codling wind park

EIAR Addendum

Appendix 21-B Bat Assessment 2025

2025

Bat Assessment: Codling Wind Park Onshore Transmission Infrastructure, Poolbeg, Co. Dublin.

Bat Eco Services Ltd.

Bat Eco Services, Ulex House, Drumheel, Lisduff, Virginia, Co. Cavan. A82 XW62.

Licensed Bat Specialist: Dr Tina Aughney (tina@batecoservices.com, 086 4049468)
NPWS licence C047/2026 (Licence to handle bats, expires 31st December 2026);
NPWS licence 014/2026 (Licence to photograph/film bats, expires 31st December 2026);
NPWS licence DER/BAT 2026-119:(Survey licence, expires 31st December 2026).

Statement of Authority: Dr Aughney has worked as a Bat Specialist since 2000 and has undertaken extensive survey work for all Irish bat species including large scale development projects, road schemes, residential developments, wind farm developments and smaller projects in relation to building renovation or habitat enhancement. She was a monitoring co-ordinator and trainer for Bat Conservation Ireland for 20 years. She is a co-author of the 2014 publication *Irish Bats in the 21st Century.* This book received the 2015 CIEEM award for Information Sharing. Dr Aughney is a contributing author for the Atlas of Mammals in Ireland 2010-2015. She is a trained bat handler, bat ringer and radio-telemetry project manager. She is a member of the Nathusius' Pipistrelle Working Group and the Cavan Bat Group.

All analysis and reporting is completed by Dr Tina Aughney. Data collected and surveying is completed with the assistance of trained field assistants. Mr. Shaun Boyle and Ms. Eva Boyle (Field Assistant) NPWS licence DER/BAT 2026-119 (Survey licence, expires 31st December 2026). Both field assistants have received in-house training to undertake all elements of bat surveying according to Collins (2023).

Client: TOBIN Consulting Engineers on behalf of Codling Wind Park Limited

Project Name & Location: Codling Wind Park Onshore Transmission Infrastructure, Poolbeg, Co. Dublin.

Report Revision History

Date of Issue	Draft Number	Issued To (process of issuing)
19th October 2025	Draft 1	TOBIN (by email)
2nd March 2026	Draft 2	TOBIN (by email)

Purpose

This document has been prepared as a Report for TOBIN Consulting Engineers. Only the most up to-date report should be consulted. All previous drafts/reports are deemed redundant in relation to the named site.

Bat Eco Service 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.

Carbon Footprint Policy

It is the policy of Bat Eco Services to provide documentation digitally to reduce carbon footprint. Printing of reports etc. is avoided, where possible.

Bat Record Submission Policy

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

Executive Summary

Project Name & Location: Codling Wind Park Onshore Transmission Infrastructure, Poolbeg, Co. Dublin.

Proposed work: Development of onshore transmission infrastructure.

Bat Survey Results – Summary (Poolbeg only)

Bat Species	Roosts	Foraging	Commuting
Common pipistrelle *Pipistrellus pipistrellus*	√	√	√
Soprano pipistrelle *Pipistrellus pygmaeus*		√	√
Nathusius' pipistrelle *Pipistrellus nathusii*			√
Leisler's bat *Nyctalus leisleri*		√	√
Brown long-eared bat *Plecotus auritus*			
Daubenton's bat *Myotis daubentonii*			
Natterer's bat *Myotis nattereri*			
Whiskered bat *Myotis mystacinus*			
Lesser horseshoe bat *Rhinolophus hipposideros*			

Bat Survey Duties Completed (Indicated by red shading)

Tree PBR Survey	◯	Daytime Building Inspection	◯
Static Detector Survey	◯	Daytime Bridge Inspection	○
Dusk Bat Survey	◯	Dawn Bat Survey	◯
Walking Transect	◯	Driving Transect	○
Trapping / Mist Netting	○	IR Camcorder filming	○
Endoscope Inspection	○	Other	◯
		Thermal imagery filming	

Citation: Bat Eco Services (2025) Bat assessment of Codling Wind Park Onshore Transmission Infrastructure, Poolbeg, Co. Dublin. Unpublished report prepared for TOBIN Consulting Engineers.

Contents

1. Introduction

Bat Eco Services Ltd. was commissioned by TOBIN Consulting Engineers to undertake a bat survey of onshore elements of the Codling Wind Park. An array of route options was surveyed in 2021, 2022 and 2023 at various areas in County Dublin and County Wicklow. However, the preferred route option has since been chosen (Poolbeg, County Dublin) and therefore the results from the surveys competed for this area only will be presented in this report.

This report is updated with 2025 survey results undertaken in the Poolbeg area only.

1.1 Relevant Legislation & Bat Species Status in Ireland

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 an offence. The most recent guidance document is “Guidance document on the strict protection of animal species of Community interest un the Habitats Directive (Brussels, 12.10.2021 C(2021) 7391 final”.

Regulation 51(2) of the 2011 Regulations provides –

(“(2) Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under *Regulation 54,* a person who in respect of the species referred to in *Part 1* of the *First Schedule*—
(*a*) deliberately captures or kills any specimen of these species in the wild, (*b*) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
(*c*) deliberately takes or destroys eggs of those species from the wild,
(*d*) damages or destroys a breeding site or resting place of such an animal, or
(*e*) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence.”

The grant of planning permission does not permit the commission of any of the above acts or render the requirement for a derogation licence unnecessary in respect of any of those acts.

Any works interfering with bats and especially their roosts, may only be carried out under a derogation licence granted by National Parks and Wildlife Service (NPWS) pursuant to Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law).

There are eleven recorded bat species in Ireland, nine of which are considered resident on the island. 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 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).

The following species list (Table 1) identifies the range of bat species (resident and vagrant) whose presence has been confirmed in Ireland along with their current status. According to the Bat Conservation Ireland databases, all nine resident bat species have been recorded in Co. Limerick.

Table 1a: Status of the Irish bat fauna (Marnell *et al.*, 2019 & NPWS, 2022).

Species: Common Name	Irish Status	European Status	Global Status
Resident Bat Species ^			
Daubenton's bat *Myotis daubentonii*	Least Concern	Least Concern	Least Concern
Whiskered bat *Myotis mystacinus*	Least Concern	Least Concern	Least Concern
Natterer's bat *Myotis nattereri*	Least Concern	Least Concern	Least Concern
Leisler's bat *Nyctalus leisleri*	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle *Pipistrellus nathusii*	Least Concern	Least Concern	Least Concern
Common pipistrelle *Pipistrellus pipistrellus*	Least Concern	Least Concern	Least Concern
Soprano pipistrelle *Pipistrellus pygmaeus*	Least Concern	Least Concern	Least Concern
Brown long-eared bat *Plecotus auritus*	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat *Rhinolophus hipposideros*	Inadequate	Least Concern	Least Concern
Possible Vagrants ^			
Brandt's bat Myotis brandtii	Data deficient	Least Concern	Least Concern
Greater horseshoe bat *Rhinolophus ferrumequinum*	Data deficient	Near threatened	Near threatened

^ Roche *et al.,* 2014

1.1.1 NPWS Article 17 Reporting

NPWS (2019) provides details on the conservation status for each of Ireland's bat species along with distribution maps (See appendices for such maps). The following table summarises the conclusions of Article 17 assessment of conservation status at the end of the most recent reporting period. Additional information for each of the bat species provides some clarifying notes in relation to the

conservation status conclusions. Such information, where appropriate to the current project, will be drawn on in the project assessment section.

Table 1b: NPWS Article 17 Conservation Status of Irish Bat Species (Adapted from NPWS, 2022).

	Range	Population	Habitat	Future Prospects	Conservation Status Assessment	Conservation Status Trend
Lesser horseshoe bat	Inadequate	Favourable	Inadequate	Inadequate	Inadequate	Deteriorating
Common pipistrelle	Favourable	Favourable	Favourable	Favourable	Favourable	Improving
Soprano pipistrelle	Favourable	Favourable	Favourable	Favourable	Favourable	Improving
Nathusius' pipistrelle	Unknown	Unknown	Favourable	Unknown	Unknown	Not applicable
Natterer's bat	Favourable	Favourable	Favourable	Favourable	Favourable	Stable
Daubenton's bat	Favourable	Favourable	Favourable	Favourable	Favourable	Improving
Whiskered bat	Favourable	Favourable	Favourable	Favourable	Favourable	Improving
Brown long-eared bat	Favourable	Favourable	Favourable	Favourable	Favourable	Improving
Leisler's bat	Favourable	Favourable	Favourable	Favourable	Favourable	Improving

1.1.2 Irish Bat Monitoring Programme – Population Trends

The Irish Bat Monitoring Programme provides information on monitoring schemes managed by Bat Conservation Ireland:

- Car-Based Bat Monitoring (All Ireland) – monitors common pipistrelle, soprano pipistrelle, Leisler's bats with limited information for Nathusius' pipistrelle and *Myotis* species.
- All Ireland Daubenton's Bat Waterway Monitoring
- Brown Long-eared Bat Roost Monitoring
- Lesser Horseshoe Bat Monitoring

This provides population trend data for seven bat species: common pipistrelle, soprano pipistrelle, Leisler's bat, Nathusius' pipistrelle, Daubenton's bat, brown long-eared bat and lesser horseshoe bat (some limited data for *Myotis* species). There is currently no systematic monitoring surveys for Natterer's bat and whiskered bat. Annual reporting is undertaken and the most recent report (Aughney *et al.,* 2023) is referenced for this report. In summary, the population trends for each bat species are as follows:

- Trends of the three common bat species (common pipistrelle, soprano pipistrelle and Leisler's bat) continued to increase in 2022, although the yearly estimates of common pipistrelle levelled out a little. Confidence intervals of these three bat species were all above their baseline indices indicating they each show a significantly increasing trend.
- Nathusius' pipistrelle trends are still unclear due to low encounter rates but decreased a little in 2022 compared to previous years.
- The yearly estimate for the *Myotis* spp. group steadied out a little but overall the smoothed trend for this group is still well below the baseline.
- Daubenton's bat numbers trend line appears to be fairly steady from year to year with error bars consistently encompassing the baseline.
- Brown long-eared bat shows a fluctuating trend around the baseline and is considered to be currently stable.
- Lesser horseshoe bat continue to increase in 2022 for the summer counts while low winter counts caused a slight downward trend in 2022. But overall, this species has increased over the last 20 years of monitoring.

1.1.3 Assessment Parameters

Different parameters are considered for the overall assessment of the potential impact(s) of a proposed development on local bat populations. The overall impacts of the proposed project on local bat populations is assessed using the following criteria:

- Impact Quality using the parameters Positive, Neutral or Negative Impact (based on EPA, 2017)

Table 1c: Criteria for assessing impact quality based on EPA, 2022,

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

- Impact Significance of potential impact parameters on specific bat species in relation to particular elements (e.g. roosting sites, foraging area and commuting routes) are assessed with reference to the following:
    - Table 4 of Marnell *et al.* (2022) (Figure 1a);
    - the known ecology and distribution of the bat species in Ireland;
    - bat survey results including type of roosts (if any recorded), pattern of bat usage of the survey area, level of bat activity recorded etc.
    - and bat specialist experience.

- Impact Significance of the proposed development on local bat populations maybe determine, where applicable, using the parameters listed in Table 1d (based on EPA, 2017).
-

Table 1d: Criteria for assessing significance of effects based on EPA, 2017,

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

The following terms will be used, where possible and applicable, when quantifying the probability and duration of the potential effects (selected from EPA, 2022, Table 3.4):

Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Figure 1a: Criteria for assessing significance of effects based on EPA, 2022 (Taken from Table 3.4),

This table continues to provide terminology in relation to "Describing the Types of Effects" as presented below.

Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

Figure 1b: Criteria for assessing significance of effects based on EPA, 2022 (Taken from Table 3.4).

1.1.4 Bat Mitigation Measures

1.1.4.1 Bats & Lighting

All European bat species, including Irish bat species, are nocturnal. Light levels as low as typical full moon levels, i.e. around 0.1 LUX, can alter the flight activity of bats (Voigt *et al.* 2018). Any level of artificial light above that of moonlight can mask the natural rhythms of lunar sky brightness and, thus, can disrupt patterns of foraging and mating and might, for instance, interfere with entrainment of the circadian system.

