot be heard by human hearing.

The microphone of the unit was positioned horizontally to reduce potential damage from rain. Song Meter (SM) Mini Bat Platform Units use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro-SD cards depending on the model) and downloaded for analysis. These results are then depicted on a graph showing the number of bat passes per species per hour/night.

Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species, such as the pipistrelles, will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat.

On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

The recordings were analysed using Wildlife Acoustics Kaleidoscope Pro. Each sound file was noted as a bat pass to indicate level of bat activity for each species recorded. This is either expressed as the number of bat passes per hour or per survey night.

The following static units were deployed during this static bat detector survey.

Static units were deployed within specific habitats to collate information on bat species foraging and/or commuting within such areas (1 unit, 5 nights per surveillance session). All units were set to record from dusk to dawn.

Table 10: Static Bat Detectors deployed during Static Bat Detector Surveys

Static Unit Code	Bat Detector Type	Bat Detector Type	Microphone
SM MB 1	Wildlife Acoustics Song Meter Mini Bat	Passive Full Spectrum	Built-in Ultrasonic

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.

Roost Records

Data was requested for a 1km and 10km radius of Irish Grid Reference N865614 from Bat Conservation Ireland but was not received at the time of compiling this report.

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 Clondalkin Rugby Club proposed site falls within one 10km data grid (O02). 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, and in the **Appendix**.

Results

Building & Structure Surveys

A total of three buildings and two bridges were surveyed on various dates in 2022 by Veon Ecology (Please see **Appendix** for a list, along with weather conditions of surveys undertaken). The types of surveys undertaken were as follows:

- Daytime inspections of buildings, structures, and trees
- Dusk (emergence/activity) surveys
- Dawn (re-entry/activity) surveys
- Static surveillance
- Night-time inspections of buildings / structures

The principal surveys were completed in the months of June and July 2022, within the main maternity months for bats.

Figure 4: Aerial photograph of the survey area indicating the approximate location the main buildings and structures surveyed for PRA in 2022

Everything within the red line is deemed within the footprint of the project and all areas outside red line are deemed as outside the footprint of the site.

Results of the PRA and subsequent assessment are detailed below in **Table 11**. Results and conclusion of presence/absence of bat roots within a structure following Dusk emergence Survey are detailed in **Table 12** below.

No Active Roosts or signs of Historic Roost usage were found in any of the structures surveyed on site. At the two bridge structures, Bat foraging and commuting activity was recorded during the dusk and dawn Bat Activity Surveys. Please see **Walking Transects** section for details.

Table 11: Detailed assessment of PRF identified during the PRA

Building Code (ref. **Figure 4**)	**Description of Structure**	**Field Signs Identified** [Y/N]	**PRF Description**	**Roost Suitability Level***
Structure 1 **Grid Ref:** O 05091 29169	Old Dairy Shed - 2-storey agricultural building with corrugated steel roof. (*Outside Footprint of PA*)	N	This structure is exposed which is not suitable for crevice dwelling species of bats. There is minimal insulation; therefore, this structure was not identified to have adequate shelter for roosting bats.	L - N
Structure 2 **Grid Ref:** O 05126 29197	Long Cattle shed Single storey buildings of mixed construction and roof types (slate and corrugated iron). (*Inside Footprint of PA*)	N	Building has suitable openings in the eves for bats. This structure is heavily exposed provides minimal shelter with no insulation. Therefore, there is Low to Negligible roost potential.	L - N
Structure 3 **Grid Ref:** O 05137 29145	Long Cattle shed Single storey buildings of mixed construction and roof types (slate and corrugated iron). (*Inside Footprint of PA*)	N	Building has suitable openings in the eves for bats. This structure is heavily exposed provides minimal shelter with no insulation. Therefore, there is Low to Negligible roost potential.	L - N
Bridge 1 **Grid Ref:** O 05085 29394	Footbridge Flat Concrete and Steel Gate posts (*Inside Footprint of PA*)	N	Structure is a flat singular concrete piece, heavily exposed provides negligible shelter with no insulation.	N 0
Bridge 2 **Grid Ref:** O 04907 29250	Bridge Arched Natural Stone and concrete (Bridging FW1/FW4) (*Outside Footprint of PA*)	N	The structure bridges the Camac River (FW1) at the South-west border of site surrounded by tree lines of varying quality with some isolated foraging areas (scrub/meadow mosaic).	M – L 1

Negligible Roost Suitability – N; Low Roost Suitability – L; Moderate Roost Suitability – M; High Roost Suitability – H.

Table 12: Results of PRA roost Survey after Day inspection and Dusk Emergence Survey

Building Code	**Internal Inspection (Y/N)**	**External Inspection (Y/N)**	**Roosts and Bat Species**
Structure 1	Y	Y	None (Absent)
Structure 2	Y	Y	None (Absent)
Structure 3	Y	Y	None (Absent)
Bridge 1	N	Y	None (Absent) (commuting & Foraging activity)
Bridge 2	N	Y	None Determined (commuting & Foraging activity)

Singular instances of Common Pipistrelle, Soprano Pipistrelle and Nathusius' Pipistrelle (*Pipistrellus nathusii*) were also recorded along 'Hedgerow 6'.

All four species were also recorded in the vicinity of the Camac River course, to the West of the site.

Weather and Time Conditions were optimal, however overall Bat Activity was very low. The only area of continuous activity (moderate) within the footprint of the project was along the Camac River (FW1).

Although commuting bats species were recorded along the external hedgerows ('Hedgerows 2&6') frequency, activity was almost negligible, with respective bat passes occurring on average once every five to six minutes, if at all.

Figure 8: Heat Map of Dawn Transect Survey 1 (3/3)

Figure 9 below combines the three transect survey walks plotted against the overall footprint of the site.

While some activity was recorded within the site over the three survey nights, this activity remained low, with only four species recorded: Leisler's (*Nyctalus leisleri*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), and Nathusius' Pipistrelle (*Pipistrellus nathusii*).

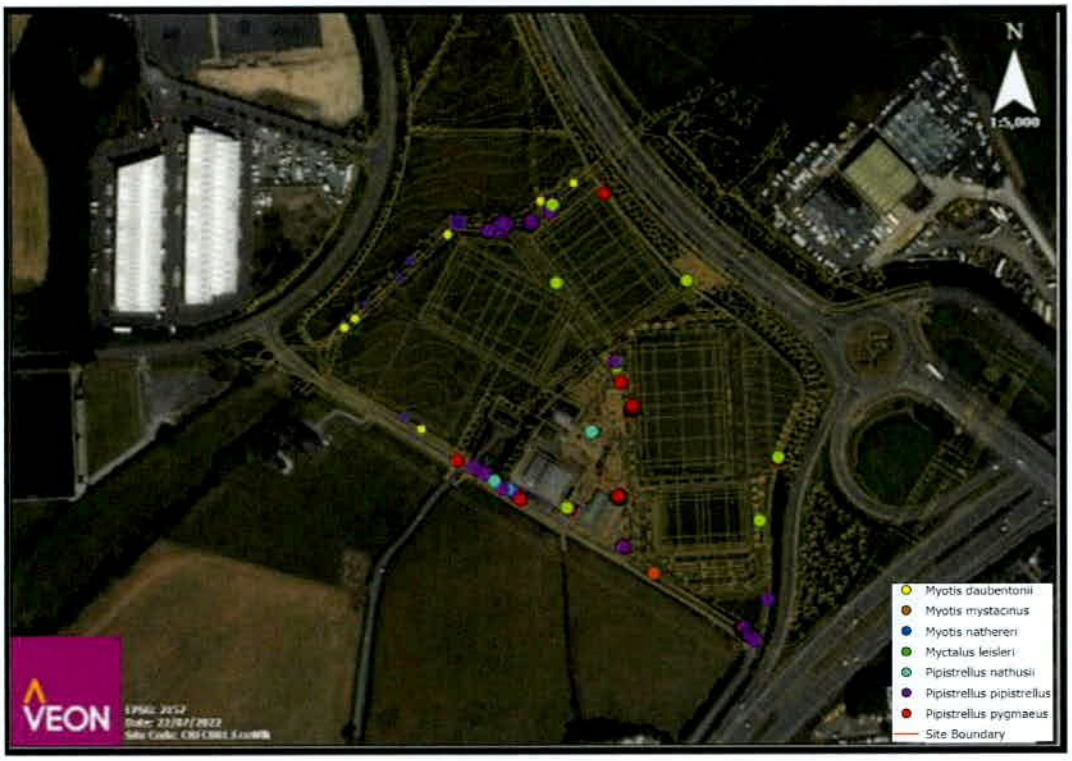

Figure 9: Combined Species activity Data from three Dusk and Dawn Surveys

Passive Static Bat Detector Survey

The Bat Activity Surveys determined that the River Camac represented a hotspot for Bat Activity on the site. While no roosts were recorded as present within the site, either in the trees or structures surveyed, the water courses to the West and South-West of the site (Camac River (FW1) and Baldonnell Upper (FW4)) were identified as important commuting and foraging areas for bats.

As such, a static bat detector (SM Mini Bat) was left to record in-situ from 30 minutes before sunset to 30 minutes after sunrise – subject to triggering – for five days (07.07.22 – 12.07.22).

The following table summarises the results recorded on the static unit deployed within the habitats of the survey area during the summer surveys:

Table 14: Results of Static Bat Detector deployed during Bat Activity Survey 2022

Static Code	Location Description	Survey Period	Bat Species	Bat Activity Level (average per night over 5 nights)
Static One (VECO 1)	Gate post at Concrete Footbridge over Camac River (West of site). Bridge 1, Grid Ref: O 05085 29394	07/07/2022 to 12/07/2022 (Five Nights)	Leis – 787 passes SP – 709 passes CP – 236 passes Daub – 3 passes NP – 1 pass Whis – 3 passes	Leis – Low to High SP – Low to High CP – Low to High Daub – Low to Neg. NP – Low to Neg. Whis – Low to Neg.

As a general guide, activity level is determined as follows: Low = <10 bat passes/hr; Medium = >10 - <50 bat passes/hr; High = >50 bat passes/hr). The static units recorded for approximately 8 hours per night.

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.

Six species of bat were recorded on the static unit over five nights of surveillance: Leisler's (*Nyctalus leisleri*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Whiskered (*Myotis mystacinus*), Daubenton's (*Myotis daubentonii*), and Nathusius' Pipistrelle (*Pipistrellus nathusii*).

These same species have been recorded elsewhere across the wider site during the walked transect activity surveys. No additional species were recorded, which suggest a level of consistency across the sites.

This is a high 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 (watercourse, grasslands, 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 Camac River.

The two watercourses in this area appear to form a continuous foraging and commuting habitat across the site.

The level of bat activity in this area indicates that the both the Baldonnell Upper and Camac River are important for the local bat populations.

Figure 10: Combined HH and Static Detector records

Habitat Survey

The study area has been mapped in detail following an Ecological walkover. A habitat map is presented below (See **Figure 10**). This provides essential information on the array of habitats fund on site and within the footprint of the project. Habitat identification follows: Fossitt (2000). *A Guide to Habitats in Ireland*, The Heritage Council, Kilkenny.

Figure 11: Habitat Map of site

The principal bat habitats on site are considered to be:

- Watercourses FW1, FW4
- Hedgerow, Woodland & Scrub WL1, WL2, WS1
- Grassland: GS2; GA1, GA2
- Built Land: BL3

Excluding Building Land category, the first three broad categories represent approximately 6.45ha of principal natural habitats considered to be suitable for foraging and commuting bats.

This is approximately 85% of the total area of the site footprint represented by the habitat survey (Approximate Total = 7.62 ha).

Amenity Grasslands (open space) make up approximately 6ha of that 6.45ha. Buildings (including artificial surfaces) currently represent approximately 1.17ha of the wider 7.62ha site and while these structures will remain, the majority of these are not suitable for roosting bats, both currently (as PRA demonstrated an absence of roots within these structures) and post renovation works.

Hedgerow and Treelines then account for approximately 0.45ha collectively across the site.

To facilitate the proposed development the following tree and hedge vegetation will need to be removed.