Artificial light pollution is an increasing global problem (Rich and Longcore, 2006) and Artificial light at night (ALAN) is considered a major threat to biodiversity, especially to nocturnal species. As urbanisation expands into the landscape, the degree of street lighting also expands. Its ecological impacts can have a profound effect on the behaviour of nocturnal animals including impacts on reproductive behaviours, orientation, predator-prey interaction and competition among others, depending on the taxon and ecosystem in question (Longcore and Rich 2004). It is considered by Hölker *et al.* (2010) to be a key biodiversity threat to biodiversity conservation. In relation to bats, the potential impacts of artificial night lighting can result in habitat fragmentation (Hanski, 1998), delay in roost emergence (Downs *et al.,* 2003) and a reduction in prey items.

In the context of behavioural ecology, lights can work to attract or repel certain animals. Many groups of insects, including moths, lacewings, beetles, bugs, caddisflies, crane flies, midges, hoverflies and wasps, can be attracted to artificial light (Eisenbeis and Hassel 2000; Frank 1988; Kolligs 2000). Attraction depends on the spectrum of light. In the context of streetlights, white (mercury vapour) lamps emit a white light that includes ultraviolet. High pressure sodium lights (yellow) emit some ultraviolet, while low pressure sodium lamps (orange) emit no ultraviolet light (e.g. Rydell 2006). As a result of the attractiveness of lights to aerial invertebrates, swarms of insects often occur in and around streetlights and, particular bat species such as aerial insect predators, can exploit the swarming insects to their advantage. Such attraction can also take prey items away from dark zones where light sensitive species are foraging, thus reducing their likelihood of feeding effectively.

Rydell (2006) divides bats into four categories in terms of their characteristic behaviours at street lamps. 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, typically large free-tailed bats (e.g. large species of the family Molossidae), 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 of the old world, three of which are found in Ireland. 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 (e.g. Speakman 1991). 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 lesser horseshoe bats. Therefore, from this, we can categorise the suite of Irish bats species as follows (please note that the sensitivity category is the author's description):

Table 3a: Potential light sensitivity of the Irish bat fauna using categories described by Rydell, 2006.

Species: Common Name	Rydell Category	Sensitivity
Daubenton's bat *Myotis daubentonii*	Category 4	Light sensitive
Whiskered bat *Myotis mystacinus*	Category 4	Light sensitive
Natterer's bat *Myotis nattereri*	Category 4	Light sensitive
Leisler's bat *Nyctalus leisleri*	Category 2	Light tolerant
Nathusius' pipistrelle *Pipistrellus nathusii*	Category 3	Semi-tolerant
Common pipistrelle *Pipistrellus pipistrellus*	Category 3	Semi-tolerant
Soprano pipistrelle *Pipistrellus pygmaeus*	Category 3	Semi-tolerant
Brown long-eared bat *Plecotus auritus*	Category 4	Light sensitive
Lesser horseshoe bat *Rhinolophus hipposideros*	Category 4	Light sensitive

The ability of different bat species to exploit insects gathered around streetlights varies greatly. Gleaning species such as *Myotis* bats rarely forage around streetlights (Rydell and Racey, 1995). The ecological effects of illuminating aquatic habitats are also poorly known. Moore *et al.* (2006) found that light levels in an urban lake, subject simply to sky glow and not direct illumination from lights, reached the same order of magnitude as full moonlight.

All European bat species, including Irish bat species, are nocturnal. As a consequence, the scientific literature provides evidence that artificial lighting does impacts on bats. The degree of impact depends on the light sensitivity of the bat species and the type of luminaire. Lesser horseshoe bats are light sensitive and therefore adversely effected by the presence of lighting in all aspects of their life strategies (e.g. foraging, commuting, drinking and roosting).

The potential impacts of street lighting can be summarised as follows:

- Attracting Prey Items

Lights can work to attract or repel certain animals. Many groups of insects can be attracted to artificial light and this attraction depends on the spectrum of light. As a result of the attractiveness of lights to aerial invertebrates, swarms of insects often occur in and around streetlights. Such attraction can also take prey items away from dark zones where light sensitive species, such as lesser horseshoe bats, are foraging, thus reducing their likelihood of feeding effectively.

- Reducing Foraging Habitat

The research documents state that there is less bat species diversity foraging in habitats lit up by artificial lighting. Only bat species considered to be light tolerant are generally able to exploit habitats with lighting present, but overall, all bat species activity tends to be less in lit up habitats compared to non-lit up habitats.

- Fragmenting The Landscape

Scientific evidence shows that lighting is a barrier to the movement of light sensitive bat species, such as lesser horseshoe bats. Light sensitive bat species will actively seek dark corridors to commute along and therefore the presence of lighting in commuting habitats will restrict their movement of such species in the landscape.

- Reducing Drinking Sites

There is increasing evidence that drinking sites for bats is an essential component for local bat population survival and that the presence of artificial lighting at waterbodies prevents bats from availing of this resource.

Lighting, including streetlights come in an array of different types but for streetlights they typically include High Pressure Sodium, Low Pressure Sodium, Mercury Vapour and the more modern Light Emitting Diodes (LED). An array of field-based research has been undertaken to document the potential impact of lighting on bat flight activity. LED lighting is predicted to constitute 70% of the outdoor and residential lighting markets by 2020. While the use of LEDs promotes energy and cost savings relative to traditional lighting technologies, little is known about the effects these broad-spectrum "white" lights will have on wildlife, human health, animal welfare, and disease transmission. As a consequence, a large array of research has been undertaken recently on the potential impact of LED on bats.

Stone *et al.* (2012) undertook research in relation to "Cool" LED streetlights on an array of local bat species in England. Overall the presence of LED street lights had a significant negative impact on lesser horseshoe bats and *Myotis* spp. for all light treatments investigated while there was no sign impact of light treatment type on *Pipistrellus pygmaeus* (soprano pipistrelle – a common Irish bat species) or *Nyctalus* (Leisler's bats is part of this bat family and is a common Irish bat species)/*Eptesicus* species. This research paper also documented behavioural changes for the different bat species. Lesser horseshoe bats and *Myotis* spp. did not avoid lights by flying along the other side of the hedge but altered their commuting behaviour altogether. It was concluded that LEDs can fragment commuting routes causing bats to alter their behaviour with potentially negative conservation consequences. Lesser horseshoe bat activity was significantly lower during high intensity treatment than medium, but at all treatment levels (even as low as 3.6 LUX), activity was significantly lower than unlit control (LUX level measurements were taken at 1.7m at the hedge below the light).

Russo *et al.* (2017) investigated the impact of LED lighting on drinking areas for bats in Italy. Drinking sites are considered to be important components for the survival of local bat populations. Drinking sites were illuminated with a portable LED outdoor light emitting (48 high-power LEDs generated a light intensity of 6480 lm (4000–4500 K) at 25°C, two peaks of relative luminous flux at 450 and 590 nm). *Plecotus auritus* (brown long-eared bat – resident in Ireland), *Pipistrellus pygmaeus* (soprano pipistrelle – resident in Ireland) and *Rhinolophus hipposideros* (lesser horseshoe bat – resident in Ireland) did not drink when troughs were illuminated.

Rowse *et al.* (2018) researched the impacts of LED lights (portable lights, 97W 4250K LED on 10m high poles) in England on local bat populations. Treatments were either 100% light intensity; dimmed (using pulse width modulation) at 50% or 25% light intensity; and unlit. Sites were in suburban areas along busy roads but with vegetation and tree lines adjacent. High light levels (50% & 100% light treatments) increased activity of opportunistic *Pipistrellus pipistrellus* (common pipistrelle – resident in Ireland) but reduced activity of *Myotis* species group. Conversely 25% and unlit sites had no difference from each other. The research paper conclude that dimming could be an effective strategy to mitigate ecological impacts of streetlights.

Wakefield *et al.* (2017) stated that an important factor to be aware of in relation to LED is the direction of the light projected. Therefore, it is recommended that highly focused/shielded LEDS designed to filter out short wavelengths of light should be used as they attract relatively fewer insects. Less insects attracted to street lights means less insects leaving dark zones where light sensitive bat species primarily feed.

Martin *et al.* (2021) showed that LED streetlights lead to a reduction in the total number of insects captured with light traps in a wide range of families. Coleoptera and Lepidoptera orders were the most sensitive groups to ecological light pollution in the study area. The paper suggested that LED was the least attractive light system for most of the affected groups both because of its very little emitted short-wavelength light and because of its lower light intensity. They also concluded that reduction in insect attraction to LED could be even larger with current LED technologies emitting warmer lights, since other research showed that LED emitting “warmer white” colour light (3000 K) involves significantly lower attraction for insects than “colder white” LED (6000 K).

Wilson *et al.* (2021) investigate the impact of LED on biting insects and concluded because LED is highly malleable regarding spectral composition, they can be tailored to decrease or increase insect catches, depending on situation. Therefore, this design control of LED could greatly assist in reducing impact of street lighting on local bat populations.

Stone *et al*. (2015) reviewed the impacts of ALAN on bat roosts and flight paths to provide recommendations in relation to street lighting. The principal recommendations were to avoid lighting places where bats are present and to ensure that there are interconnected light exclusion zones and variable light regimes with reduced intensity of light in specific areas (e.g. important foraging and commuting habitats) as responses to street lighting may vary between species. It recommends that there should be a 'light threshold'.

1.1.4.1.1 Lighting Guidelines – Effective Mitigation Measures

As a consequence of this extensive amount of research there are two principal guideline documents available for best practice for effective mitigation relating to outdoor lighting.

EUROBATS (Voigt *et al.,* 2018) guidelines recommends the following:

- ALAN should be strictly avoided, and artificial lighting should be installed only where and when necessary, coupled with the following:
    - Dynamic lighting schemes, where possible.
    - Use a minimal number of lighting points and luminaires on low positions in relation to the ground for minimising light trespass to adjacent bat habitats or into the sky.
    - Use focused light, e.g. by using LED or shielded luminaires which limit the light flux only to the required areas and prevent light trespass into adjacent bat habitats.
    - Create screens, either by erecting walls or by planting hedgerows or trees, to prevent light trespass, e.g. from illuminated roads, to surrounding bat habitats.
    - Exits of bat roosts and a buffer zone around them should be protected from direct or indirect lighting to preserve the natural circadian rhythm of bats.

This BCT (2018) guidelines provided a list of recommendations in relation to luminaire design, which was based on the extensive research completed at the time on the potential impact of lighting on bats, and therefore provides best practice mitigation measures. These recommendations have been updated with the new BCT (2023) guidelines:

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp-cut-off, lower intensity, good colour rendition and dimming capability,
- A warm white light source (2700 Kelvin or lower) should be adopted to reduce blue light component.
- Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.

DEFINITION: Red Light refers to the light sources in the red spectrum and mainly consist of long wavelength light above 600nm with an RA value of 60 (for good colour recognition). This wavelength of light is considered to the have the least impact on bats.

- Internal luminaires can be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill.
- Waymarking inground markers (low output with cowls or similar to minimised upward light spill) to delineate path edges.
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ration, and with good optical control, should be considered.
- Luminaires should always be mounted horizontally, with no light output above 90^{o} and/or no upward tilt.
- Where appropriate, external security light should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow (e.g. 1-2 minute timer).
- Use of a Central Management System (CMS) with additional web-enables devices to light on demand.
- Use of motion sensors for the local authority street lighting may not be feasible unless the authority has the potential for smart metering through a CMS.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Due to the large array of research undertaken on the potential impact of ALAN on bats, the new guidelines from the BCT (2023) have provided an updated table on the potential impact of ALAN on UK bat species. Extracting data from this table, the following is a summary of the effect of ALAN on Irish Bat species. Please note that this information is drawn from European studies and, unfortunately, as it does not have information for all Irish bat species, it is indicative only.

Table 3b: Potential impact of lighting on Irish bat fauna.

YELLOW: Positive effect **GREY:** No effect **BLUE:** Negative effect **NA:** No data available

Species	Roost	Flight Corridor	Foraging Area	Drinking Site	Migration	Landscape Level	Habitat Type
Lesser horseshoe bat			NA	NA	NA		Clutter
Brown long-eared bat					NA		Clutter
Natterer's bat		NA	NA		NA	NA	Clutter

Daubenton's bat	NA			NA	NA		Edge
Whiskered bat	NA	NA	NA	NA	NA	NA	Edge
Common pipistrelle	NA				NA		Edge
Soprano pipistrelle				NA			Edge
Nathusius' pipistrelle	NA	NA	NA	NA			Edge
Leisler's bat	NA	NA	NA		NA		Open

BCT (2023) also state key messages in this document, some of which are presented below:

Key Message 1.18

"It is important to minimised ALAN close to vegetation, particularly for slower-flying species, and the need to increase dense vegetation in urban landscape to provide, not just roosting opportunities, but also protection against ALAN for open-space foraging bats in city landscapes".

Key Message 1.20

"When considering how bats move through the landscape, ALAN has been shown to be particularly harmful along river corridors, near woodland edges and hedgerows".

Key Message 1.39

"This research highlights the importance of integrating avoidance measures (as per the first step of the mitigation hierarchy) into the development design, by retaining ecologically functional 'dark corridors' within scheme where feasible, and in preference to seeking lighting mitigation strategies".

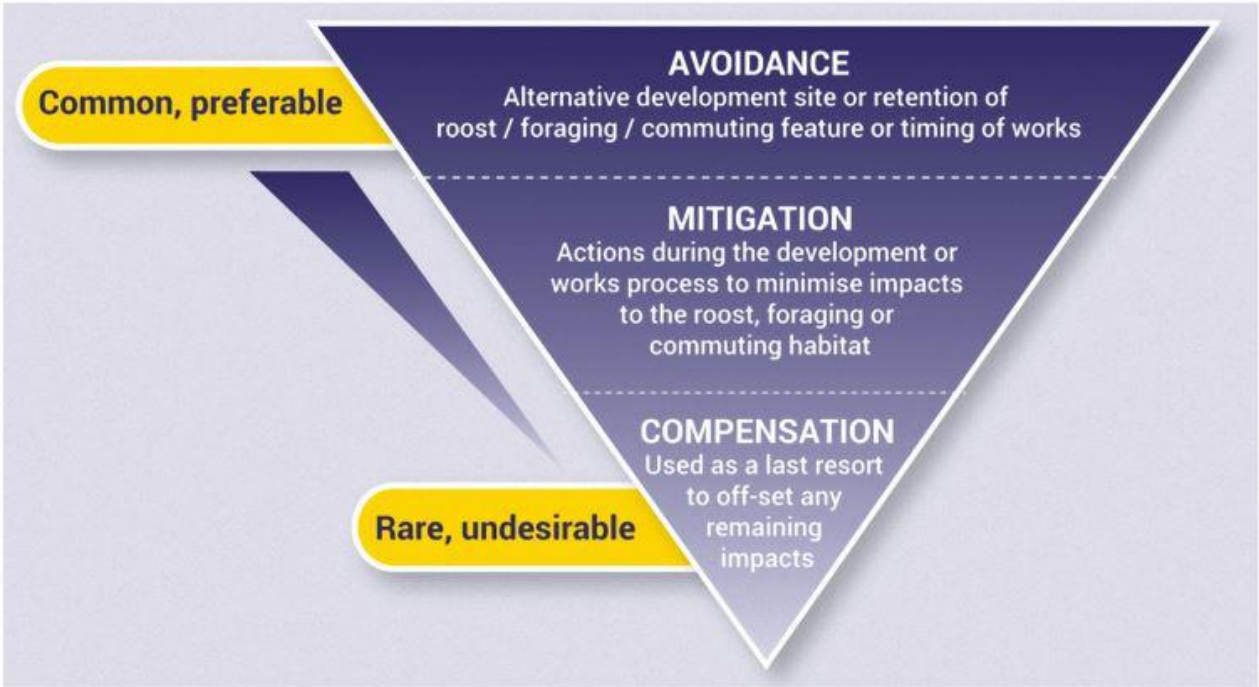

Figure 2. Mitigation hierarchy emphasising the importance of considering avoidance in the first instance (credit Bat Conservation Trust).

Figure 1c: Taken from BCT (2023) – Mitigation Hierarchy.

Key Message 3.13

"There are no lux level thresholds available for individual species to negate the need for site specific advice. Every site is different … The key in the first instance is to maintain or reduce existing light levels, and reduce blue content to protect the bat species present … Ideally light levels should always be designed to minimise potential environmental impacts and to maximise the potential of habitat and species enhancement work …"

1.1.4.2 Bat Box Schemes

Bat Boxes are frequently used as part of bat mitigation to retain local bat populations within an area proposed to be development. The NPWS Bat Mitigation Guidelines (Marnell *et al.* 2022) considers that where roosts of low conservation significance (Figure 20, Marnell *et al.* (2022)) are to be lost due to a development, bat boxes may provide an appropriate form of mitigation and the effectiveness depends on the type of bat box provided, which should be appropriate to the bat species (Figure 1f).

Table 7 The types of bat box used by different species.

Species	Summer/ maternity	Summer/non breeding	Hibernation*	Notes
Rhinolophus hipposideros	N/A	N/A	N/A	Horseshoe bats cannot use bat boxes
Myotis daubentonii	H	H		
Myotis mystacinus	H	H		
Myotis nattereri	H	?		
Pipistrellus nathusii	H	H		
Pipistrellus pipistrellus	C	C/H	C	H are rarely used as maternity roosts.
Pipistrellus pygmaeus	C	C/H	C	
Nyctalus leisleri	H	H	H?	
Plecotus auritus	H	H		Maternity roosts

Key

* Large well-insulated hibernation boxes may be more successful

N/A -not applicable; bat boxes should not be considered as replacement roosts

H – tree hollow-type box, providing a void in which bats can cluster

C – tree crevice-type box, with 25-35mm crevices

? – few data on which to base an assessment

Figure 1d: Table 7 (p 58) Reproduced from Marnell *et al.* (2022).

1.1.4.2.1 Effectiveness of Bat Boxes as a Mitigation Measure

Two publications that provide good scientific advice in relation to the effectiveness of bat boxes are presented below. McAney & Hanniffy (2015) reviewed the use of bat boxes in Ireland in relation to the bat usage of the following bat box schemes: 62 Schwegler boxes of three models erected in Portumna Forest Park (Bat box scheme consisted of 30x 1FF design, 30x 2FN design and 2x 1FW design); 50 2FN boxes erected in Coole-Garryland Nature Reserve and 50 2FN boxes erected in Knockma Nature Reserve of which 40 were later transferred to Glengarriff Nature Reserve County Cork. The bat box schemes were set up in March 1999 and data was collected up to 2015. Eight of the nine resident bat species were recorded roosting in bat boxes (lesser horseshoe bats cannot

use bat boxes due to their need to fly, rather than crawl, into roosts). The main summary points are as follows:

- Leisler's, brown long-eared and *Pipistrellus* spp. were recorded in boxes at all three Galway woods, Daubenton's bat was only recorded in Garryland, Natterer's bat was only recorded in Glengarriff and whiskered/Brandt's was recorded just twice.
- There was a 31% chance of encountering a bat at Portumna Forest Park compared to 11.5% and 10% at Coole-Garryland Nature Reserve and Knockma Nature Reserve respectively.
- Pipistrellus spp. preferred 1FF boxes as this bat box design offer crevice-like roosting conditions. This species group also showed a seasonal preference with more bats present later in the season (visual observations confirmed the bats were using the boxes as mating roosts) and their numbers increased from the time that the bat box scheme was originally established.
- Brown long-eared bats preferred 2FN boxes that mimic holes in trees, the natural roosting sites for this species. This species also showed no seasonal pattern to their occurrence in the boxes. However, one aspect of 2FN boxes that this report mentions is the high occupancy by birds which can be an issue in relation to nesting material reducing the availability of bat boxes for roosting bats.
- Leisler's bat showed no preference for box model but showed a seasonal preference with more bats present later in the season.
- Aspect was not a significant factor for occupancy, but most boxes received dappled sunshine for part of the day.
- The other factor that proved significant was the length of time the boxes were in place, with occupancy rates increasing for all three species, although in the case of pipistrelles this increase appears to have stabilised. So, although the boxes were occupied very quickly, it took several years before they were regularly occupied and before clusters of bats were formed and breeding was confirmed.

Collins *et al.* (2020) investigated the implementation and effectiveness of bat roost mitigation, which included bat boxes, in building developments completed between 2006 and 2014 in England and Wales. The bat species studied were common and soprano pipistrelle, brown long-eared bat and *Myotis* species, all of which are present in Ireland. A summary of the main points relating to bat boxes are as follows:

- Bat boxes were the most frequently deployed roosting provision (i.e. alternative roosts), being installed at 64% (n = 71) of sites surveyed as a compensation or enhancement measure.
- Box frequencies ranged from 1 to 41 at sites where they were installed, with an average of 6.6 boxes per site.
- Bats, or evidence of bats, were recorded in 20% of these bat boxes.
- Bat boxes mounted externally on buildings showed the highest occupation rate regardless of species while Common pipistrelle showed a preference for these over tree mounted boxes; the opposite was true for soprano pipistrelle.
- The four most popular bat box models used by consultants in the study were all Schwegler woodcrete bat boxes. Bat presence was highest in the 1FF bat box design (32%, n = 53) and lowest for birds (8%). The tree-mounted 2F and wall-integrated 1FR/2FR models both demonstrated similar bat presence rates of 23% (n = 43) and 25% (n = 32) respectively. The 2FN tree-mounted model showed the lowest presence rate for bats (11%, n = 19) and the highest for birds (58%). There were also 26 timber bat boxes, none of which were used by bats.

The author has also erected a number of bat box schemes and, where possible, has completed occasional monitoring visits. One such example is a bat box scheme erected in Kileshandra, Co. Cavan which consists of 8 Schwegler woodcrete bat boxes of various designs. The bat boxes were erected on mature trees located in a linear woodland adjacent to a river. This bat box scheme was erected in 2012 as part of mitigation for the demolishment of a large derelict building where small satellite roosts were recorded for *Pipistrellus* spp. and Daubenton's bat. Two site visits have been completed since 2012 and during these visits the bat boxes were checked for evidence of bat usage. The first site visit was on 25/8/2015 and one bat box was occupied by a single Leisler's bat while the additional seven bat doxes had evidence of bat droppings (*Pipistrellus* spp. and *Myotis* spp.). During the second site visit (27/7/2019) four bat boxes were occupied by bats (Soprano pipistrelle x1 individual (adult male), Leisler's bat x1 individual (adult male) and two bat boxes with x16 Daubenton's bats and x10 Daubenton's bats respectively). Biometrics was recorded for the 12 of the bats (which included 10 of the Daubenton's bats recorded in the bat box with 16 individuals) and five of these Daubenton's bats were lactating females with the remaining five Daubenton's bats recorded as juveniles, thereby indicating that this bat box was used as a maternity roost. The remaining four bat boxes all had droppings within for *Pipistrellus* spp and Leisler's bats. This bat box scheme, while just one example, demonstrates that when bat boxes are erected in an area with good bat habitat (bat survey documented a high level of bat activity for the named bat species), a high level of occupancy of bat boxes will occur.

In relation to bat boxes, Marnell *et al.* (2022), a document that provides guidelines that are considered to be practical and effective based on past experience, recommends that the design life of potential bat boxes, including essential maintenance, should be about 10 years, as this would be comparable with the lifespan of the tree roosts that bat boxes are designed to mimic. The guidelines continue by stating that the "This lifespan can be achieved with good quality wooden boxes and exceeded by woodcrete bat boxes or other types of construction that ensure any softwoods are protected from the weather and attack by squirrels" (note – this includes woodstone bat boxes).