- c.8m of Hedgerow 1 to allow for a vehicular entrance to the new car park on the southern boundary
- c.8m of Tree Belt in Hedgerow 3 to allow for the pedestrian entrance on the northern boundary
- c.45m of Hedgerow 4 to allow for the sports field to the east.
- 5 ash trees in Hedgerow 4 to allow for the sports field to the east.
- c.110m of Hedgerow 5 to allow for the two sports field to the east and access to the new clubhouse

Based on the tree and hedge (WL1/2) removal above, it is calculated that the approximate loss of principal natural bat habitats in relation to the proposed development then is approximately 0.0176ha, which accounts for approximately 4% of the existing trees and hedgerows on site and should not exceed 1% (calculated at 0.23%) of the entire site at the most extreme.

It will however naturally fragment some commuting areas, namely in Hedgerow 5, so Veon Ecology recommends that the Developers consider at Bat Box Scheme around the existing and new building proposed.

The exact area of proposed hedgerow removal is actual subject to light pollution/spillage throughout the evening hours due to a north-facing floodlight located on the active agricultural shed (BL3) (*Grid reference O 05096 29181*) located approximately 90m to the South, which remains on all night. This building is located on Private property and is not part of the proposed development.

So, it is predicted that this particular aspect of the project will have a low to negligible residual impact on the local bat species. **See Impact Assessment Section** for more detailed discussion on potential impacts.

Of greatest significance for the local bat populations are the two watercourses situated in the West and South-west of the site, respectively. The Camac River (FW1) which flows along the most western

boundary of the project area for approximately 290m, and the Baldonnell Upper (FW4) which flows approximately 135m along the South-western boundary, at which point it connects with the Camac River (at approximately Grid reference: O 04909 29251).

No hedgerow and/or tree removal is expected to be removed in these areas, so the foraging community routes are not expected to be fragmented in this regard. The impact of light spillage is more of a consideration in these areas, though it is noted from the night-time surveys that these areas are already impacted to some degree by light pollution from the Commercial areas to the West and residential buildings to the East and South.

See Impact Assessment Section for more detailed discussion on potential Light impacts, specifically **Lighting Impacts.**

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
Daubenton's (*Myotis daubentonii*)*	✓	X	Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper.	Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper
Leisler's (*Nyctalus leisleri*)	✓	X	Along Broadleaf hedgerows and Treelines 1-6. Open Spaces on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper.	Along Broadleaf hedgerows and Treelines 1-6. Open Spaces on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper.
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	✓	X	Along Broadleaf hedgerows and Treelines 1-6. Open Spaces on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper. N7 'Dark Space' to East of public road.	Along Broadleaf hedgerows and Treelines 1-6. Open Spaces on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper. N7 'Dark Space' to East of public road.
Common Pipistrelle (*Pipistrellus pipistrellus*)	✓	X	Along Broadleaf hedgerows and Treelines 1-6. Open Spaces on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper. N7 'Dark Space' to East of public road.	Along Broadleaf hedgerows and Treelines 1-6. Open Spaces on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper. N7 'Dark Space' to East of public road.

Whiskered (*Myotis mystacinus*)*	✓	X	Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper. N7 'Dark Space' to East of public road	Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper. N7 'Dark Space' to East of public road.
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	✓	X	Open spaces within Agricultural buildings on site.	Open spaces within Agricultural buildings on site. Along watercourses and broadleaf treelines of Camac River and Baldonnell Upper.
Brown Long-eared (*Plecotus auritus*)	X	X	N/A	N/A
Lesser horseshoe (*Rhinolophus hipposideros)*	X	X	N/A	N/A
Natterer's (*Myotis nattereri)**	✓	X	Open spaces within Agricultural buildings on site.	Open spaces within Agricultural buildings on site.

Species Percentage

Table 16: Percentage of Bat Passes across surveys by Species

Species	DK1	DK2	DW1	Static 1	Collective Total
Leisler's (*Nyctalus leisleri*)	1	25	107	787	920
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	3	23	32	709	767
Common Pipistrelle (*Pipistrellus pipistrellus*)	15	37	26	236	314
Whiskered (*Myotis mystacinus*)	0	2	0	3	5
Daubenton's (*Myotis daubentonii*)	0	2	0	3	5
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	1	1	0	1	3
Total per survey	**20**	**90**	**165**	**1739**	**2014**

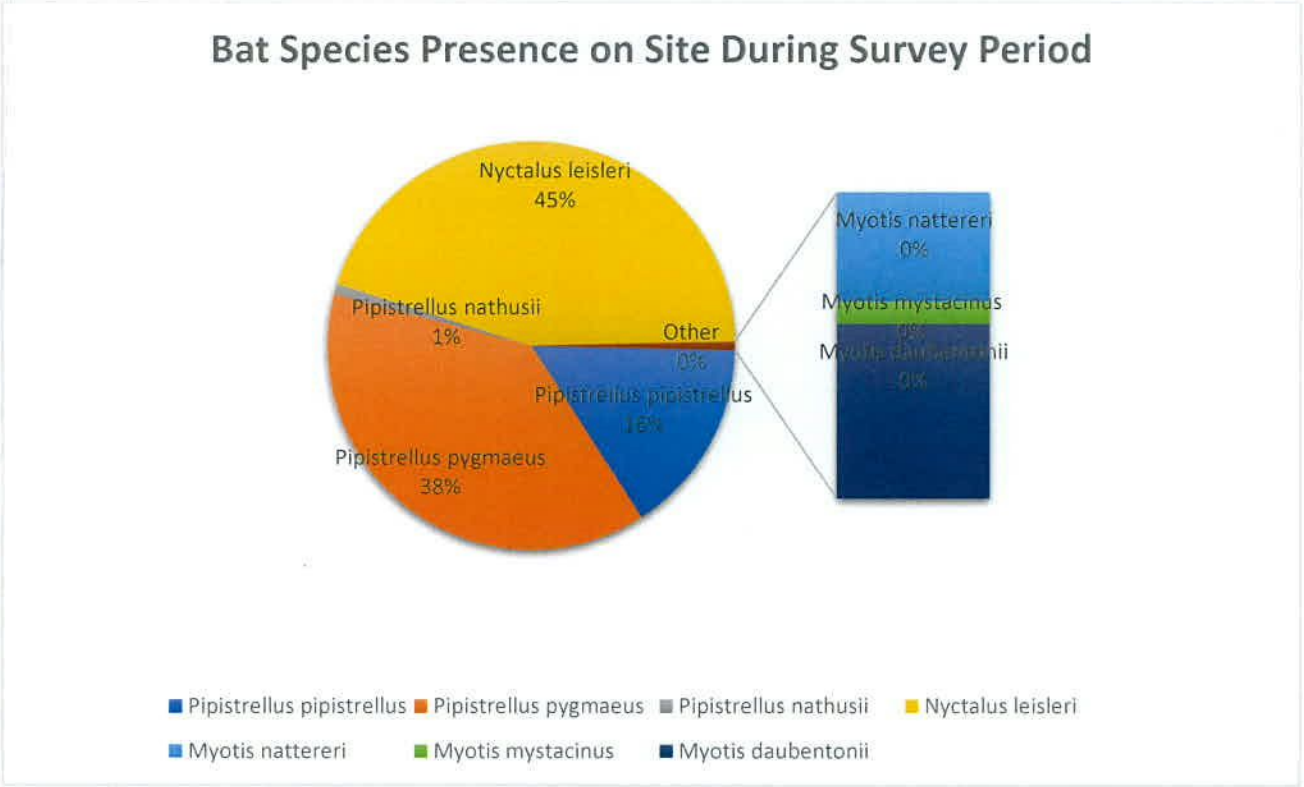

Figure 12: Percentage of Bat Passes across surveys by Species

Figure 13: Leisler's (Nyctalus leisleri) Bat Pass records

Figure 14: Common Pipistrelle (Pipistrellus pipistrellus) Bat Pass Records

Figure 15: Whiskered (Myotis mystacinus) Bat Pass Records

Figure 16: Nathusius' Pipistrelle (Pipistrellus nathusii) Bat Pass Records

Figure 17: Natterer's bat (Myotis nattereri) Bat Pass Recor

Figure 18: Daubenton's (Myotis daubentonii) Bat Pass Records

Hotspot

A 'Hotspot' for Bat activity was identified along the Camac River to the West of the site. Higher activity was recorded here consistently, with up to seven species present on any given night, namely: Leisler's, Soprano Pipistrelle, Common Pipistrelle, Whiskered (*Myotis mystacinus*), Daubenton's (*Myotis daubentonii*), Natterer's bat (*Myotis nattereri),* and Nathusius' Pipistrelle).

Activity was also higher to the south, correlating with the pathway of the Baldonnell Upper as it flows along the outside of the project footprint and the point it enters the South-west of the site inside the hedge boundary.

The 'Dark area' created through the loss of the three streetlights along the public road to the South-East has also promoted increased activity off site.

Desktop Review

Bat Conservation Ireland Database

Data was requested for a 1km and 10km radius of Irish Grid Reference N865614 from Bat Conservation Ireland but was not received at the time of compiling this report.

Included are distribution Maps for the Species detected on site within Dublin County:

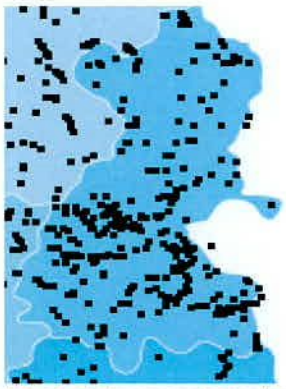

Figure 19: Soprano pipistrelle distribution in Dublin

Figure 20: Leisler's bat distribution in Dublin

Figure 21: Daubenton's bat distribution in Dublin

Figure 22: Whiskered bat distribution in Dublin

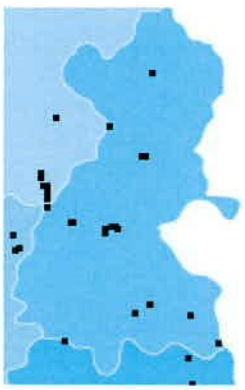

Figure 23: Natterers bat distribution in Dublin

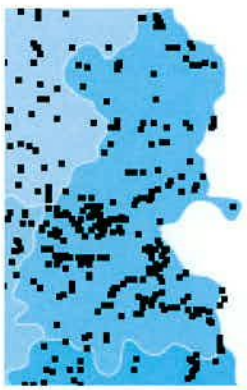

Figure 24. Common pipistrelle distribution in Dublin

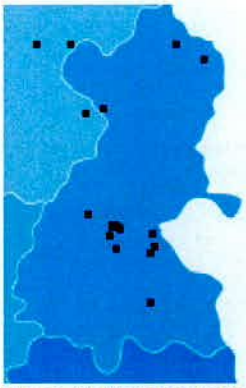

Figure 25: Nathusius' pipistrelle records for Dublin

National Biodiversity Data Centre (NBDC)

Bat Suitability Index

Figure 26: 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 Clondalkin Rugby Club site.