In relation to the number of bat boxes recommended to be erected, Lintott & Mathews (2018) found that the greater the number of bat boxes deployed, the greater the probability of at least one of the boxes becoming occupied and that the odds of bats occupying at least one box increased by approximately 7% with each additional bat box that was deployed. Bat boxes are erected, as part of the development of the onshore transmission infrastructure, to mitigate for the loss of potential roosts in trees. Therefore, the number of bat boxes are calculated according to the number of trees with additional boxes added for greater bat conservation value.

Therefore, Schwegeler woodcrete bat boxes are recommended as a bat mitigation measure and the authors preference to use 1FF designs as this box is open at the bottom which reduces build-up of droppings (i.e. it is a self-cleaning bat box). Both McAney & Hannify (2015) and Collins *et al.* (2020) demonstrated that usage of this bat box design by bat species recorded in this survey report. This bat box is also less likely to be used by birds and therefore retaining it for bat usage between monitoring visits. To increase occupancy of bat boxes by bats it is important to erect bat boxes 4m or higher (to ensure that bat boxes are out of reach from disturbance by humans and predation by other mammals) and that they should be located where bats have been documented foraging and commuting. The aspect of the bat box is not an influencing factor in relation to occupancy. These recommendations have all been included in this report.

1.1.4.3 Landscaping For Bats

Bats depend on the landscape for foraging, roosting and commuting. Different bat species will travel different distances, to and from their principal roosting sites, depending on their morphology, life

stage and preferred foraging areas. Bats in Ireland are insect eating mammals and feed on an array of insects, whose populations are ultimately supported by vegetation. Areas of rich vegetation habitat tend to support higher abundances of insect populations and therefore a higher abundance of bats. In addition, many bat species rely on continuous linear habitats (e.g. treelines and hedgerows) to commute along. As a consequence landscaping as part of a development project is an important element to the goal of retaining local bat populations.

The Bat Conservation Trust publication "Landscape and Urban Design for bats and biodiversity" (Gunnell *et al.,* 2012) is a resource for planning landscape design in our urban areas. This resource encourages measures to enhance existing bat foraging habitat, create water features such as ponds (drinking sites for bats and as a source of emerging insects), manage species rich grassland and planting of tall vegetation to ensure that exiting treelines and hedgerows are linked. It also recommends that use of landscaping as a means to creating dark zones or dark corridors for this mammal group to fly along in our lit urban areas. This is also support by the BCT Lighting Guidelines (BCT, 2018) where landscape design can be utilised to buffer potential light spillage from developments.

1.1.4.4 Seasonality of Bat Mitigation Measures

The NPWS Bat Mitigation Guidelines (Marnell *et al.* 2022) provides best practice guidance in relation to the timing of bat mitigation measures. It states that the most common and effective method of avoiding potential harm to a bat is to carry out the work at an appropriate time of the year. The following table provides a summary of timings.

Table 5 Optimum season for works in different types of roosts.

Bat usage of site	Optimum period for carrying out works (some variation between species)
Maternity	1st October – 1st May
Summer (not a proven maternity site)	1st September – 1st May
Hibernation	1st May – 1st October
Mating/swarming	1st November – 1st August

Figure 1e: Table 5 (p 50) Reproduced from Marnell *et al.* (2022).

Timing of bat mitigation measures is relevant to the proposed tree felling of Potential Bat Roosts (PBRs). Felling is recommended outside the principal maternity season and during mild weather conditions (to avoid cold weather that would encourage bats to hibernate). This coupled with dusk/dawn surveys and additional daytime inspections is best practice to ensure that tree felling is completed without causing harm to potentially roosting bats. The preferred tree felling months also avoids the bird nesting season.

2. Development Description

2.1 Site Location

The preferred route option is in Poolbeg, County Dublin. The elements of the development of the onshore transmission infrastructure for the Poolbeg area is presented on the figure below.

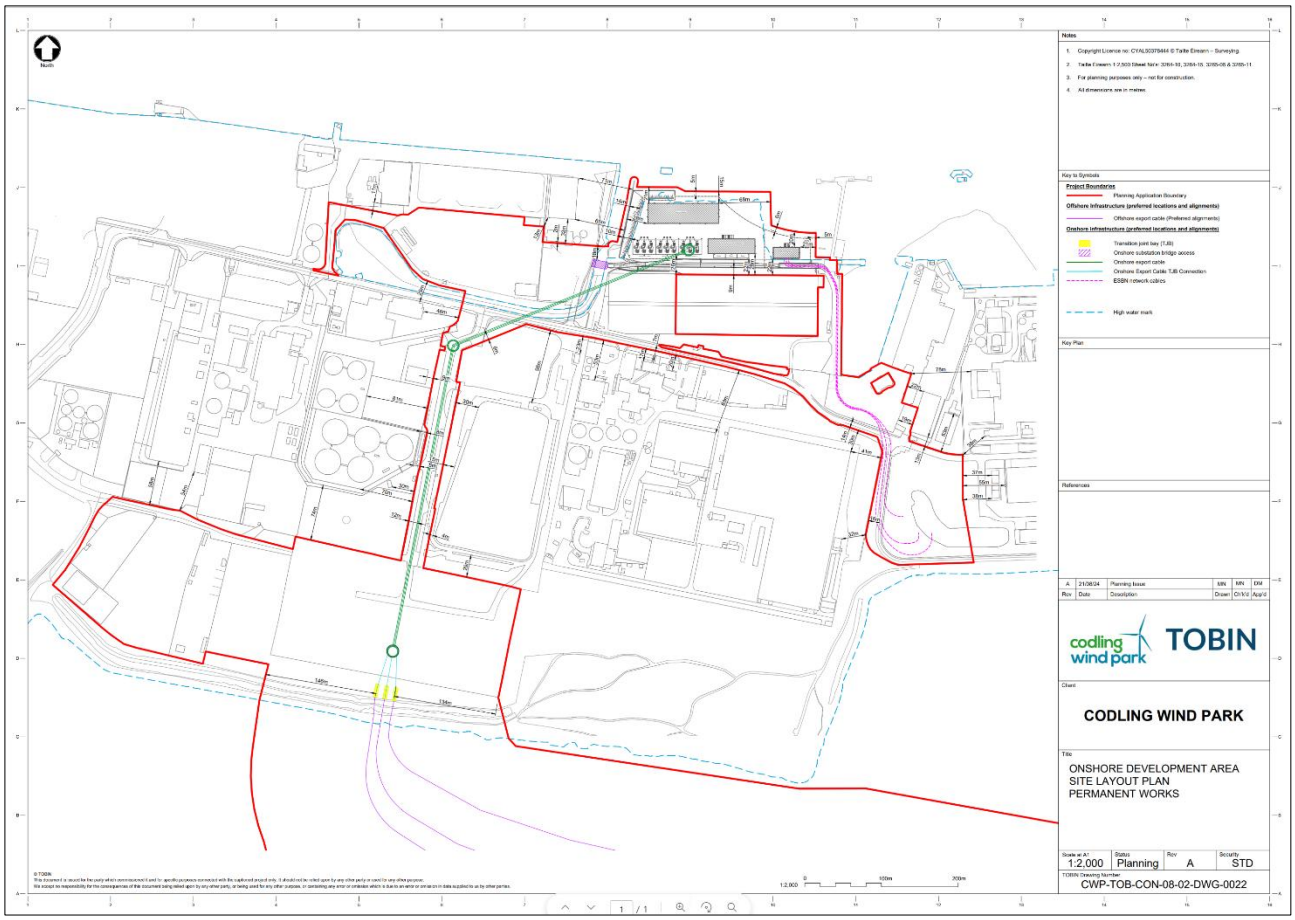

Figure 2: Location of proposed works in Poolbeg, Co. Dublin (Source: Tobin Consulting Engineers).

2.2 Proposed Project

1. Codling Wind Park Limited (CWPL) is proposing to develop the Codling Wind Park (CWP) Project, a proposed offshore wind farm (OWF) located in the Irish sea approximately 13 - 22 km off the east coast of Ireland, at County Wicklow.
2. EirGrid have identified Poolbeg as a preferred connection node for offshore wind, and the CWPL has therefore selected the area as the preferred option for the onshore infrastructure of the CWP Project.
3. The onshore infrastructure will include the following components of the CWP Project:
   - The landfall, which describes the point at which the offshore export cables are brought onshore; and
   - The OTI, which comprises the transition joint bays (TJBs), the onshore export cables, the onshore substation, and the Electricity Supply Board Networks (ESBN) network cables to connect the onshore substation to the Poolbeg 220kV substation.

Landfall and Onshore Transmission Infrastructure

4. The landfall location is where the offshore export cables will be brought onshore through the intertidal area within Dublin Bay, to a location where they are connected to the onshore export cables. The components of the landfall include works above and below the HWM and works that span the HWM, including:
   - Temporary facilities for the landfall works forming part of the Construction Compound A;
   - Installation of 3 no. Transition Joint Bays (TJBs), within which the offshore export cables are jointed to the onshore export cables;
   - Offshore export cable duct installation works between the TJBs and the HWM, and across the HWM, using open cut trenching installation;
   - A temporary cofferdam in the intertidal area (40m long and 75m wide);
   - Cable pull through the pre-installed cable ducts;
   - Vehicle and pedestrian access between Construction Compound A and the intertidal area;
   - Works to manage interfaces with the public, such as temporary diversion of the existing pedestrian pathway, protecting public from construction activities and reinstatement works;
   - Location of Construction Compound B, which will provide primarily material storage capacity;
   - A temporary access route for construction compound A and B;
   - Open cut trenching works will require temporary removal and reinstatement of the existing coastal revetment; and
5. Three 220kV HVAC onshore export cable circuits will connect to the offshore export cables at the landfall / TJBs and will transfer the electricity onwards to the onshore substation.
6. To install the onshore export cables between the landfall and the onshore substation the Applicant is seeking consent for underground tunnelling for the onshore export cables. At a high level, the option can be summarised as follows:
   - Installation of the onshore export cable circuits within an underground tunnel. The tunnel will be installed beneath a number of man-made structures and existing utilities;
   - The route for the onshore export cables is west of the Dublin Waste to Energy Plant, crossing under the cooling water channel & into the onshore substation site.
7. The onshore substation is located on the south bank of the River Liffey, on the Poolbeg Peninsula. The site is currently unused land on the southern bank of the River Liffey, reclaimed by Dublin Port Company (c. 1998) and surrounded on three boundaries by water and then by a mixture of industrial uses. Immediately to the south the site is the Ringsend Waste Water Treatment Plant and Pigeon House Road, beyond which lies the Irishtown Nature Park and Dublin Bay. The onshore substation will be a gas insulated (GIS) switchgear design, where the HV equipment is designed to be insulated and cooled by pressurised gas. The substation will include:
   - Perimeter structures including upgraded revetements and coastal retaining walls;
   - Land reclamation for the ESB building;
   - Raised site platform;
   - 1 no. GIS building;
   - 2 no. ESB buildings (the ESB GIS building and ESB MV building);
   - 3 no. Shunt reactors (incorporated within the GIS building);
   - 1 no. Statcom buildings;
   - 3 no. Harmonic filters;
   - Piling foundations for the site buildings;

- Upgrades to the existing access road from Pigeon House Road to the site entrance;
- New bridge to provide vehicle access across the Dublin Waste to Energy plant cooling water discharge channel;
- New internal access road layout within the site boundary;
- Drainage infrastructure;
- Security and lighting.

8. The boundary of the onshore substation site will require reinforcing so a future quay wall and revetment structure will be installed around the perimeter of the site. In the northeast corner, these perimeter works are required facilitate a waterside turning circle for Dublin Port Company (DPC).
9. A temporary construction compound (Construction Compound C) will be located within the Dublin City Council (DCC) land to the south east of the onshore substation, adjacent to the existing Pigeon House Hotel. Contractor welfare facilities will be located in this compound as well as some material storage space.
10. A temporary construction compound (Construction Compound D) will be located on the western side of the cooling water channel, next to where the new bridge is being installed. Contractor welfare facilities will be located in this compound as well as some material storage space, to facilitate the bridge installation.
11. Three 220kV HVAC onshore export cable circuits will connect from the onshore substation to the Poolbeg 220kV substation, which will then transfer the electricity onwards to the national grid. The onshore export cables from the onshore substation to the Poolbeg 220kV substation will be installed by a combination of open cut trench and HDD. There is an existing Irish Water culvert on the route of the open cut section. However, site conditions will still allow for an open cut trench installation at this location without impacting on the existing culvert. Most infrastructure located below ground.