Table 17: BSI by Species (NBDC 2022)

Species (CN)	Species (LN)	BSI
All bats	All bats	39.67
Daubenton's bat	*Myotis daubentonii*	34
Whiskered bat	*Myotis mystacinus*	38
Natterer's bat	*Myotis nattereri*	42
Leisler's bat	*Nyctalus leisleri*	59
Nathusius' pipistrelle	*Pipistrellus nathusii*	20
Common pipistrelle	*Pipistrellus pipistrellus*	59
Soprano pipistrelle	*Pipistrellus pygmaeus*	50
Brown long-eared bat	*Plecotus auritus*	55
Lesser horseshoe bat	*Rhinolophus hipposideros*	0

The species of bats recording during the surveys generally correlate with the NBDC BSI, especially with regards to Leisler's, Common pipistrelle, 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^2 Record

The 10km radius of the Clondalkin Rugby Club lies within NBDC 10km Grid Square O02

Figure 27: NBDC 10kmx10km Grid Square

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

O02:

Table 18: NBDC Bat Records within o02 10kmx10km Grid Square

Species Name	Record Count	Date of Last Record	Title of Dataset
Brown Long-eared Bat (*Plecotus auritus*)	4	05/07/2012	National Bat Database of Ireland
Daubenton's bat (*Myotis daubentonii*)	52	21/08/2014	National Bat Database of Ireland
Leisler's Bat (*Nyctalus leisleri*)	20	18/09/2012	National Bat Database of Ireland
Natterer's bat (*Myotis nattereri*)	1	14/09/2011	National Bat Database of Ireland
Common Pipistrelle (*Pipistrellus pipistrellus*)	15	15/10/2012	National Bat Database of Ireland
Soprano pipistrelle (*Pipistrellus pygmaeus*)	12	05/08/2012	National Bat Database of Ireland

Historic NBDC Bat Presence records in geographical relation to the site at Kingswood Farm are as follows:

Figure 28: Historic Brown Long-eared Bat (Plecotus auritus) records (NBDC 2022)

Figure 29: Historic Daubenton's Bat (Myotis daubentonii) records (NBDC 2022)

Figure 30: Historic Leisler's Bat (Nyctalus leisleri) records (NBDC 2022)

Figure 31: Historic Natterer's Bat (Myotis nattereri) records (NBDC 2022)

Figure 32: Historic Common Pipistrelle Bat (Pipistrellus pipistrellus) records (NBDC 2022)

Figure 33: Historic Soprano pipistrelle Bat (Pipistrellus pygmaeus) records (NBDC 2022)

Figure 34: Historic Whiskered Bat (Myotis mystacinus) records (NBDC)

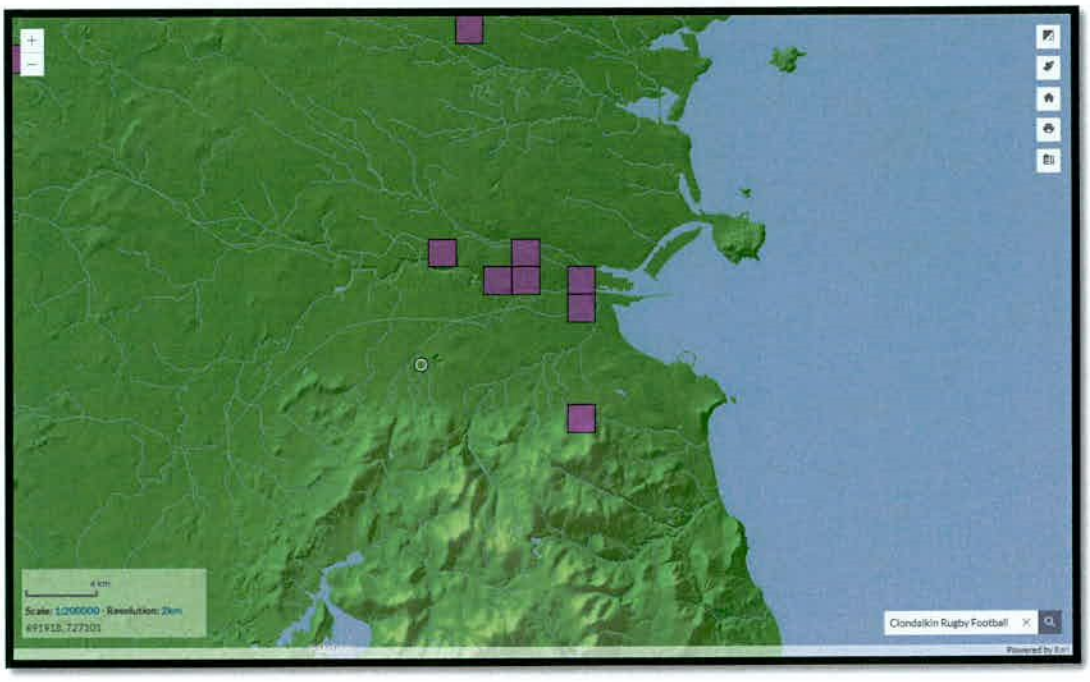

Figure 35: Historic Nathusius' pipistrelle Bat (Pipistrellus nathusii) records (NBDC 2022)

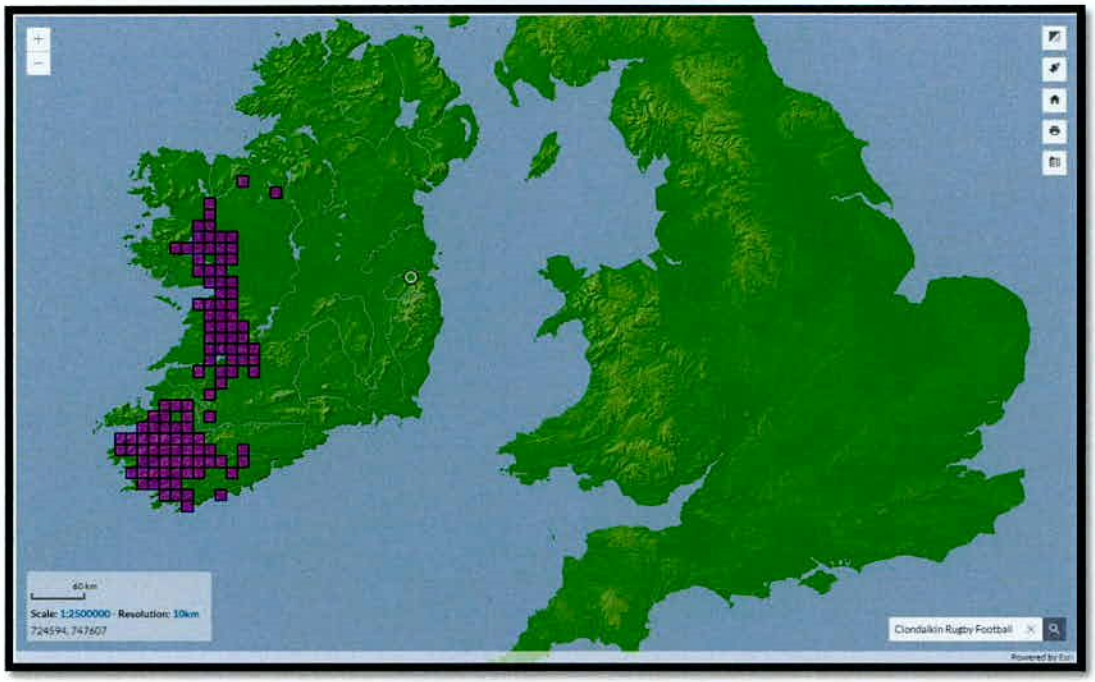

Figure 36: Historic Lesser horseshoe Bat (Rhinolophus hipposideros) records (NBD C2022)

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
Timing of surveys	The bulk of the surveys were completed during the summer maternity season (June to July 2020).
Survey Type Completed	Tree PBR Survey Static Detector Survey Dusk Bat Survey Dawn Bat Survey Walking Transect Endoscope Inspection Daytime Building Inspection Daytime Bridge Inspection
Weather conditions	Surveys were undertaken in appropriate weather conditions for the majority of surveys (Please see **Appendix** for details).
Constraints	Access to the East and North of site (outside boundaries) due to Significant Road Traffic and Health & Safety Issues Tree PBR inspected from ground level only Traffic Noise affected some recordings (Details below)
Survey Effort 2022 (Veon Ecology only) **Daytime Surveys hrs** 8hrs **Night-time Surveys hrs** 9hrs **Static Surveillance hrs** 45hrs (maximum) (Dawn to Dusk plus 30mins. 5 Nights) **Total hrs** 62hrs	**Summer Survey** Daytime Inspection of Agricultural Buildings (28.06.2022) Daytime Inspection of Tree lines and Hedgerows (28.06.2022) Dusk Surveys (28.06.2022, 07.07.2022) Dawn Surveys (12.07.2022) Walking Transects (28.06.2022, 07.07.2022, 12.07.2022) Static Surveillance (07.12.07.2022)
Extent of survey area	Kingswood Farm, Moneenalion Commons Lower, Clondalkin and public road (to south)
Equipment	All in good working order.

The extent of the surveys undertaken has achieved 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 the high volume of traffic in the local area, which continued throughout the night hours, 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. More pronounced areas where noise files were generated occurred in the south and south-west and North and North-East areas, respectively.

Myotis species

It should be noted that Heterodyne Systems and subsequent analysis software can sometimes have trouble distinguishing individual Myotis Spps. bat passes.

For instance, the Daubenton's bat has a characteristic echolocation call when typically foraging over water, but when it feeds outside this area, e.g. around trees, its echolocation calls become similar to other Myotis species such as Natterer's bat and Whiskered Bat, meaning it is not always possible to definitively identify the bat passes to species level.

Similarly, bats that are heard and sound like Myotis species but are not seen skimming a water surface may be another Myotis species. The Natterer's bat and Whiskered Bat records defined in this survey were infrequent and general occurred away from a water source.

Based on the above, where either the Natterer's bat and/or Whiskered Bat have been differentiated from Daubenton's, the Surveyor is confident in these identifications. The Static Detector also differentiated between Myotis Spps. Along the Camac River.

The historic NBDC and BCI bat records, although low frequency, have also recorded instances of the Natterer's bat and Whiskered Bat in the region, albeit in the wider area rather than local.

As such, some degree of caution should be taken with regards to the Natterer's bat and Whiskered Bat records, as it cannot be wholly-discounted that some/all of these are potentially Daubenton's bat passes.

Noise interference on site due to heavy traffic also added a constraint on some finite identification of Myotis species.

Where the surveyor heard the typical rapid clicking echolocation calls of a Myotis species and clearly saw the bat skimming the water surface, a determination of Daubenton's was given. So, the Daubenton's records can be regarded as 'Sure'.

Bat Ecological Evaluation

Bat Species Recorded & Sensitivity

A total of Seven bat species were confirmed foraging and commuting within Kingswood Farm, Moneenalion Commons Lower, Clondalkin, Co. Dublin.

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

Bat Species	Roosting	Foraging	Commuting
Leisler's (*Nyctalus leisleri*)	X	✓	✓
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	X	✓	✓
Common Pipistrelle (*Pipistrellus pipistrellus*)	X	✓	✓
Whiskered (*Myotis mystacinus*)	X	✓	✓
Daubenton's (*Myotis daubentonii*)	X	✓	✓
Nathusius' Pipistrelle (*Pipistrellus nathusii)*	X	✓	✓
Natterer's bat (*Myotis nattereri)*	X	✓	✓

Three of the bat species recorded were Common Pipistrelle, Leisler's bat, and Soprano Pipistrelle. These are the three most common bat species 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 noted as present within the trees, treelines, and hedgerows surveyed. Although some PRFs were identified in some of the more mature trees on site, mainly Ash.

Bat Foraging Habitat & Commuting Routes

While roosts are recorded as absent within the project area, the proposed development site is utilised as a foraging and commuting area for local bat populations of up to seven species of bat.

The following commuting routes were recorded (See **Mapped commuting routes** below), while foraging was recorded throughout the Kingswood Farm, Moneenalion Commons Lower, Clondalkin, Co. Dublin.

All bat species recorded general navigated as expected via linear land features. East to West was navigated primarily via the public road to the south of the site and tracking the routes of the water course.

North to South was primarily via the Camac River and Hedgerow 2. Some North-South routes were intermittent across the site via the Hedgerows (6, 4, and 5). There was reduced commuting in this area due to Noise of Heavy Traffic on N7 and light spill/pollution from the roadside lighting.

In the South-East of the site, three street lights were not functional, creating a Dark Zone, which featured very high Bat activity.

This indicates that there are well-connected commuting and foraging routes to the East and West of the site. Very little activity (singular passes) was recorded of Bats crossing East to West across the open spaces (amenity grasslands) within the wider footprint of the project site.

Figure 37: Mapped Bat commuting routes at Kingswood Farm

Solid Blue line: All species, continuous activity/
Broken line: Leisler's and Pipistrelle Spps. Low activity, intermittent. Commuting route

Zone of Influence – Bat Landscape Connectivity

Due to the availability of linear hedgerow and treeline habitats within the site and the presence of the River Camac and Baldonnell Upper watercourses, Kingswood Farm provides important commuting habitat for local bat populations.