Operation and Maintenance Phase

12. For the landfall and onshore export cables, there will be minimal above ground infrastructure left in place. The TJBs and the onshore export cables will be located underground.
13. The onshore substation will be largely unmanned, outside of times of essential inspections and maintenance.

3. Bat Survey Methodology

3.1 Guidance Document

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

- Collins, J. (Editor) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). Bat Conservation Trust, London
- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland (Version 1: Kelleher & Marnell, 2006).

Collins (2023) was the principal document used to provide guidance in relation to bat survey effort required. Marnell *et al.* (2022) is referred to for guidance in relation to survey guidance (timing and survey design), derogation licences and mitigation measures.

3.2 Desktop Review

3.2.1 Bat Conservation Ireland Database

Bat Conservation Ireland acts as the central depository for bat records for the Republic of Ireland. Its' bat database is comprised of >100,000 bat records. The database primarily contains bat records from the following datasets:

- Irish Bat Monitoring Programme
- BATLAS 2020 & 2010
- Ad Hoc Bat Records submitted by ecologist bat groups etc.

An important caveat to note is that the BCIreland dataset is dependent on bat records being regularly submitted to BCIreland and/or NBDC. Therefore the absence of information does not necessarily imply that there are no bats or bat roosts present in the search area.

3.2.2 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 are undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope).

Buildings were assessed to determine their suitability as a bat and described using the parameters Negligible, Low, Moderate or High suitability in view of table presented in the previous section.

Survey Date: 11th May 2022 & 5th April 2023

3.2.3 Tree Potential Bat Roost (PBRs) Inspection

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

Trees identified as PBRs were inspected during the daytime, where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present) 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.

A Phase 1 inspection was undertaken to make a list of trees within the development of the onshore transmission infrastructure site to onshore development area that may be suitable as roosting sites for bats. Inspections were undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) during the daytime searching for PRFs, if visible.

Survey Date: 16th September 2021 & 11th May 2022

Table 4b: Tree Bat Roost Category Classification System (adapted from Collins, 2016).

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

3.2.4 Bat Habitat & Commuting Routes Mapping

The survey site was assessed during daytime walkabout surveys, in relation to potential bat foraging habitat and potential bat commuting routes. Such habitats were classified according to Fossit, 2000 (Appendix 1, Table 1.B). Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs.

Survey Date: 16th September 2021 & 11th May 2022

3.3 Night-time Bat Detector Surveys

3.3.1 Dawn Bat Survey

Dawn surveys were completed (in vicinity of Building 1, Building 2 and Building 3 (See Figure 4a, Results Section) from 110 minutes before sunrise to 10 minutes after sunrise. Surveys were completed during mild and dry weather conditions with air temperature 8°C or greater. All bat encounters were noted during surveys.

Survey Date: 11th May 2022

3.3.2 Dusk Bat Survey

Dusk surveys were completed (in vicinity of Building 1, Building 2 and Building 3 (See Figure 4a, Results Section) from 15 minutes before sunset to 110 minutes after sunset. Surveys were

completed during mild and dry weather conditions with air temperature 8ºC or greater. All bat encounters were noted during surveys.

5th and 12th August and 4th September 2025

3.3.3 Walking Transects

Walking transects were undertaken from dusk on 16/9/2021, 10/5/2022, 5/4/2023, 12/8/2025 and 4/9/2025 and prior to Dawn Survey (11/5/2022). This involved the surveyor(s) walking the survey area, noting the time, location and bat species encountered. Due to the large array of buildings in the general survey area, the surveyors, during the walking transects, were vigilant of any potential emerging bat from buildings and therefore applied combined the methodology of dusk surveys and walking transects. Mapping of bat encounters was undertaken using QGIS and an excel file produced for mapping purposes (ITM Irish grid reference co-ordinates). Validation of bat records was completed by the principal bat surveyor prior to mapping.

Survey Dates: 16th September 2021, 10th May 2022, 11th May 2022, 5th April 2023 & 12th August and 4th September 2025

The following equipment was used:

Surveyor 1 (Principal surveyor): Anabat Walkabout Full Spectrum Bat Detector and Petersson D200 Heterodyne Bat Detector.

Surveyor 2: Bat Logger M2 Spectrum Bat Detector and Petersson D200 Heterodyne Bat Detector.

3.3.4 Filming

Guide TrackIR Pro25, Pro19 thermal imagery scope filming was also deployed during the dawn survey on 11/5/2022 to capture potential roosting bats in the warehouse located at Poolbeg (Building 1). This was completed from 110 minutes before sunrise to 10 minutes after sunrise. While filming was completed for all dusk surveys undertaken in 2025 with filming starting from 15 minutes before sunset to 110 minutes after sunset. Captured film was watched post-survey and any emerging bats were noted. Bat detectors were attached to the filming units to aid species identified: e.g. Anabat Scout Full Spectrum Bat Detectors.

Survey Date: 11th May 2022, 5th and 12th August and 4th September 2025

3.3.5 Passive Static Bat Detector Survey

Passive Static Bat Surveys were completed in

- 2021 (Static 1: 15/9/2021 to 20/9/2021);
- 2022 (Static 2: 11/5/2022 to 16/5/2022 and Static 3 & 4: 7/6/2022 to 12/6/2022);
- 2023 (Statics 5-8: 5/4/2023 to 11/4/2023);
- 2025 (Statics 9-12: 5/8/2025 to 14/8/2025.

Static bat surveys involved leaving a static bat detector unit (with ultrasonic microphone) in a specific location, 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 was effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time and increases the opportunity to record less common bat species as the units are set to continuously record ultrasonic noise, when triggered, from 30 minutes for sunset to 30 minutes after sunrise. Bat detectors with ultrasonic microphones were 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. The static units deployed 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 depicted on a graph showing the number of bat passes per species per 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.

Recordings were analysed using Wildlife Acoustics Kaleidoscope Pro. Manual validation was undertaken by the principal bat specialist and the following rules were followed:

- Validation that the auto-id function was checked for at least 20% of *Pipistrellus* spp. and Leisler's bat calls apart from Nathusius' pipistrelle calls.
- All Nathusius' pipistrelles calls were manually verified. The reasoning for this is due to frequently misidentification of low 40kHz calls, by auto-id tools, as this species, which may in fact be low frequency common pipistrelle calls.
- All brown long-eared bat calls were manually verified. The reasoning for this due to frequently misidentification of social calls of *Pipistrellus* spp. frequently identified as this bat species.
- Manual verification of *Myotis* spp., where possible, to species level in order to increase the accuracy of the dataset. Where such calls cannot be identified to species level, they are reported as *Myotis* spp.
- Manual validation was undertaken for all "Unidentified" calls and for approximately 20% proportion of "Noise" calls.

Each audio file was noted as a bat pass to indicate level of bat activity for each species recorded. This was expressed as the average number of bat passes per survey night (no. of nights was the total number successful nights of deployment). The following static unit model were deployed during this static bat detector survey:

Table 5: Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Unit Code	Bat Detector Type	Recording Function	Microphone
SM Mini Bat 1 Units	Wildlife Acoustics SongMeter Mini Bat	Passive Full Spectrum	SMM-U2
SM Mini Bat 2 Units	Wildlife Acoustics SongMeter Mini Bat	Passive Full Spectrum	SMM-U2

Figure 3a: Location of static units deployed during static surveillance 2025 (Map produced on 19/10/2025).

Figure 3b: Location of static units deployed during static surveillance 2021, 2022 & 2023 (Map produced on 25/6/2024).

4. Bat Survey Results

A bat survey is comprised of several different elements. The results of these different types of surveys are presented below in a step-wise fashion and summarised at the end of the section. It is important that the whole section is read to gain a full impression of the potential bat value of the survey area.

4.1 Daytime Inspections

4.1.1 Building & Structure Inspections

There are no works proposed for the buildings described below. However, as a precaution, surveys were undertaken to collated information on local bat populations within and adjacent to the proposed development area.

The Buildings 1, 2, and 3 were inspected in the area of Poolbeg, Co. Dublin on the 11th May 2022. These buildings are located in a highly industrial zone with little tall vegetation. As a consequence, the suitability of the area for foraging and commuting bats is greatly reduced and therefore the suitability of the buildings, to provided bat roosting sites, is reduced. The internal and external walls of Building 1 was inspected (at ground level) while only the external walls of Building 2 and Building 3 were inspected. No evidence of bat usage was recorded in the buildings.

Buildings 1 and 4 were inspected in the area of Poolbeg, Co. Dublin on the 5th April 2023. No evidence of bat usage was recorded in the buildings. Building 1 was inspected a second time due to ease of accessing the building and due to the fact that this is a large building and ground inspections cannot rule out potential roosting sites at higher levels. This is a large open building (i.e. ease of access for a transient bat in need of shelter during inclement weather conditions) and while there was no evidence of bat usage during the surveys, it is not possible to state that bats do not use it occasionally.

The Buildings 1, 2, and 3 were inspected in the area of Poolbeg, Co. Dublin on the 5th August 2025. Inspection of Building 1 was limited due to Health and Safety reasons, with access only to ground floor areas was permitted. The internal and external walls of Building 1 was inspected (at ground level) while only the external walls of Building 2 and Building 3 were inspected. No evidence of bat usage was recorded in the buildings. The immediate area of these buildings continues to be highly industrialised and as a consequence, the suitability of the area for foraging and commuting bats is greatly reduced. In addition, there is security lighting present in the front courtyard of the buildings. Therefore the suitability of the buildings (esp. Building 2), to provided bat roosting sites, is reduced. There is no lighting to the rear of Building 1.

Table 6: Buildings / Structures inspection results.

Building Code	Description	Roost Type / Suitability	Bat Species
Building 1 ITM 720384, 733784	Large derelict warehouse building (former Power Station). Main power station is a red brick structure. There are additional modern extensions to the rear of the main building.	Low to Moderate Suitable crevices and could provide shelter during inclement weather conditions. Limited tall vegetation to provide foraging and commuting habitat.	No evidence recorded However, limited access due to derelict condition of structure.

	Large interior space with crevices suitable as potential roosting spaces. Sections of roof in poor condition.		
Building 2 ITM 720339, 733687	Large estate house, currently used as offices. Slate roof, natural stone cladding (See Plate 2).	Low Suitable due to slate roof and type of building. However, large degree of security lighting present which reduces suitability. No commuting or foraging habitat directly adjacent to structure.	No evidence recorded (only external walls of structure surveyed)
Building 3 ITM 720378, 733679	Sheds Mixed roof material, concrete walls 2-storey structures. This structure is adjacent to Building 1 (gable – See Plates 1b and 3)	Low Not suitable for roosting and large degree of security lighting present which reduces suitability. Little vegetation adjacent to structure.	No evidence recorded (only external walls of structure surveyed)
Building 4 ITM 719875, 733816	Shed Mixed roof material, concrete walls.	Negligible Not suitable for roosting. No commuting or foraging habitat adjacent to structure. Lighting present.	No evidence recorded

Figure 4: Location of buildings surveyed during daytime inspection and dawn survey 11/5/2022 and inspected on 5/4/2023.

Plate 1a: Building 1, Poolbeg, Co. Dublin.

Plate 1b: Building 1 – gable of main structure with section of Building 3 shown, Poolbeg, Co. Dublin.

Plate 1c: Building 1 – rear of main structure of Building 1, Poolbeg, Co. Dublin.

Plate 2: Building 2 – Modern sheds adjacent to Building 1, Poolbeg, Co. Dublin.

Plate 3: Building 3 – Modern sheds adjacent to Building 1, Poolbeg, Co. Dublin.

4.1.2 Tree Potential Bat Roost (PBRs) Inspection

The area surveyed in 16th September 2021 and 11th May 2022 were surveyed for trees with Potential Bat Roost (PBR) features. There are no trees with such features present within the survey area and therefore are considered not suitable to provide roosting for local bat populations.

4.1.3 Bat Habitat & Commuting Routes Mapping

The habitat types, with reference to Fossit (2000) were recorded both within the survey area and adjacent to the survey area on 16th September 2021 and 11th May 2022. The survey area is located in a highly industrial zone with little tall vegetation. As a consequence, the suitability of the area for foraging and commuting bats is greatly reduced.

Table 7a: Habitat types present within survey area.

Habitat	Yes	Habitat	Yes	Habitat	Yes	Habitat	Yes
Cultivated land		Salt marshes		Exposed rock		Fens/flushes	
Built land	√	Brackish waters		Caves		Grasslands	√
Coastal structures	√	Springs		Freshwater marsh		Scrub	√
Shingle/gravel		Swamps		Lakes/ponds		Hedges/treelines	
Sea cliffs/islets		Disturbed ground	√	Heath		Conifer plantation	
Sand dunes		Watercourse		Bog		Woodland	

Table 7b: Habitat types present adjacent to survey area.

Habitat	Yes	Habitat	Yes	Habitat	Yes	Habitat	Yes
Cultivated land		Salt marshes		Exposed rock		Fens/flushes	
Built land	√	Brackish waters		Caves		Grasslands	√
Coastal structures	√	Springs		Freshwater marsh		Scrub	√
Shingle/gravel		Swamps		Lakes/ponds		Hedges/treelines	√
Sea cliffs/islets		Disturbed ground	√	Heath		Conifer plantation	
Sand dunes		Watercourse		Bog		Woodland	

4.2 Night-time Bat Detector Surveys

4.2.1 Walking Transect 16th September 2021

A walking transect of the Sean Moore Park and along the pedestrian pathway towards the Great South Wall was surveyed at dusk on 16th September 2021 (Weather conditions: 15°C, full cloud cover, breezy and dry).

Three bat species were recorded on during the walking transect completed on the 16th September 2021 (soprano pipistrelle, common pipistrelle and Leisler's bat). Common pipistrelle was the most frequently bat species recorded during the walking transect with encounters noted along the majority of the transect. While Leisler's bat and soprano pipistrelles were recorded, they are encountered infrequently along the transect.

Figure 5a: Common pipistrelle bat encounters recorded during 2021 walking transects of Poolbeg, Co. Dublin (Map produced on 9/10/2022).

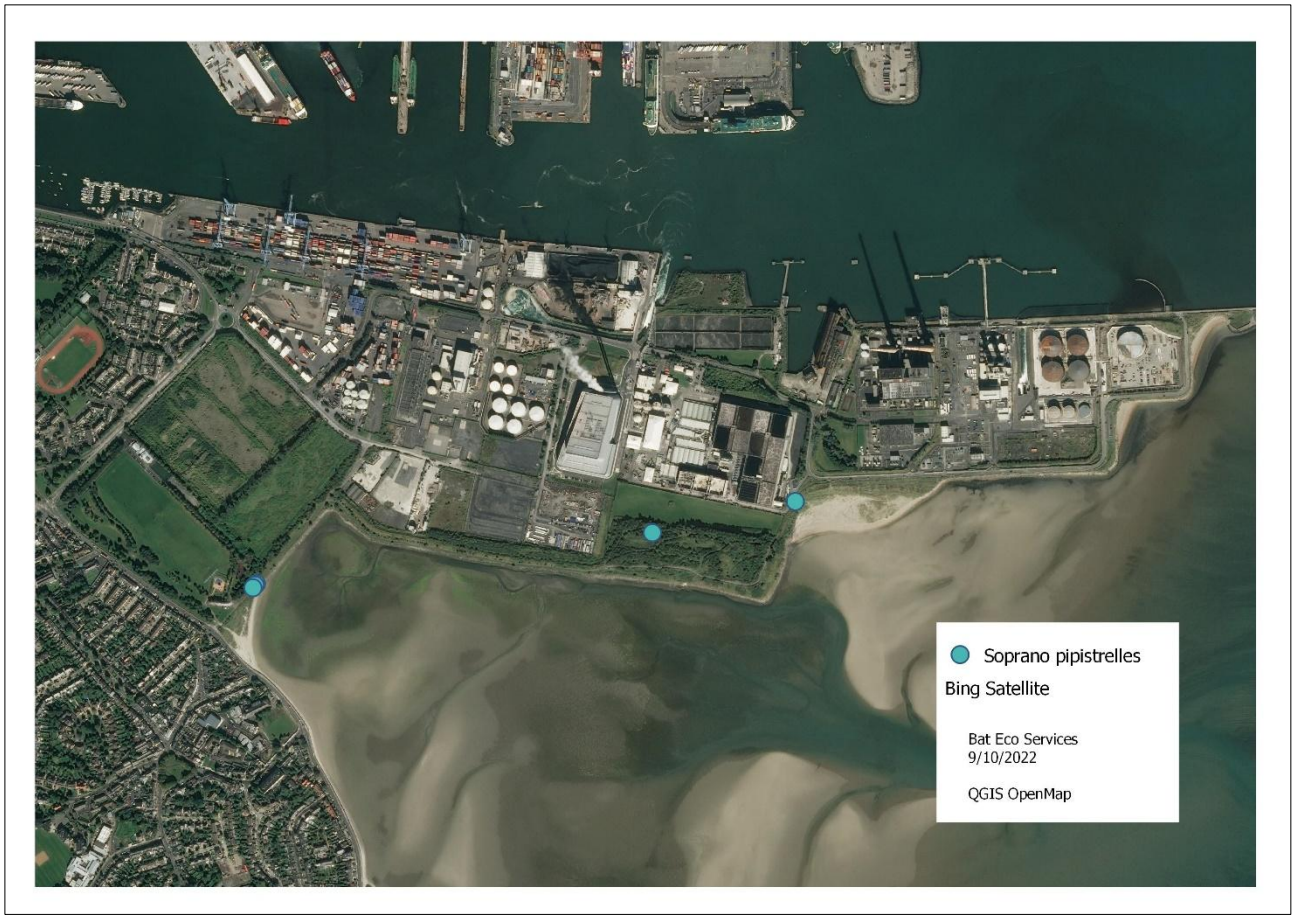

Figure 5b: Soprano pipistrelle bat encounters recorded during 2021 walking transects of Poolbeg, Co. Dublin.

Figure 5c: Soprano pipistrelle bat encounters recorded 2021 during walking transects of Poolbeg, Co. Dublin.

4.2.2 Dawn Bat Survey & Walking Transects 2022

Night-time surveys of the Poolbeg area was completed on 10th May 2022 (Walking Transect/Dusk Survey: weather conditions - 10°C, dry, light wind and patchy cloud cover) and around Buildings 1-3 was undertaken on the 11th May 2022 (Walking transect/Dawn Survey: weather conditions - 9°C, dry, light wind and patchy cloud cover). This included a dawn survey of Buildings 1-3 on the 11th May 2022 (03:30 hrs to 05:30 hrs). The buildings below and the general area of Poolbeg was surveyed by two surveyors (using full spectrum bat detectors) and two units of thermal imagery scopes (scopes deployed during dawn survey) concentrating on accessible sections of the structures. The walking transect include accessible roads within the development site.

During the dusk walking transect and dawn walking transect, no bats were detected commuting or foraging in the area during the survey and no bats were detected returning to roost in the buildings surveyed during dawn building survey. In order to back up the dawn survey, a static surveillance survey was undertaken for Building 1 (Please see Section 4.2.5 for results).

Table 8: Buildings / Structures survey results.

Building Code	Roost Type & Location	Bat Species (No. of bats)	Access Points	Vegetation / Lighting arrangement
Building 1	No bat roost recorded	Not applicable	Not applicable	No vegetation, outdoor lighting present
Building 2	No bat roost recorded	Not applicable	Not applicable	No vegetation, outdoor lighting present
Building 3	No bat roost recorded	Not applicable	Not applicable	No vegetation, outdoor lighting present

Plate 4: Screen shot of thermal imagery filming survey (Building 1 – Dawn Survey, 11/5/2022).

No bats were recorded during the walking transects completed in 2022. The lack of bat encounters during the 2022 walking transects reflects the fact that this area has little tall vegetation for commuting and foraging bats and bat activity is variable from season to season.

4.2.3 Walking Transect 5th April 2023

A walking transect of the park south of Poolbeg and the local road network was undertaken on 5th April 2023 (Weather conditions: 10°C, full cloud cover, light breeze and dry). Two species of bat was encountered during the walking transect: common pipistrelle (16 bat encounters) and soprano pipistrelle (8 bat encounters). This was a low level of bat activity recorded during a three hour walking transect.

Figure 6: Bat encounters recorded during 2023 walking transects of Poolbeg, Co. Dublin (Map produced on 25/6/2024).

4.2.4 Dusks Surveys & Walking Transects 2025

Three dusk surveys were undertaken in 2025. Night 1 (5/8/2025) surveyed Building 1, Building 2 and Building 3. The remainder two surveys (Night 2 – 12/8/2024 and Night 3 5/9/2025) concentrated on the rear buildings of Building 1 as bat activity was record in this area on Night 1.

Night 1 (5/8/2025: weather conditions full cloud cover, breezy, dry and 18oc) recorded no bats emerging from Building 1 and Building 3 by the surveyor positioned in the courtyard and this was confirmed by thermal imagery filming. Indeed, no bats were recorded commuting or foraging in the area during the entire bat survey. The surveyor located to the rear of Building 1 recorded a common pipistrelle flying low across the yard towards the open water at 21:52 hrs, 37 minutes after sunset. Common pipistrelles were recorded during the dusk survey with 2/3 individuals foraging along the buildings catching insects accumulating in the sheltered areas. A single soprano pipistrelle was recorded flying through the survey area from the water along the rear of the buildings at 22:40 hrs.

Post dusk survey, the surveyors undertook a walking transect. Two species of bat was recorded during this transect: common pipistrelle and soprano pipistrelle. All of the bat passes recorded for both the dusk survey and walking transect are mapped below along with the walking transect route.

Figure 7a: Bat encounters recorded during dusk survey and walking transects on 5/8/2025 of Poolbeg, Co. Dublin (Map produced on 19/10/2025).

As a consequence of the common pipistrelle bat activity recorded to the rear of Building 1, two additional dusk surveys were undertaken of the rear of Building 1 (coupled with thermal imagery filming). Due to limited space to set up thermal imagery scopes, thermal imagery filming over the course of the three nights covered numerous sections of Building 1 to determine bat emergence points. It should be noted that this is a large series of buildings with numerous open windows and doorways.

Night 2 was completed on 12/8/2025 (weather conditions: clear sky, light breeze, dry, 19oC). Two exit points were recorded and these are shown on Plate 5a. A total of three common pipistrelles emerged from the building. Common pipistrelles were recorded foraging along the water and rear of building (in sheltered areas) for the duration of the survey. Leisler's bats (first bat recorded at 21:46 hrs, 45 minutes after sunset) and soprano pipistrelles (first bat recorded at 22:41, 100 minutes after sunset) were also recorded.

A walking transect was also undertaken post dusk survey. The bat encounters for both the dusk survey and walking transect are presented on the map below along with the walking transect route. Three bat species were recorded, but a higher level of common pipistrelles (115 bat passes) was recorded with occasional encounters for Leisler's bats (8 bat passes) and soprano pipistrelles (8 bat passes).