On examination of the landscape around Kingswood Farm, the riverine habitats are particularly important bat habitat resource in a largely agricultural landscape.

A 'Hotspot' for Bat activity was identified the West of the site along the Camac River to. Higher activity was recorded here consistently, with up to seven species present on any given night, namely: Leisler's, Soprano Pipistrelle, Common Pipistrelle, Whiskered (*Myotis mystacinus*), Daubenton's (*Myotis daubentonii*), Natterer's bat (*Myotis nattereri),* and Nathusius' Pipistrelle).

Activity was also higher to the south, correlating with the pathway of the Baldonnell Upper as it flows along the outside of the project footprint and the point it enters the South-west of the site inside the hedge boundary.

Separately, the 'Dark area' created through the loss of the streetlights in the South-East has also promoted increased 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 Kingswood Farm are all of "Least Concern" (Table 1, Section 1.1.5).

The bat ecological evaluation of Kingswood is presented for each of the bat species recorded during the bat surveys. Due to the high bat biodiversity Kingswood Farm is considered 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.

Within the Kingswood Farm site, the Camac River is of High Local Importance for local foraging and commuting bats species, while the Hedgerows, Treelines, and Amenity Grasslands, appear to be of Lower Local Importance in relation to the Camac River and the Baldonnell Upper drainage stream.

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

Bat Species	**Survey Results**	**Evaluation Value**
Leisler's (*Nyctalus leisleri*)	Foraging habitat Commuting routes	Local importance – Kingswood Farm and immediate surroundings, County Dublin
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Foraging habitat Commuting routes	Local importance – Kingswood Farm and immediate surroundings, County Dublin
Common Pipistrelle (*Pipistrellus pipistrellus*)	Foraging habitat Commuting routes	Local importance – Kingswood Farm and immediate surroundings, County Dublin
Whiskered (*Myotis mystacinus*)	Foraging habitat Commuting routes	County Importance – County Dublin
Daubenton's (*Myotis daubentonii*)	Foraging habitat Commuting routes	Local importance – Kingswood Farm and immediate surroundings, County Dublin
Nathusius' Pipistrelle (*Pipistrellus nathusii)*	Foraging habitat Commuting routes	County Importance – County Dublin
Natterer's bat (*Myotis nattereri)*	Foraging habitat Commuting routes	County Importance – County Dublin

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 dying trees, such as the Elm in 'Hedgerow 4' present current and future Potential Roost Features - suitable for use by individual bats, at least. However these trees account for only a small fraction of trees present and overall, there is planned retention and enhancement of linear habitat features proposed as part of the landscape strategy for the proposed development site.

Foraging and commuting areas were recorded extensively throughout the proposed development area primarily along the water courses but also the hedgerows and treelines within the proposed development site and adjacent to the proposed development area and along the River Camac and the Baldonnell Upper. The Seven 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 at Kingswood Farm, accounting for around 46% of all bat passes.

There are some active and derelict agricultural buildings located within the survey area, with plans as part of this project to re-purpose and change use of the former. No bat roosts were recorded in any of the buildings surveyed on site in 2022.

Agricultural arable/grasslands/paddocks.

This habitat is present within the survey area as agricultural blocks surrounded by linear habitats. These agricultural blocks and associated hedgerows/treeline boundaries provide foraging habitats for all of the bat species recorded. Amenity Grasslands (open space) make up approximately 6ha of that 6.45ha. May be considered as Medium ecological value.

Hedgerows, scrub and treeline boundaries, access roads/tracks.

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 roots 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.

Hedgerow and Treelines then account for approximately 0.45ha collectively across the site. Based on the tree and hedge (WL1/2) removal proposed in the project, it is calculated that the approximate loss of principal natural bat habitats in relation to the proposed development amounts to approximately 0.0176ha, which accounts for approximately no more than 4% of the existing trees and hedgerows on site and should not exceed 1% (calculated at 0.23%) of the entire site at the most extreme.

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

Watercourses

The Camac River and the Baldonnell Upper (as a tributary to the Camac River at a point located on site) flows through Kingswood Farm. The Camac River and is an important habitat in both the local and the wider landscape. These linear habitats are also essential for commuting and foraging bats. May be considered as High ecological value.

There is approximate 430m of combined waterbodies within the site (approximately 300m of the Camac River and 130m of the Baldonnell Upper) interconnected and located within the South-West and Western boundaries. and it is estimated that the proposed development will result in no loss of this habitat type.

Buildings and structures

Several operation and non-operational agricultural buildings are located within the Kingswood Farm site, none of which were recorded as bat roosts for any of the seven bat species recording as present within the wider site nor for any other Bat Species.

Buildings (including artificial surfaces) currently represent approximately 1.17ha of the wider 7.62ha site and while these structures will remain, the majority of these are not suitable for roosting bats, both currently (as PRA demonstrated an absence of roots within these structures) and post renovation works. These are therefore be considered as Low ecological value.

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 (*Nyctalus leisleri*)
Soprano Pipistrelle (*Pipistrellus pygmaeus*)
Common Pipistrelle (*Pipistrellus pipistrellus*)
Whiskered (*Myotis mystacinus*)
Daubenton's (*Myotis daubentonii*)
Nathusius' Pipistrelle (*Pipistrellus nathusii*)
Natterer's bat (*Myotis nattereri*)

This represents seven of the nine residence bat species known to Ireland, eight known to occur in County Dublin. 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 relocation of the existing Clondalkin RFC grounds at Gordon Park to new lands at Kingswood Farm, Moneenalion Commons Lower Clondalkin and comprising of four new rugby playing pitches, including:

- a high-quality main competition pitch (with modern directional floodlighting comprising 18m high floodlighting columns either side)
- a high-quality Junior pitch both laid approximately level
- and two back pitches as well as various grassed rugby training areas all laid on existing land cross fall levels

The project also involves:

- change of use of existing agricultural shed to accommodate new two storey changing facility and storage areas
- a new two storey Clubhouse Pavilion with supporting facilities including dressing rooms, physio rooms, coffee dock, committee rooms, members bar and lounge, plantroom, and toilets
- all associated site development sustainability and infrastructure work including connection to existing public foul sewer, SUDs, sedum roof and PV roof panels
- new landscaping throughout the site comprising trees, hedges, and wildflower areas
- new cycle track and pedestrian access and stairs off the R136, bicycle shelter, children's playground area, electrical car charging stations, vehicle parking and new vehicle entrance off the Old Country Roadway

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

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

To facilitate the proposed development the following tree and hedge vegetation will need to be removed.

- c.8m of 'Hedgerow 1' to allow for a vehicular entrance to the new car park on the southern boundary
- c.8m of combined Treeline and Hedging along 'Hedgerow 3' combined to allow for the pedestrian entrance on the northern boundary
- c.45m of 'Hedgerow 4' to allow for the sports field to the east
- 5 ash trees within the treeline of 'Hedgerow 4' to allow for access to the sports field to the east
- c.110m of 'Hedgerow 5' to allow for the two sports field to the east and access to the new clubhouse

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**	**Whisk**	**Natt**	**Daub**
Renovation and repurposing of Agricultural buildings Loss of roots	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)
Removal of linear habitats Loss of foraging and commuting habitat	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**
Removal of trees Loss of tree roosts	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)
Operation of the development site Increased lighting and human activity (noise levels).	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport

Infrastructure Including new Carparks, Playgrounds, Facility buildings	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport	**Minor-Moderate** Site is already impacted by light spill and noise from Motorway, Commercial buildings, and nearby Airport
Lighting of development area Reduced foraging Reduced commuting	**Moderate-Major** Project to convert site to a Sports Ground Use of Floodlights	**Moderate-Major** Project to convert site to a Sports Ground Use of Floodlights	**Moderate-Major** Project to convert site to a Sports Ground Use of Floodlights	**Moderate** Project to convert site to a Sports Ground Use of Floodlights	**Moderate-Major** Project to convert site to a Sports Ground Use of Floodlights	**Moderate-Major** Project to convert site to a Sports Ground Use of Floodlights	**Moderate-Major** Project to convert site to a Sports Ground Use of Floodlights

SP = soprano pipistrelle, CP = common pipistrelle, Leis = Leisler's bat, BLE = brown long-eared bat, Whis = whiskered bat, Natt = Natterer's bat & Daub = Daubenton's bat.

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 footprint of the proposed route 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 *Myotis* species and brown-long-eared bats

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. According to the Arboricultural Assessment conducted at Kingswood Farm, Moneenalion Commons, Lower Clondalkin, Dublin 22 (See accompanying report *Clondalkin Rugby Club Tree Survey Report*) the loss of the proposed trees and hedgerows on site is to be mitigated by:

"...the landscaping of this completed development with the use of trees, shrubs, hedging, herbaceous perennial, and bulb planting. This planting will be in the new beds that surround the car parking spaces, along the internal paths, and the tree lines and hedging that will partition the playing fields. This planting will complement the development and its incorporation into the surrounding area. It will also help to provide good quality, sustainable, long-term tree cover and, as it establishes and grows, it will be continuously mitigating any negative impacts created with the loss of the existing tree and hedge vegetation.

A mix of tree species, forms, and sizes, including the use of semi-mature trees, will form a strong and unifying element to the landscape areas, ideally with the use native species such as oak, birch, alder, and Scots pine in open spaces; whitebeam, hornbeam, and cherry bird in smaller spaces and near structures; and hazel, yew, holly as hedging plants.

This replanting will provide more long-term tree cover for the area than the trees that need to be removed could provide, as they are all in decline from 'ash dieback', i.e. Tree No.0397 and Tree Line No.3. A veteran ash tree, Tree No.0394, is showing some resistance to infection by 'ash die back' and this tree along with the northern section of Hedge No.4 is to be retained and incorporated into the finished development due to their value to the area.

The proposed development will see no alteration to existing ground levels, so water availability or waterlogging issues for the tree and hedge vegetation is not expected. All the peripheral boundary's tree and hedge vegetation is to be retained, except for the small entrance areas on the northern and southern side of the site area. The main vegetation that will need removal is the internal hedges between fields, but the planned landscape planting for the development will outweigh the amount of vegetation lost to facilitate the development, and the regular maintenance that this facility will receive will add to the longevity of the vegetation within it.

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

The landscape planning team have provided confirmation that the above measures will be implemented as part of the landscaping for the proposed development.

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:

- Planting of new native hedgerow, with individual trees between the boundary of the amenity fields West of the site (increase commuting habitat) and the 10m set-back from the banks of the Camac River and Baldonnell Upper (buffer in relation to potential lighting along the watercourses in the West & South-West corner).
- It is proposed that a Bat Box scheme is considered to facilitate the continuity of any fragmented corridors, were feasible.

Lighting plan

The lighting plan report titled "*Clondalkin RFC Lighting Report*" Conor O'Bryne, Lighting Director, Wink for Cummins & Voortman Ltd. Architects (July 2022) provides details of the external outdoor lighting plan for the proposed development site.

Any recommendations within this plan were made independently to this Bat report and in advance of it being conducted.

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 should 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 should 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 should 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 should be used to prevent overspill.

There should be no direct illumination of known bat roosts. Lights should be positioned to avoid sensitive areas and restricted so that there are dark areas.

The timing of lights should 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** below:

Cycle Bridge

As the cycle bridge is positioned across the Camac River within a bat hotspot. Lighting must be kept to a minimum to avoid major negative impacts and a fragmentation of a commuting and foraging route. Recommendations are the consideration of some form of motion-activated timed lighting scheme, with low hooded/directional lighting away from the watercourse.

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

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

Bats are light sensitive bats species, hence their nocturnal activities. Of the seven bat species recorded foraging and commuting within the survey area, three of the bat species are light sensitive (Rydall Category 4):

Whiskered, Daubenton's, and Natterer's.

Three 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, Camac River and Baldonnell Upper.

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.

- Camac River and Baldonnell Upper.
- Specific Dark Zones

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.

- Camac River and Baldonnell Upper.
- Specific Dark Zones

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 in to zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected.

- Additional landscaping measures to crease 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 since 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.