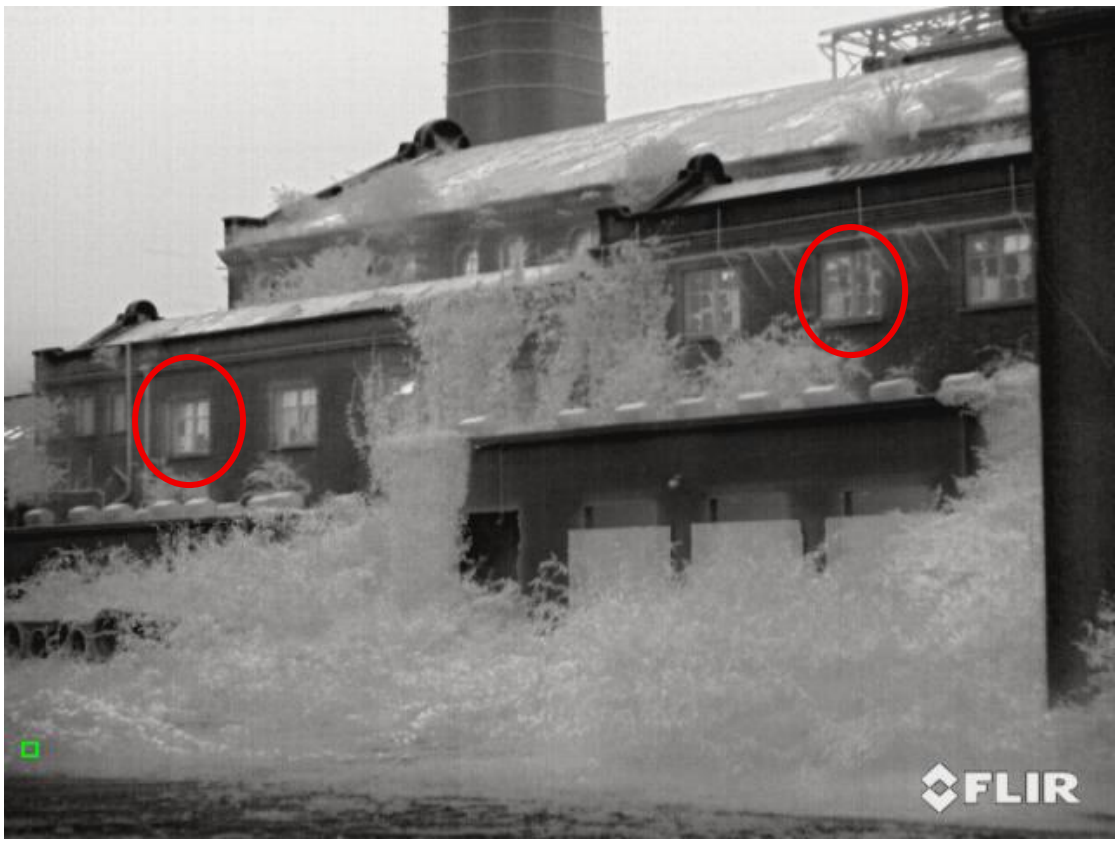

Plate 5a: Screen shot of thermal imagery filming survey by FLIR thermal imagery scope (Building 1 – Dusk Survey, 12/8/2025). Red circles – areas where bats emerged.

Figure 7b: Bat encounters recorded during dusk survey and walking transects on 12/8/2025 of Poolbeg, Co. Dublin (Map produced on 19/10/2025).

Night 3 was completed on 5/9/2025 (weather conditions: patchy cloud cover, light breeze, dry and 16oC). An Anabat Scout full spectrum bat detector was placed inside the modern extension of the structure (filmed by the FLIR thermal imagery scope), for the duration of the dusk survey, as bats were noted emerging from this area during Night 2 while the surveyors were located outside the Building 1. A single common pipistrelle was recorded emerging from single storey structure (species id confirmed by full spectrum bat detector record). This bat circled, foraging in and out of different sections of the 2-storey building (with the broken windows and shown in Plate 5a) building for the duration of the survey along with a second individual (exit point not noted).

Plate 5b: Screen shot of thermal imagery filming survey by FLIR thermal imagery scope (Building 1 – Dusk Survey, 5/9/2025). Red circle – area where bat emerged.

Plate 5c: Screen shot of thermal imagery filming survey by FLIR thermal imagery scope (Building 1 – Dusk Survey, 5/9/2025). Red arrow – foraging route of the 2 bats recorded.

The series of dusk surveys undertaken confirmed that there is a small satellite roost for common pipistrelles (approximately 3-5 individuals) roosting in the modern extension buildings to the rear of Building 1. The exit points were, from night to night, variable due to open access of the building and the numerous open doorways and broken windows.

4.3 Static Surveillance

4.3.1 Passive Static Bat Detector Survey 2021 & 2022

The following table summarises the results recorded on the static units deployed during three surveillance periods during 2021 and 2022. Static 1 and Static 2 were located in potential bat habitat areas while Static 3 and Static 4 were located in Building 1. Three bat species were recorded on Static 1 (soprano pipistrelle, common pipistrelle and Leisler's bat) while no bats were recorded on three other static units. The lack of bat encounters on Static 2-4 reflects the fact that this area has little tall vegetation for commuting and foraging bats. A similar pattern of bat activity was recorded during the walking transects, as reported above.

The level of bat activity recorded on Static 1 reflects that there is commuting and foraging habitat present in this area and that there is connectivity to other parkland areas west of Poolbeg and along South Dublin Bay. Common pipistrelles was the most frequently recorded bat species but overall the level of bat activity recorded is low. Leisler's bats were recorded briefly during each surveillance night while soprano pipistrelles were recorded on four of the five surveillance nights. Both of these bat species were recorded in a low level of bat activity.

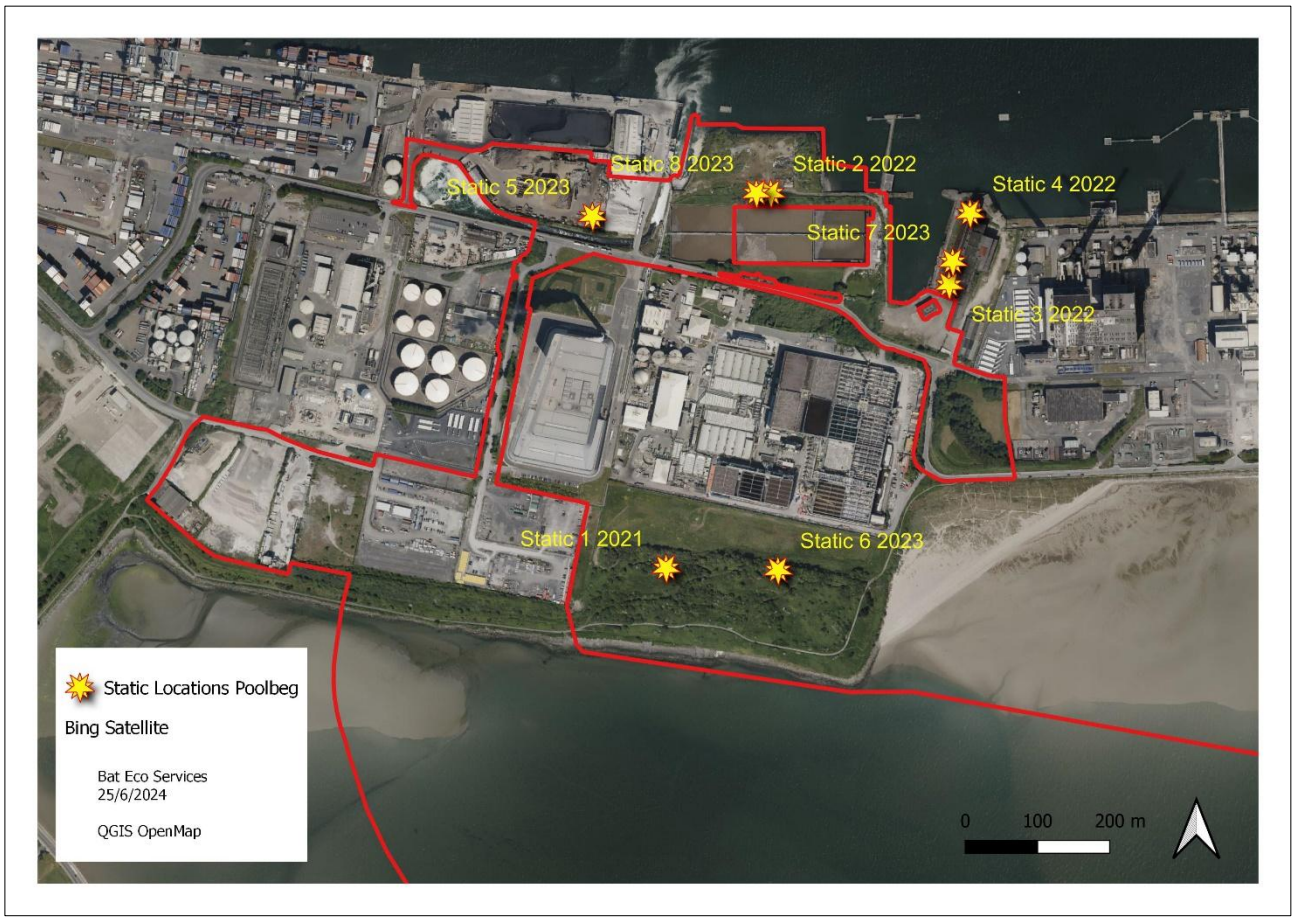

Figure 8a: Location of static units deployed during static surveillance 2021, 2022 & 2023 (Map produced on 25/6/2024).

Table 9a: Results of Static Bat Detectors deployed during 2021 & 2022 Static Bat Detector Surveys.

Static Code	Location Description / Bat Habitat Type	Grid Reference (ITM)	Survey Period	Bat Species
Static 1	Located on tree in parkland area	720122, 733848	15/9/2021 to 20/9/2021	Soprano pipistrelles, common pipistrelles, Leisler's bat
Static 2	Static on fence in field	720369, 733721	11/5/2022 to 16/5/2022	No bats recorded
Static 3	In Building 1	720398, 733820	7/6/2022 to 12/6/2022	No bats recorded
Static 4	In Building 1	719977, 733329	7/6/2022 to 12/6/2022	No bats recorded

Sunset times during the 2021 surveillance survey was approximately 19:50 hours. The time of first bat encounter for each bat species was investigated. Each bat species has an optimum emergence time; Leisler's bat emerge at sunset while *Pipistrellus* species emerge approximately 20 minutes after sunset.

The Leisler's bat echolocation calls were recorded 15-18 minutes after sunset indicating that the roost is not located within the survey area. The earliest common pipistrelle bat echolocation call was recorded at 20:33 hrs (16/9/2021) which is approximately 43 minutes after sunset. This indicates that the roost is not located within the survey area. A similar result was recorded for soprano pipistrelles with the earliest bat encounter noted at 20:32 hrs (19/9/2021), again indicating that the roost is not located within the survey area.

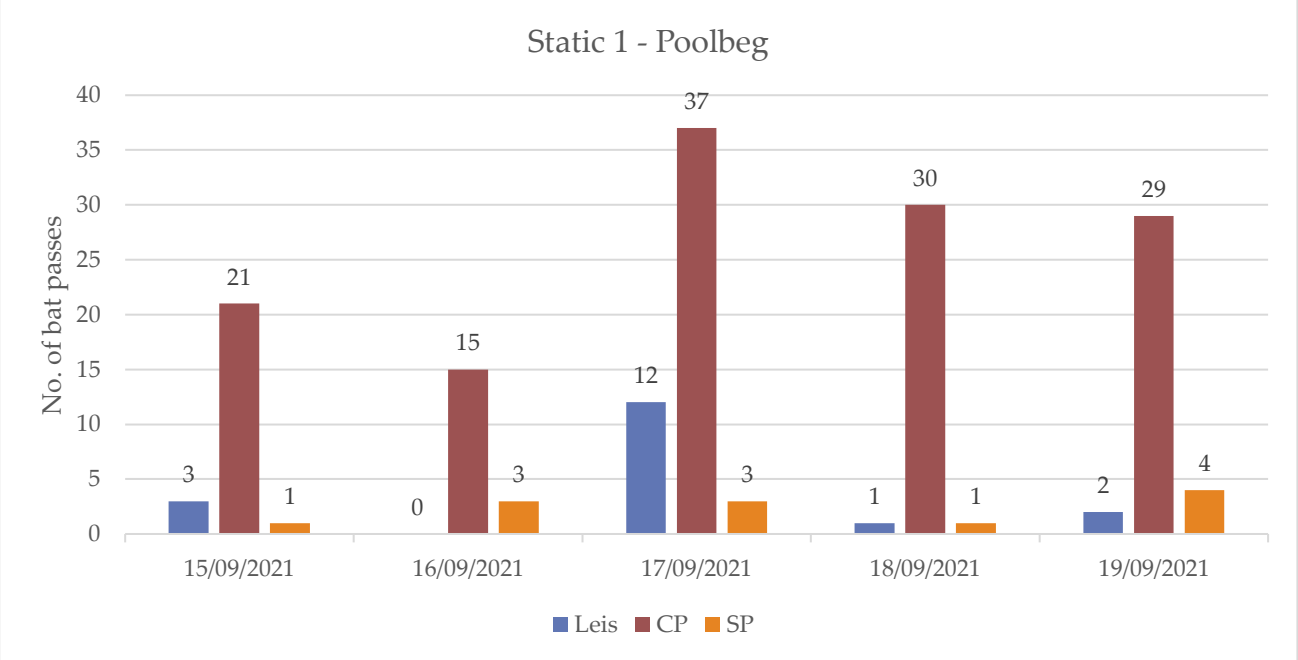

Figure 8b: Number of bat passes recorded on Static 1 deployed during static surveillance in 2021.