Crucial points in relation to a proposed lighting plan:

- Continuous dark corridor required along the Camac River
- No light spill onto the Camac River and adjacent tree/hedge line from the proposed development
- Dark Zone and dark corridors required in vicinity of the Camac River and
- Essential to provide areas of dark corridor connectivity within the proposed development site to allow local bat populations to commute through area

Sportsground Flood Lighting

The following are recommendations, based on recent Planning Applications regarding Bats and Sports Flood lighting:

The use of asymmetric beam floodlights, as opposed to symmetric ones, orientated so that the glass of the luminaries is positioned parallel to the ground is recommended.

This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light.

General recommendations for lighting of Sport Playing Pitches:

1. Lighting levels of 3 Lux or less where feasible.
2. Buffer zone of 50m between areas requiring lighting (e.g. flood lights, pedestrian lights, and car parks) and habitats (e.g. treelines, hedgerows, and woodland).
3. No lighting adjacent to rivers or lakes.
4. Use lighting with no UV component

It is recommended that a bat survey should be undertaken annually at the site of the proposed floodlights, typically for a period of three years following commencement of operation of the development.

The survey should be undertaken by an ecologist with appropriate qualifications, training, and experience in bat surveys, and should 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 should incorporate appropriate time periods during which the development is in operation and otherwise. Any survey reports should 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.

The proposed floodlights should not operate outside the hours of 16:00 (4pm) to 21:30 (9:30pm) on any day and should be confined to the months of October to March only.

Reason: To protect bats in the area during times of activity

Leisler's bats 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.

Floodlights 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.

Dark Zones: Camac River

In relation to the recommendation made above, while it is recognised that the Western playing fields may require some lighting, it is recommended that there are dark zones in the specific areas along the watercourses. The aim is to ensure that there is a value of 0 LUX level in the tree canopy to allow bats to fly and no more than 5 LUX level at ground level from any artificial lighting installed adjacent to the zone. All of the lighting installed should also strictly meeting the guidelines according to the BCT (2018).

Reason: to allow light sensitive bat species to fly between the mature hedgerows and watercourses in the West and South West corners.

In addition, there should be minimum external lighting (any lighting required should only shine downwards to reduce sky glow).

Existing Light pollution areas on site

The area of proposed hedgerow removal to allow the building of the clubhouse is already subject to light pollution/spillage throughout the evening hours due to a north-facing floodlight located on the active agricultural shed (BL3) (*Grid reference O 05096 29181*) located approximately 90m to the South, which remains on all night.

This building is located on Private property and is not part of the proposed development.

Photograph 1: Light Spill in Exiting Environment

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 the access route needs to be designed to ensure that there are dark corridors to allow bat movement between habitats on either side of the 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. A 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	Whisk	Natt	Daub
Renovation and repurposing of Agricultural buildings	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)
Removal of linear habitats	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**
Minimise loss of foraging and commuting habitat Replacement planting							
Removal of trees	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)	**Not Applicable** (No Roosts)
Tree planting							
Operation of the development site	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**	**Minor**	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**
Additional planting to buffer noise and lighting impacts Bat friendly lighting plan							
Lighting of development area	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**	**Minor**	**Moderate**	**Moderate**	**Moderate**
Implement bat friendly lighting plan Ensure that dark zones are achieved							
Infrastructure	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**	**Minor-Moderate**

SP = soprano pipistrelle, CP = common pipistrelle, Leis = Leisler's bat, BLE = brown long-eared bat, Whisk = whiskered bat, Natt = Natterer's bat & Daub = Daubenton's bat.

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 (*Nyctalus leisleri*)
Soprano Pipistrelle (*Pipistrellus pygmaeus*)
Common Pipistrelle (*Pipistrellus pipistrellus*)
Whiskered (*Myotis mystacinus*)
Daubenton's (*Myotis daubentonii*)
Nathusius' Pipistrelle (*Pipistrellus nathusii*)
Natterer's bat (*Myotis nattereri*)

- This represents seven of the nine resident bat species known to Ireland and eight resident bat species in County Dublin.
- 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.

Recommended bat mitigation and compensatory measures for consideration, in summary, include:

- Bat sensitive Lighting Plan
- Additional landscaping
- Creation of Dark Zone at Camac River and Baldonnell Upper
- Bat box Scheme

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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Appendices

Appendix 1 - Photographs

Structure 1 and Structures 3 – External

Structure 1 External

Structure 1 Internal

Structure 1 Internal

Structure 2 External

Structure 2 Internal

Structure 3 External

Structure 3 External

Structure 3 Internal

Structure 3 Internal

Bridge 1 (With Static Recorder)

Bridge 2

Amenity Grassland (Recolonising) (GA2) – East

Amenity Grassland (Recolonising) (GA2) – East

Amenity Grassland (Recolonising) (GA2) – East

Amenity Grassland (Recolonising) (GA2) – East

Amenity Grassland (Recolonising) (GA2) – West

Amenity Grassland (Recolonising) (GA2) – West

Camac River (by Bridge)

Camac River (by Bridge)

Hedgerow 1

Hedgerow 2

Hedgerow 3

Hedgerow 4

Hedgerow 5

Hedgerow 6

Example of Trees with PRFs in HR4

Example of Trees with PRFs in HR4

Baldonnell Upper

Baldonnell Upper

Appendix 2 – Data Files

Weather conditions during the survey dates and times

Date	Time	Temperature (°C)	Weather Conditions	Survey Type
28/06/2022	21:31 – 22:30	14 - 17	Cloudy	First dusk emergence survey; walking transects of survey area
	22:30 – 22:59	14 - 15	Cloudy	First dusk emergence survey; walking transects of survey area
07/07/2022	21:52 – 23:00	18 - 20		Second dusk emergence survey; walking transects of survey area
	23:00 – 00:02	17 - 18		Second dusk emergence survey; walking transects of survey area
13/07/2022	03:59 – 05:01	13 - 16		First dawn re-emergence survey; walking transects of the survey area

Bat level activity by date using the static detector (Bat activity is the total number of bat recordings divided by recorded hours per day; Low = <10 bat recordings/hr; Medium = >10 - <50 bat recordings/hr; High = >50 bat recordings/hr)

Date	SP	Activity level	CP	Activity level	NP	Activity Level	LB	Activity Level	WB	Activity Level	NB	Activity Level	DB	Activity Level
07/07/2022	30	6	14	2.8	2	0.4	33	6.6	-	-	1	0.2	1	0.2
08/07/2022	130	17.3	33	4.4	3	0.4	98	13.1	-	-	-	-	2	0.3
09/07/2022	105	14	27	3.6	2	0.3	112	14.9	-	-	-	-	2	0.3
10/07/2022	111	14.8	29	3.9	1	0.13	170	22.7	-	-	1	0.13	1	0.13
11/07/2022	123	16.4	61	8.13	4	0.53	232	30.9	-	-	1	0.13	1	0.13
12/07/2022	232	29	62	7.8	1	0.13	193	24.1	-	-	-	-	-	-
13/07/2022	53	10.6	27	5.4	2	0.4	69	13.8	-	-	1	0.2	1	0.2

SP – Soprano pipistrelle; CP – Common pipistrelle; NP – Nathusius' pipistrelle; LB – Leisler's bat; WB – Whiskered bat; NB – Natterer's bat; DB – Daubenton's bat; 07/07/2022 – 5 hours recording; 08/07/2022 – 7.5 hours recording; 09/07/2022 – 7.5 hours recording; 10/07/2022 – 7.5 hours recording; 11/07/2022 – 7.5 hours recording; 12/07/2022 – 8 hours recording; 13/07/2022 – 5 hours recording

Bat level activity by date using the handheld detectors (Bat activity is the total number of bat recordings divided by recorded hours per day; Low = <10 bat recordings/hr; Medium = >10 - <50 bat recordings/hr; High = >50 bat recordings/hr)

Date	SP	Activity level	CP	Activity level	NP	Activity Level	LB	Activity Level	WB	Activity Level	NB	Activity Level	DB	Activity Level
28/06/2022	2	1.3	34	22.7	1	0.7	1	0.7	-	-	-	-	-	-
07/07/2022	23	9.2	43	17.2	2	0.8	38	15.2	1	0.4	1	0.4	-	-
13/07/2022	1	1	1	1	-	-	6	6	-	-	-	-	-	-

SP – Soprano pipistrelle; CP – Common pipistrelle; NP – Nathusius' pipistrelle; LB – Leisler's bat; WB – Whiskered bat; NB – Natterer's bat; DB – Daubenton's bat; 28/06/2022 – 1.5 hours of recording; 07/07/2022 – 2.5 hours of recordings; 13/07/2022 – 1 hour of recordings

Summary data for the first dusk survey conducted on 28/06/2022

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450001	28/06/2022 22:31	Noise	Custom	0	0	0	0	0	0	17	53.3026	-6.4233
44450002	28/06/2022 21:38	Noise	Custom	1	23.2	24.7	22.9	7.2	0	16	53.30271	-6.42341
44450003	28/06/2022 22:02	Noise	Custom	1	23.2	24.7	22.9	7.9	0	15	53.30295	-6.42361
44450004	28/06/2022 22:08	Pipistrellus nathusii	Reviewed	10	40.5	41.1	39.9	7.7	110	15	53.30295	-6.4236
44450005	28/06/2022 22:15	Noise	Custom	0	0	0	0	0	0	15	53.30305	-6.42334
44450006	28/06/2022 22:21	*Pipistrellus pipistrellus*	Reviewed	6	48.3	51	47.7	5	311	15	53.30455	-6.4241
44450007	28/06/2022 22:22	*Pipistrellus pipistrellus*	Reviewed	7	50.9	63.7	50.2	5	80	15	53.30463	-6.42408
44450008	28/06/2022 22:29	*Pipistrellus pipistrellus*	Reviewed	3	49.4	51.3	48.7	5.7	235	14	53.30445	-6.42437
44450009	28/06/2022 22:29	*Pipistrellus pipistrellus*	Reviewed	2	48.3	54.1	47.7	6.6	338	14	53.30446	-6.42438
44450010	28/06/2022 22:29	Noise	Custom	0	0	0	0	0	0	14	53.30446	-6.42438
44450011	28/06/2022 22:30	*Pipistrellus pipistrellus*	Reviewed	1	49.7	54.6	49.1	2.6	0	14	53.30446	-6.42437

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450012	28/06/2022 22:30	*Pipistrellus pipistrellus*	Reviewed	7	50.3	56.4	49.3	4.5	143	14	53.30446	-6.42435
44450013	28/06/2022 22:30	*Pipistrellus pipistrellus*	Reviewed	3	50.3	52.2	48.6	3.7	474	14	53.30447	-6.42433
44450014	28/06/2022 22:30	*Pipistrellus pipistrellus*	Reviewed	4	48	49.9	47.6	5.6	126	14	53.30448	-6.42434
44450015	28/06/2022 22:31	*Pipistrellus pipistrellus*	Reviewed	4	48.8	52.1	48.3	5	118	14	53.30448	-6.42435
44450016	28/06/2022 22:31	*Pipistrellus pipistrellus*	Reviewed	1	47.3	49.4	47	5.2	0	14	53.30447	-6.42434
44450017	28/06/2022 22:31	*Pipistrellus pipistrellus*	Reviewed	4	48.5	52.2	48.3	5.4	415	14	53.30447	-6.42434
44450018	28/06/2022 22:31	*Pipistrellus pipistrellus*	Reviewed	4	49	49.9	48.7	5	430	14	53.30448	-6.42432
44450019	28/06/2022 22:31	*Pipistrellus pipistrellus*	Reviewed	1	50	54.3	48.8	5.2	0	14	53.30448	-6.42432
44450020	28/06/2022 22:31	*Pipistrellus pipistrellus*	Reviewed	4	48.5	50.8	48.3	5	232	14	53.30448	-6.42433
44450021	28/06/2022 22:32	*Pipistrellus pipistrellus*	Reviewed	1	48.5	56.7	47.6	5.9	0	14	53.30446	-6.42462

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450022	28/06/2022 22:32	*Pipistrellus pipistrellus*	User	0	0	0	0	0	0	14	53.30446	-6.42463
44450023	28/06/2022 22:32	*Pipistrellus pipistrellus*	Reviewed	8	48.6	53.4	47.9	5	171	14	53.30446	-6.42464
44450024	28/06/2022 22:33	*Pipistrellus pipistrellus*	User	2	47.9	52.2	47.7	5.9	321	14	53.30446	-6.4247
44450025	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	4	49	54.7	48	5.6	345	14	53.30445	-6.4247
44450026	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	1	47.3	48.5	47	5.2	0	14	53.30445	-6.4247
44450027	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	5	48.4	54	48.1	5	319	14	53.30445	-6.4247
44450028	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	3	47.6	51.6	47.2	5.2	419	14	53.30444	-6.4247
44450029	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	4	48.6	53.1	48.3	5	201	14	53.30443	-6.42469
44450030	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	4	49.3	54.7	49	4.3	318	14	53.30443	-6.42468
44450031	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	2	49.3	55.1	49.1	4.3	514	14	53.30443	-6.42468

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450032	28/06/2022 22:33	*Pipistrellus pipistrellus*	Reviewed	1	49.1	52.5	48.5	4.6	0	14	53.30443	-6.42474
44450033	28/06/2022 22:34	*Pipistrellus pipistrellus*	Reviewed	6	48.6	50.6	47.4	7	125	14	53.30441	-6.42486
44450034	28/06/2022 22:34	*Pipistrellus pipistrellus*	User	2	49	51.5	48	4.6	248	14	53.30441	-6.42486
44450035	28/06/2022 22:34	*Pipistrellus pipistrellus*	Reviewed	4	48.5	52.5	47.7	5.9	133	14	53.30442	-6.42486
44450036	28/06/2022 22:34	*Pipistrellus pipistrellus*	Reviewed	1	48.5	50	48.2	6.6	0	14	53.30442	-6.42486
44450037	28/06/2022 22:34	*Pipistrellus pipistrellus*	Reviewed	3	48.2	52.9	47.8	5	212	14	53.30441	-6.42486
44450038	28/06/2022 22:34	*Pipistrellus pipistrellus*	Reviewed	3	48.6	53.8	48.1	4.6	125	14	53.30442	-6.42486
44450039	28/06/2022 22:34	Noise	Custom	0	0	0	0	0	0	14	53.30444	-6.42498
44450040	28/06/2022 22:35	Noise	Custom	1	25.6	25.6	25.3	60.3	0	14	53.30443	-6.42492
44450041	28/06/2022 22:35	*Pipistrellus pipistrellus*	User	3	48.3	52.3	47.6	5.6	242	14	53.30446	-6.42472

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450042	28/06/2022 22:35	*Pipistrellus pipistrellus*	Reviewed	7	50.4	54	49.7	3	90	14	53.30447	-6.42469
44450043	28/06/2022 22:37	*Pipistrellus pygmaeus*	Reviewed	18	54.7	69	54.5	4	83	14	53.30469	-6.42345
44450044	28/06/2022 22:40	*Pipistrellus pygmaeus*	Reviewed	40	52.2	62	51.8	5	80	15	53.30404	-6.42244
44450045	28/06/2022 22:40	*Nyctalus leisleri*	Reviewed	9	24.7	27.3	24	10	222	15	53.30405	-6.42243
44450046	28/06/2022 22:54	Noise	Custom	0	0	0	0	0	0	14	53.30305	-6.42172
44450047	28/06/2022 22:54	Noise	Custom	0	0	0	0	0	0	14	53.30305	-6.4219
44450048	28/06/2022 22:55	Noise	Custom	2	18.6	18.6	17.4	4.6	0	14	53.30308	-6.42212
44450049	28/06/2022 22:58	Noise	Custom	2	20.1	20.1	20.1	42.3	125	14	53.30262	-6.42346
44450050	28/06/2022 22:59	Noise	Custom	0	0	0	0	0	0	14	53.30262	-6.42346

Summary data for the second dusk survey conducted on 07/07/2022

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450001	07/07/2022 21:52	Noise	Custom	0	0	0	0	0	0	19		
44450002	07/07/2022 21:53	Noise	Custom	0	0	0	0	0	0	20	53.30405	-6.42399
44450003	07/07/2022 22:04	*Nyctalus leisleri*	User	14	20.3	20.6	20	18	508	19	53.30246	-6.42324
44450004	07/07/2022 22:12	*Nyctalus leisleri*	User	2	21.4	21.5	21.2	6.2	459	19	53.30245	-6.42324
44450005	07/07/2022 22:12	*Nyctalus leisleri*	User	14	20.8	21.3	20.4	19	450	19	53.30245	-6.42324
44450006	07/07/2022 22:12	*Nyctalus leisleri*	User	9	21.4	21.9	21	13.8	277	19	53.30245	-6.42325
44450007	07/07/2022 22:12	*Nyctalus leisleri*	User	4	20.4	20.7	19.9	14.7	343	19	53.30245	-6.42325
44450008	07/07/2022 22:13	*Nyctalus leisleri*	User	23	21.5	22.3	21.1	15	280	19	53.30245	-6.42325
44450009	07/07/2022 22:16	*Nyctalus leisleri*	User	17	20.7	21.1	20.3	16	320	19	53.30246	-6.42327
44450010	07/07/2022 22:21	*Nyctalus leisleri*	Reviewed	45	22.6	24.5	21.8	18	295	19	53.30245	-6.42327
44450011	07/07/2022 22:21	*Nyctalus leisleri*	User	2	22.4	22.9	22.1	5.9	473	19	53.30245	-6.42327
44450012	07/07/2022 22:27	*Nyctalus leisleri*	Reviewed	41	22.5	24.2	21.8	17	335	19	53.30245	-6.42326

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450013	07/07/2022 22:27	*Nyctalus leisleri*	User	2	21.4	22.1	20.9	15.7	345	19	53.30245	-6.42327
44450014	07/07/2022 22:28	*Nyctalus leisleri*	Reviewed	4	22	22.3	21.3	13.1	327	19	53.30246	-6.42328
44450015	07/07/2022 22:30	*Pipistrellus pipistrellus*	Reviewed	34	46.3	58.3	46	4	170	19	53.30246	-6.42327
44450016	07/07/2022 22:32	*Nyctalus leisleri*	Reviewed	18	21.8	22.6	21.3	15	401	19	53.30248	-6.42325
44450017	07/07/2022 22:32	*Nyctalus leisleri*	User	3	22.1	23.4	21.7	11.4	373	19	53.30247	-6.42325
44450018	07/07/2022 22:33	*Nyctalus leisleri*	Reviewed	15	21.6	22.1	21.2	17	380	19	53.30247	-6.42325
44450019	07/07/2022 22:33	*Nyctalus leisleri*	Reviewed	10	22	23.1	21.6	12.1	322	19	53.30247	-6.42326
44450020	07/07/2022 22:33	*Nyctalus leisleri*	User	1	20.7	21	20.4	16.4	0	19	53.30247	-6.42326
44450021	07/07/2022 22:37	*Pipistrellus pygmaeus*	Reviewed	15	56.1	70	55.7	3	70	19	53.30246	-6.42327
44450022	07/07/2022 22:38	*Pipistrellus pygmaeus*	Reviewed	4	56.1	58.6	54.8	4	135	19	53.30246	-6.42328
44450023	07/07/2022 22:38	*Pipistrellus pygmaeus*	Reviewed	3	55.1	62	53.6	4.6	209	19	53.30246	-6.42329
44450024	07/07/2022 22:39	*Nyctalus leisleri*	User	2	21.5	21.8	21.4	5.9	372	19	53.30247	-6.42326

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450025	07/07/2022 22:39	*Nyctalus leisleri*	User	2	22	22.9	21.5	13.4	905	19	53.30247	-6.42325
44450026	07/07/2022 22:39	*Nyctalus leisleri*	Reviewed	6	23.3	24.2	22.7	9.2	499	19	53.30247	-6.42325
44450027	07/07/2022 22:39	*Nyctalus leisleri*	User	24	22.9	24.5	22.3	11	330	19	53.30247	-6.42325
44450028	07/07/2022 22:42	*Nyctalus leisleri*	User	2	21	21.7	20.7	18	492	19	53.30247	-6.4233
44450029	07/07/2022 22:42	*Nyctalus leisleri*	Reviewed	39	21.6	22.6	21.1	18	360	19	53.30247	-6.4233
44450030	07/07/2022 22:42	*Nyctalus leisleri*	Reviewed	12	21.2	21.9	20.8	17	290	19	53.30246	-6.42329
44450031	07/07/2022 22:48	*Nyctalus leisleri*	Reviewed	26	22.5	23.8	21.8	13	380	18	53.30247	-6.42328
44450032	07/07/2022 22:59	*Nyctalus leisleri*	Reviewed	12	22.8	23.9	22.2	14	515	18	53.30342	-6.42329
44450033	07/07/2022 23:01	*Pipistrellus pipistrellus*	Reviewed	40	46.2	62.2	45.8	5	95	18	53.30345	-6.42331
44450034	07/07/2022 23:05	*Nyctalus leisleri*	Reviewed	12	23.2	24.3	22.7	12	552	18	53.30345	-6.4233
44450035	07/07/2022 23:07	*Pipistrellus pygmaeus*	Reviewed	17	52.3	55.3	51.8	10	80	18	53.30346	-6.4233
44450036	07/07/2022 23:10	Noise	Custom	1	21.4	22.3	21	7.9	0	18	53.30345	-6.42329

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450037	07/07/2022 23:12	*Nyctalus leisleri*	Reviewed	6	22.9	24.6	22	12.2	322	18	53.30346	-6.42327
44450038	07/07/2022 23:14	*Pipistrellus pipistrellus*	Reviewed	36	51.3	58.9	50.8	7	190	18	53.30346	-6.4233
44450039	07/07/2022 23:15	*Pipistrellus pygmaeus*	Reviewed	3	51.5	58.8	51.3	5	102	18	53.30331	-6.42324
44450040	07/07/2022 23:15	Noise	Custom	0	0	0	0	0	0	18	53.30325	-6.42323
44450041	07/07/2022 23:17	*Pipistrellus pygmaeus*	Reviewed	30	52.1	57.3	51.8	5	90	18	53.3031	-6.42309
44450042	07/07/2022 23:20	*Pipistrellus pygmaeus*	Reviewed	35	55.1	73.9	54.7	6	90	18	53.3031	-6.42312
44450043	07/07/2022 23:20	*Pipistrellus pygmaeus*	Reviewed	15	55.4	62.4	55	4	80	18	53.3031	-6.42312
44450044	07/07/2022 23:21	*Nyctalus leisleri*	User	2	22.1	23.2	21.5	14.1	309	18	53.30312	-6.42309
44450045	07/07/2022 23:21	*Nyctalus leisleri*	User	2	23.6	24.7	22.6	11.1	279	18	53.30312	-6.42309
44450046	07/07/2022 23:21	*Nyctalus leisleri*	User	1	23.5	25	22.6	13.8	0	18	53.30311	-6.4231
44450047	07/07/2022 23:21	*Nyctalus leisleri*	Reviewed	4	25.2	25.8	24.5	7.7	529	18	53.30311	-6.4231

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450048	07/07/2022 23:21	*Nyctalus leisleri*	Reviewed	10	22.6	23.9	21.8	14	270	18	53.30312	-6.42311
44450049	07/07/2022 23:24	*Myotis natteri*	Reviewed	26	48.5	71.7	40.1	3	84	17	53.30313	-6.4231
44450050	07/07/2022 23:25	*Pipistrellus pygmaeus*	Reviewed	9	54.3	55.8	53.8	7	205	17	53.30312	-6.4231
44450051	07/07/2022 23:28	*Pipistrellus pygmaeus*	Reviewed	23	52.4	70.4	51.9	5	90	17	53.30313	-6.4231
44450052	07/07/2022 23:30	Noise	Custom	0	0	0	0	0	0	17	53.30313	-6.42316
44450053	07/07/2022 23:32	Noise	Custom	1	19.2	19.2	18.9	27.5	0	18	53.30247	-6.42327
44450054	07/07/2022 23:32	*Pipistrellus pygmaeus*	Reviewed	15	54	61.2	53.7	6	90	18	53.30247	-6.42327
44450055	07/07/2022 23:35	Noise	Custom	3	19.2	19.9	18.4	17.7	311	18	53.30211	-6.42324
44450056	07/07/2022 23:35	Noise	Custom	3	18.1	19.7	18	5.6	56	18	53.30211	-6.42324
44450057	07/07/2022 23:35	Noise	Custom	0	0	0	0	0	0	18	53.30211	-6.42323
44450058	07/07/2022 23:35	*Pipistrellus pygmaeus*	Reviewed	67	55.8	68.4	55.3	5	90	18	53.30211	-6.42322
44450059	07/07/2022 23:35	Noise	Custom	2	19.8	20.1	19.2	12.5	0	18	53.30211	-6.42321

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450060	07/07/2022 23:36	*Pipistrellus pygmaeus*	Reviewed	17	57.5	64.2	56.9	4	85	18	53.30209	-6.4232
44450061	07/07/2022 23:36	Noise	Custom	3	18.9	19	18.4	10.3	362	18	53.3021	-6.42321
44450062	07/07/2022 23:36	*Pipistrellus pipistrellus*	Reviewed	11	44.8	48.1	43.8	6	100	18	53.3021	-6.42321
44450063	07/07/2022 23:37	*Myotis mystacinus*	Reviewed	17	47.2	73.3	38.8	3	75	18	53.3019	-6.42284
44450064	07/07/2022 23:40	*Pipistrellus pipistrellus*	Reviewed	15	43.7	47.9	43.3	5	190	18	53.30147	-6.4217
44450065	07/07/2022 23:40	*Pipistrellus pipistrellus*	Reviewed	19	44.3	52.2	43.9	5	190	18	53.30149	-6.4217
44450066	07/07/2022 23:40	*Pipistrellus pipistrellus*	Reviewed	7	43.6	51.4	43.1	6.9	90	18	53.30149	-6.42171
44450067	07/07/2022 23:41	*Pipistrellus pipistrellus*	Reviewed	5	44.4	48.4	44	6	153	18	53.30148	-6.42174
44450068	07/07/2022 23:41	*Pipistrellus pipistrellus*	Reviewed	25	44.1	49.1	43.6	5	100	18	53.30148	-6.42176
44450069	07/07/2022 23:41	*Pipistrellus pipistrellus*	Reviewed	15	44.4	50.5	43.7	7	185	18	53.30148	-6.42176

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450070	07/07/2022 23:41	*Pipistrellus pipistrellus*	Reviewed	43	44.5	50.1	44	4	94	18	53.30148	-6.42176
44450071	07/07/2022 23:42	*Pipistrellus pipistrellus*	Reviewed	5	44.7	48.9	44	4.3	99	18	53.30148	-6.42174
44450072	07/07/2022 23:42	*Pipistrellus pipistrellus*	User	2	43.8	47.9	43.2	5.6	331	18	53.30148	-6.42174
44450073	07/07/2022 23:42	*Pipistrellus pipistrellus*	Reviewed	38	44.4	53.4	43.8	6	80	18	53.30148	-6.42174
44450074	07/07/2022 23:42	*Pipistrellus pipistrellus*	Reviewed	37	44.5	50.9	43.9	6	100	18	53.30149	-6.42174
44450075	07/07/2022 23:42	*Pipistrellus pygmaeus*	Reviewed	35	55.7	68.1	55.2	3	75	18	53.3015	-6.42176
44450076	07/07/2022 23:42	*Pipistrellus pygmaeus*	Reviewed	24	53.9	65.8	53.6	5	76	18	53.3015	-6.42178
44450077	07/07/2022 23:42	*Pipistrellus pipistrellus*	Reviewed	17	43.8	53.2	43.4	7	110	18	53.3015	-6.42178
44450078	07/07/2022 23:43	*Pipistrellus pygmaeus*	Reviewed	13	53.4	59.5	53.2	5	95	18	53.3015	-6.42177
44450079	07/07/2022 23:43	*Pipistrellus pygmaeus*	Reviewed	13	54.4	63.9	53.5	2	127	18	53.3015	-6.42176

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450080	07/07/2022 23:43	*Pipistrellus pygmaeus*	Reviewed	11	51.5	64	51.2	3	85	18	53.3015	-6.42177
44450081	07/07/2022 23:43	Noise	Custom	2	28.4	28.7	28.4	22.9	38	18	53.30146	-6.42171
44450082	07/07/2022 23:43	Noise	Custom	1	28.4	28.7	28.4	13.1	0	18	53.30147	-6.42171
44450083	07/07/2022 23:44	*Pipistrellus pipistrellus*	User	0	0	0	0	0	0	18	53.30148	-6.42173
44450084	07/07/2022 23:44	*Pipistrellus pipistrellus*	Reviewed	75	44.3	54.4	43.7	5	104	18	53.30149	-6.42173
44450085	07/07/2022 23:45	*Pipistrellus pipistrellus*	Reviewed	33	44.8	51.9	44	7	105	18	53.30148	-6.42173
44450086	07/07/2022 23:45	*Pipistrellus pipistrellus*	Reviewed	6	43.8	46.6	43.5	5	278	18	53.30148	-6.42173
44450087	07/07/2022 23:45	*Pipistrellus pygmaeus*	User	48	44.2	49.5	43.6	7	110	18	53.30147	-6.42174
44450088	07/07/2022 23:45	*Pipistrellus pipistrellus*	Reviewed	2	44.4	49	44.4	2.9	309	18	53.30148	-6.42173
44450089	07/07/2022 23:45	*Pipistrellus pipistrellus*	Reviewed	39	44.1	55.6	43.4	7	120	18	53.30149	-6.42173

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450090	07/07/2022 23:46	*Pipistrellus pipistrellus*	Reviewed	44	44.1	53.2	43.5	5	95	18	53.30151	-6.42171
44450091	07/07/2022 23:46	*Pipistrellus pipistrellus*	Reviewed	27	44.1	51.9	43.5	5	100	18	53.30151	-6.42173
44450092	07/07/2022 23:46	*Pipistrellus pipistrellus*	Reviewed	16	44	50.5	43.6	5	100	18	53.3015	-6.42173
44450093	07/07/2022 23:46	*Pipistrellus pipistrellus*	Reviewed	14	44.4	49.2	43.9	3	110	18	53.30146	-6.42169
44450094	07/07/2022 23:46	*Pipistrellus pipistrellus*	Reviewed	52	43.7	49.5	43.4	4	100	18	53.30147	-6.42169
44450095	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	6	43.8	50.3	43.2	7	225	18	53.30145	-6.4217
44450096	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	3	44.3	46.9	43.9	5.9	201	18	53.30145	-6.42169
44450097	07/07/2022 23:47	*Pipistrellus pygmaeus*	Reviewed	6	57	62.7	56.7	5	193	18	53.30145	-6.42169
44450098	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	25	44.5	52.8	44	5	100	18	53.30145	-6.42167
44450099	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	76	44.5	58.5	44.1	5	94	18	53.30144	-6.42166

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450100	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	19	45.6	71.8	45.4	6	83	18	53.30144	-6.42166
44450101	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	48	45.2	61.9	44.8	5	90	18	53.30143	-6.42164
44450102	07/07/2022 23:47	*Pipistrellus pipistrellus*	Reviewed	62	44.3	58.3	43.9	5	90	18	53.30141	-6.4216
44450103	07/07/2022 23:53	*Pipistrellus pygmaeus*	Reviewed	44	52.2	67.3	51.7	5	84	17	53.30237	-6.42387
44450104	07/07/2022 23:54	*Nyctalus leisleri*	Reviewed	2	22.7	22.9	22	10.8	267	18	53.30239	-6.4239
44450105	07/07/2022 23:56	*Pipistrellus pipistrellus*	Reviewed	6	41.8	43.1	41.3	6.6	274	17	53.30246	-6.42447
44450106	07/07/2022 23:56	*Nyctalus leisleri*	Reviewed	10	24.9	25.9	24.2	16	372	17	53.30247	-6.4245
44450107	07/07/2022 23:56	*Nyctalus leisleri*	User	4	22.2	22.7	21.6	16.1	661	17	53.30247	-6.4245
44450108	07/07/2022 23:56	*Pipistrellus pipistrellus*	Reviewed	11	41.7	43.1	41.1	7	237	17	53.30247	-6.42451
44450109	07/07/2022 23:56	*Pipistrellus pipistrellus*	Reviewed	19	43.7	48.2	43.2	6	100	17	53.30247	-6.4245
44450110	07/07/2022 23:56	*Pipistrellus*	Reviewed	23	43.5	48.6	43	7	90	17	53.30248	-6.42451

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
		pipistrellus										
44450111	07/07/2022 23:56	Noise	Custom	0	0	0	0	0	0	17	53.3025	-6.42453
44450112	07/07/2022 23:56	*Pipistrellus pipistrellus*	Reviewed	43	43.3	48.6	42.8	6	96	17	53.30251	-6.42457
44450113	07/07/2022 23:57	*Pipistrellus nathusii*	Reviewed	17	41.3	42.9	40.8	9	180	17	53.30253	-6.42463
44450114	07/07/2022 23:57	*Pipistrellus nathusii*	Reviewed	4	41.2	41.7	40.6	6	121	17	53.30258	-6.42479
44450115	07/07/2022 23:58	Noise	Custom	4	24.1	24.1	23.8	43.3	209	17	53.30265	-6.42501
44450116	07/07/2022 23:58	*Pipistrellus pygmaeus*	Reviewed	20	53.1	59.1	52.7	4	90	17	53.30273	-6.42524
44450117	07/07/2022 23:59	*Pipistrellus pipistrellus*	Reviewed	4	42.5	45.9	42.4	4.1	246	17	53.30269	-6.42504
44450118	07/07/2022 23:59	*Pipistrellus pipistrellus*	Reviewed	3	41.5	45.8	41.4	4.4	150	17	53.30265	-6.42494
44450119	07/07/2022 23:59	*Pipistrellus pipistrellus*	User	0	0	0	0	0	0	17	53.30264	-6.42491
44450120	08/07/2022 00:00	*Pipistrellus pipistrellus*	Reviewed	4	42.9	45.1	42.4	5.7	224	17	53.30253	-6.42468

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450121	08/07/2022 00:00	*Pipistrellus pygmaeus*	Reviewed	2	53.1	53.4	52.8	6.2	447	17	53.30245	-6.42447
44450122	08/07/2022 00:02	Noise	Custom	0	0	0	0	0	0	17	53.30207	-6.4233
44450123	08/07/2022 00:02	Noise	Custom	0	0	0	0	0	0	17	53.30207	-6.4233
44450124	08/07/2022 00:02	Noise	Custom	2	15.9	19.5	14.9	1.3	0	17	53.30208	-6.42329
44450125	08/07/2022 00:02	Noise	Custom	1	30.2	36	27.1	1.3	0	17	53.30209	-6.42327
44450126	08/07/2022 00:02	Noise	Custom	1	30.2	30.5	26.8	1.3	0	17	53.30209	-6.42327
44450127	07/07/2022 21:52	Noise	Custom	0	0	0	0	0	0	19	53.30405	-6.42399

Summary data for the dawn survey conducted on 13/07/2022

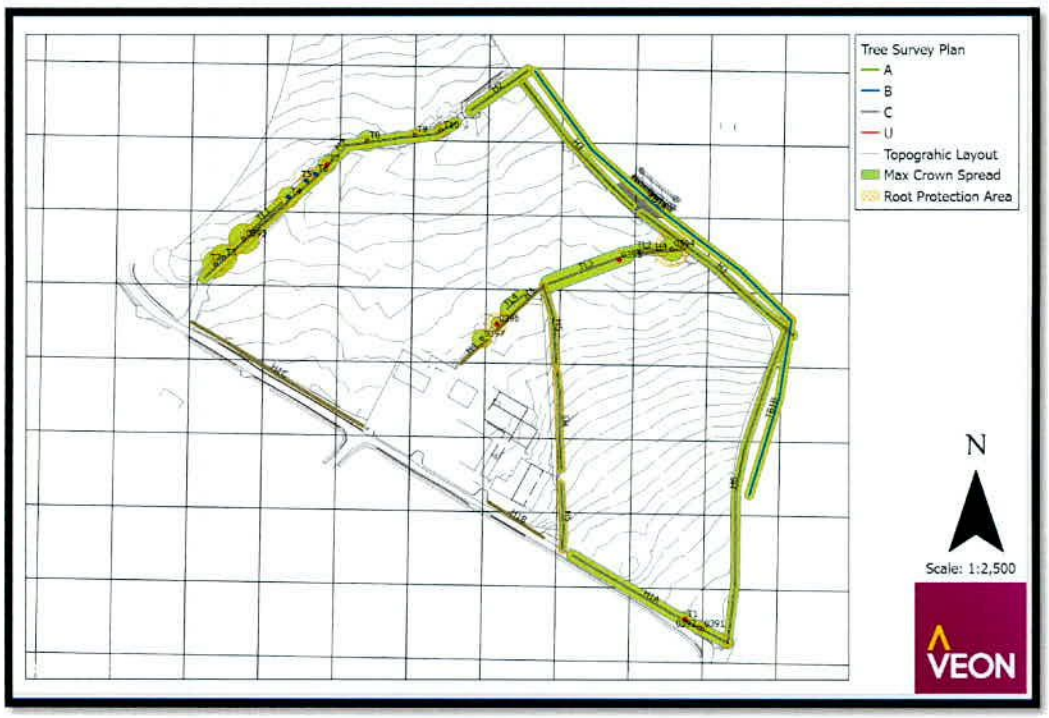
Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450001	13/07/2022 03:59	Noise	Custom	0	0	0	0	0	0	16	53.30162	-6.42227
44450002	13/07/2022 04:01	Noise	Custom	4	18.9	20.1	17.4	12.3	62	14	53.30203	-6.42326
44450003	13/07/2022 04:02	Noise	Custom	2	18	18.3	17.7	5.2	0	14	53.30203	-6.42325
44450004	13/07/2022 04:02	Noise	Custom	1	28.4	28.7	28.4	24.9	0	14	53.30205	-6.42325
44450005	13/07/2022 04:02	Noise	Custom	3	17.2	17.5	15.7	14.4	113	14	53.30206	-6.42326
44450006	13/07/2022 04:05	Noise	Custom	4	21.7	21.8	21.7	60	107	14	53.30304	-6.4234
44450007	13/07/2022 04:05	Noise	Custom	0	0	0	0	0	0	14	53.30303	-6.4234
44450008	13/07/2022 04:09	Noise	Custom	1	32.6	32.9	31.7	43.3	0	14	53.30321	-6.42203
44450009	13/07/2022 04:14	Noise	Custom	2	16.9	18.1	16.3	4.6	912	14	53.30346	-6.42128
44450010	13/07/2022 04:15	Noise	Custom	1	30.8	31.4	30.5	6.6	0	14	53.30324	-6.42111
44450011	13/07/2022 04:16	Noise	Custom	1	18	18	17.7	5.9	0	14	53.3028	-6.42125
44450012	13/07/2022 04:17	Noise	Custom	3	31	31.7	29.6	44.9	41	14	53.30275	-6.42129

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450013	13/07/2022 04:17	*Pipistrellus pygmaeus*	Reviewed	32	53.7	70.6	53.3	5	80	14	53.30274	-6.42131
44450014	13/07/2022 04:18	Noise	Custom	0	0	0	0	0	0	14	53.30272	-6.4213
44450015	13/07/2022 04:21	*Nyctalus leisleri*	Reviewed	20	22.8	23.7	21.9	12	220	14	53.30275	-6.42131
44450016	13/07/2022 04:26	*Nyctalus leisleri*	Reviewed	30	22.2	22.8	21.6	14	240	14	53.30229	-6.42154
44450017	13/07/2022 04:30	*Pipistrellus pipistrellus*	Reviewed	26	47.1	64.8	46.7	3	95	14	53.30171	-6.42144
44450018	13/07/2022 04:35	Noise	Custom	0	0	0	0	0	0	13	53.30182	-6.42181
44450019	13/07/2022 04:36	Noise	Custom	1	25	30.2	24.4	2	0	14	53.30197	-6.42232
44450020	13/07/2022 04:37	Noise	Custom	3	26.4	26.8	26.1	48.8	60	13	53.3022	-6.42269
44450022	13/07/2022 04:38	Noise	Custom	2	27	28.5	26.1	31.1	419	13	53.30276	-6.42324
44450023	13/07/2022 04:39	Noise	Custom	1	32.9	32.9	32.6	12.5	0	13	53.30287	-6.42331
44450024	13/07/2022 04:41	*Nyctalus leisleri*	Reviewed	32	22.3	23.2	21.5	16	220	13	53.30403	-6.42403
44450025	13/07/2022 04:43	*Nyctalus leisleri*	User	3	23.8	24.3	23.1	8.5	316	13	53.30461	-6.42408

Recording	Timestamp	Species	Classification source	Calls (#)	Mean Peak Frequency (kHz)	Mean Max Frequency (kHz)	Mean Minimum Frequency (kHz)	Mean Call Length (ms)	Mean Call Distance (ms)	Temperature (C)	Latitude	Longitude
44450026	13/07/2022 04:43	*Nyctalus leisleri*	Reviewed	9	20.9	22.3	20.4	10.4	411	13	53.3046	-6.42406
44450027	13/07/2022 04:44	*Nyctalus leisleri*	Reviewed	13	22.2	23.6	21.8	16	345	13	53.3046	-6.42408
44450028	13/07/2022 04:55	Noise	Custom	1	32.3	32.9	32.3	9.2	0	13	53.30244	-6.42328
44450029	13/07/2022 05:01	Noise	Custom	1	16.2	16.2	15.9	5.2	0	13	53.30208	-6.42321
44450030	13/07/2022 03:59	Noise	Custom	0	0	0	0	0	0	16	53.30162	-6.42227

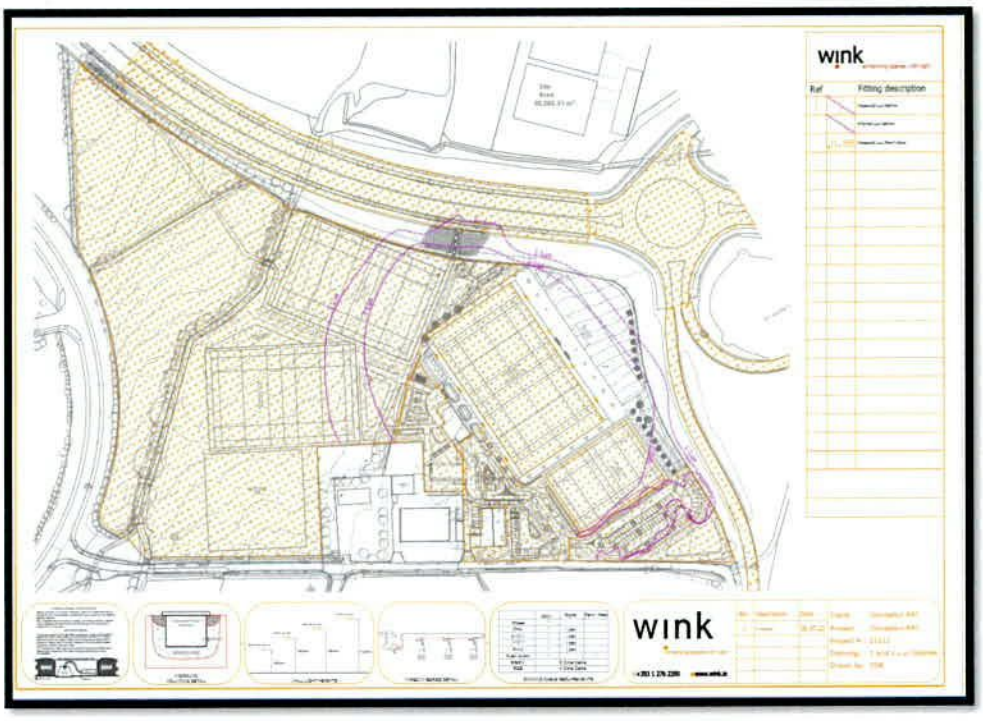
Appendix 3 – Maps

Tree and Hedgerow Lines - TCP



Tree and Hedgerow Lines - TSP

Lighting Heatmap (Wink 2022)

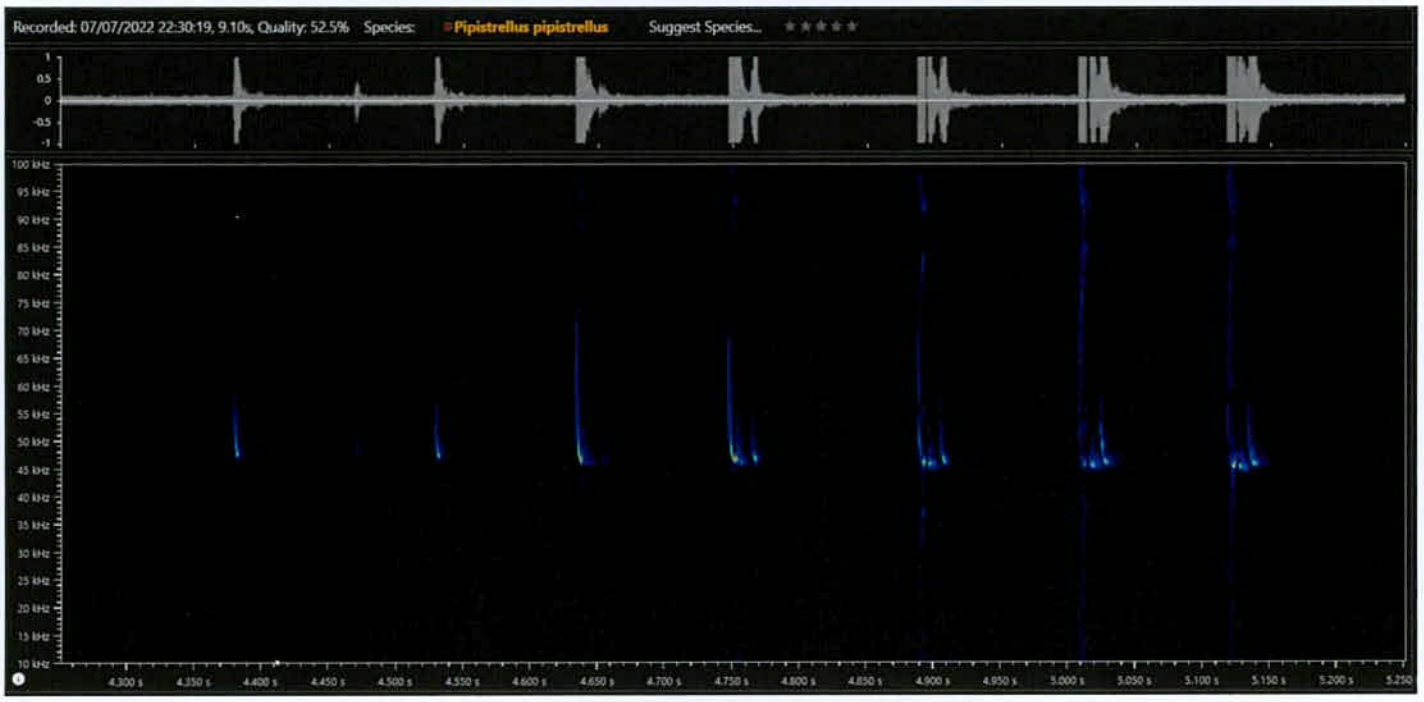


Lighting Map (Wink 2022)

Proximity of Site to Airport and motorway (N7) (EPA 2022)

Water Courses on site (EPA 2022)

Appendix 4 – Additional Information



Example of Sonogram (for Common Pipistrelle)

Habitat Description	Habitat Code (Fossitt)
Watercourses	FW1, FW4
Hedgerow, Woodland & Scrub	WL1, WL2, WS1
Grassland	GS2, GA1, GA2
Built Land	BL3

Habitats on Site