4.3.2 Passive Static Bat Detector Survey 2023

The following table summarises the results recorded on the static units deployed during 2023 (4 static units over 7 nights of surveillance). Static 5 and Static 7 were located in buildings while Static 6 and Static 8 were located in potential bat habitat areas. Two bat species were recorded on Static

6 and Static 8 (soprano pipistrelle and common pipistrelle), common pipistrelle was only recorded on the static unit located in Building 1 (Static 7) while no bats were recorded on the static unit located in Building 4 (Static 5).

In relation to the static unit located in Building 1 (Static 7), only one bat pass for a common pipistrelle was recorded and therefore indicates a single bat flying near or briefly in the structure. It is not indicative of a roosting individual.

Table 9b: Results of Static Bat Detectors deployed during 2023 Static Bat Detector Surveys.

Static Code	Location Description / Bat Habitat Type	Grid Reference (ITM)	Survey Period	Bat Species
Static 5	Located in Building 4	719875,733816	5/4/2023 to 11/4/2023	No bats recorded
Static 6	On tree in Irishtown Park	720132,733326	5/4/2023 to 11/4/2023	No bats recorded
Static 7	In Building 1	720374, 733753	5/4/2023 to 11/4/2023	Common pipistrelle
Static 8	On fence in field	720102,733848	5/4/2023 to 11/4/2023	Common pipistrelle, soprano pipistrelle

A greater number of bat passes was recorded on the static units located in nearby bat habitat (Static 6 and Static 8). The following graph depicts the total number of bat passes for each bat species. Common pipistrelle was the more frequently encountered bat species during the surveillance in 2023. This encounter rate for common pipistrelle was greater in 2023 than that recorded in the 2021 static surveillance (Static 1) which was located in a similar area to Static 6. However, no Leisler's bats were recorded in 2023 while a low encounter rate was recorded in 2021. A similar soprano pipistrelle encounter rate was recorded in 2023 and 2021.

A lower level of bat activity was recorded on Static 8 compared to Statics 6 in 2023. Static 8 was located in a similar position to Static 2 (2022 Static Surveillance). However in 2022, not bat activity was recorded on Static 2.

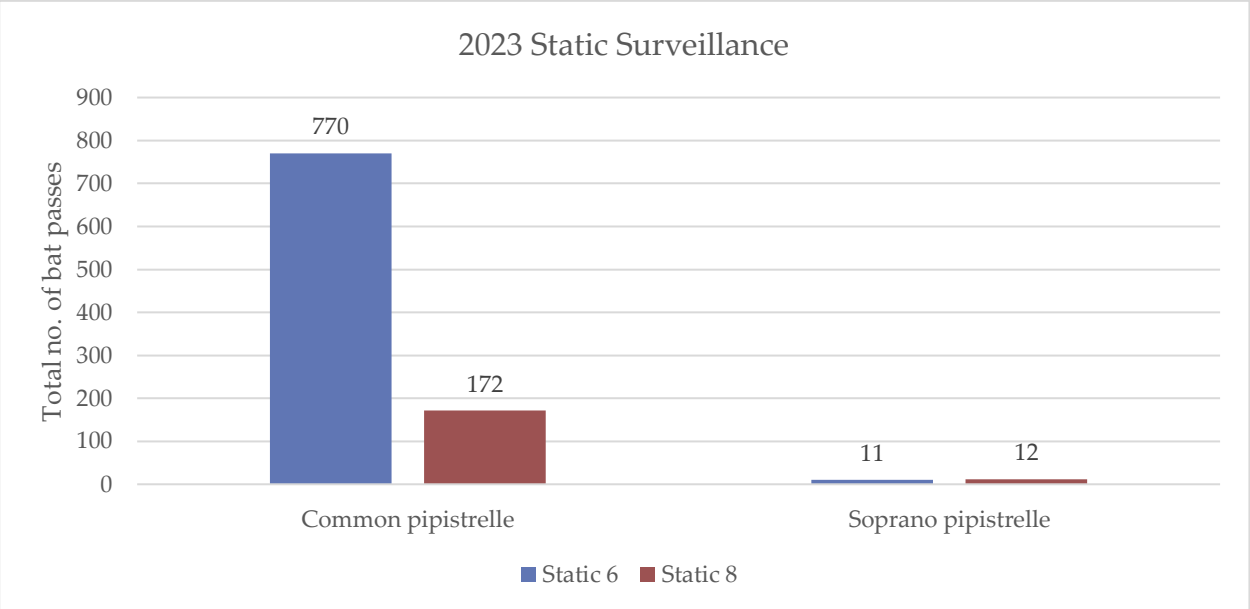

Figure 9: Number of bat passes recorded on Static 6 and Static 8 deployed during static surveillance in 2023.

4.3.3 Passive Static Bat Detector Survey 2025

Four static units were deployed in 2025 for a duration of 5-7 nights surveillance. All four unites recorded bats. The highest level of bat activity was recorded on Static 9, located in the public park to the south-east of the proposed development area.

In relation to the static unit located in Building 1 (Static 11), a much higher level of bat activity was recorded on this unit compared to previous years of surveillance. Therefore, this provides evidence that the satellite roosts recorded in 2025 may not have been present during previous years of surveys. A low level of soprano pipistrelle and Leisler's bat activity was also recorded but this was associated with foraging individuals during the night and not at times associated with dusk emergence or returning to roost at dawn.

Table 9c: Results of Static Bat Detectors deployed during 2023 Static Bat Detector Surveys.

Static Code	Location Description / Bat Habitat Type	Grid Reference (ITM)	Survey Period	Bat Species
Static 9	Tree in parkland	720237, 733305	5/8/2025 to 12/8/2024	Soprano pipistrelles, common pipistrelles, Leisler's bat
Static 10	Boundary fence	720114, 733856	5/8/2025 to 12/8/2024	Soprano pipistrelles, common pipistrelles, Leisler's bat
Static 11	Inside Building 1	720365, 733743	5/8/2025 to 10/8/2024	Soprano pipistrelles, common pipistrelles, Leisler's bat
Static 12	To rear of Building 1	720431, 733824	5/8/2025 to 10/8/2024	Soprano pipistrelles, common pipistrelles, Leisler's bat

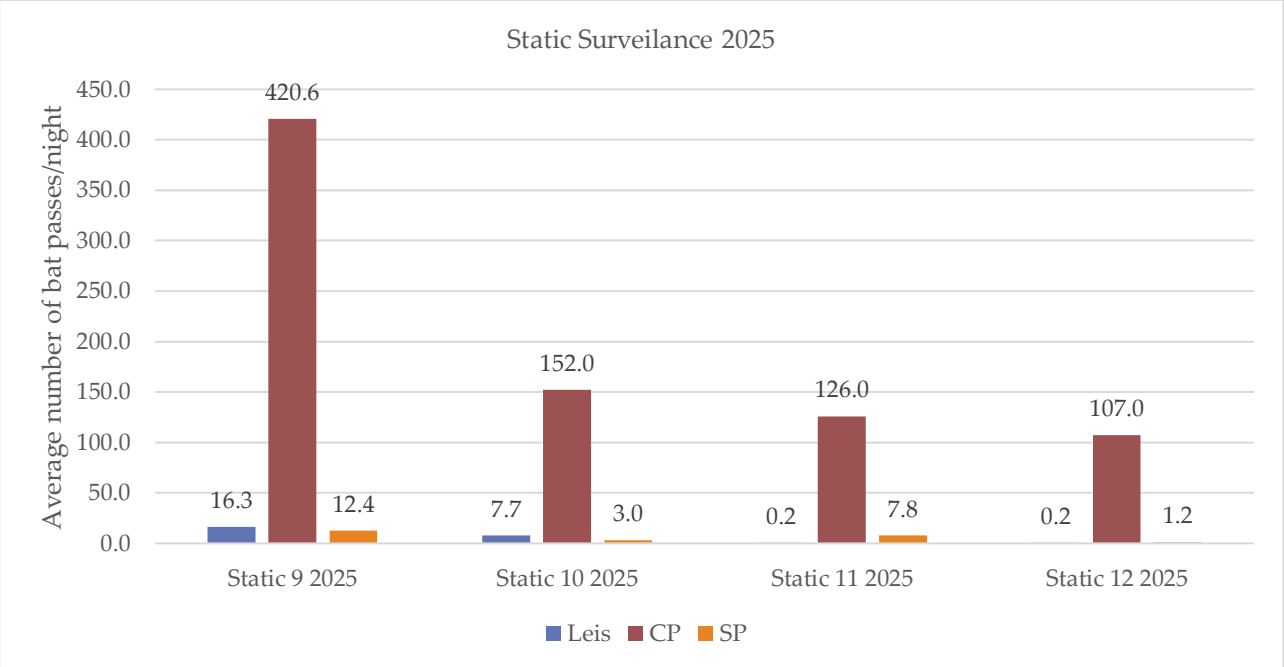

Figure 10: Number of bat passes recorded on statics deployed during static surveillance in 2025.

4.4 Desktop Review

4.4.1 Bat Conservation Ireland Database

The bat records within a 1km radius of the development of the onshore transmission infrastructure (Irish Grid Reference O2032533619) on the BCIreland database. This dataset consists of one bat record for common pipistrelle (night roost recorded in 2011 as a result of passive detector survey) in vicinity of buildings surveyed as part of this survey. However, it was not possible to determine which building the recorded data relates to.

4.5 Survey Effort, Constraints & Survey Assessment

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

Table 10: Survey Effort, Constraints & Survey Assessment Results.

Category	Discussion
Timing of surveys	Bat activity surveys undertaken in 2021 were outside the main bat activity season. However, as it was foraging and commuting bat survey (i.e. no potential roost surveys in buildings etc.) therefore, as it was completed during suitable weather, the results are acceptable. 2023 bat surveys were also undertaken outside the preferred survey months. This was intentional in order to determine the seasonal bat activity in the survey area. As a result bat activity was recorded in Spring (2023), Summer (2025, 2022) and Autumn (2021).
Survey Type	Bat Survey Duties Completed (Indicated by red shading) Tree PBR Survey ● Static Detector Survey ● Dusk Bat Survey ● Walking Transect ● Trapping/Mist Netting ○ Endoscope Inspection ○ Daytime Building Inspection ● Daytime Bridge Inspection ○ Dawn Bat Survey ● Driving Transect ○ IR Camcorder filming ○ Other (Thermal imagery) ●
Weather conditions	Weather conditions suitable for bat survey.
Survey Constraints	No survey constraints
Survey effort 368 hours	2021: Walking transect and static surveillance. 2022: Dawn survey, walking transect and static surveillance. 2023: Walking transect and static surveillance. 2025: 2x walking transects, 3x dusk surveys and static surveillance
Extent of survey area	Parkland areas to south of Poolbeg also included in surveys.
Equipment	All in good working order.

The extent of the surveys undertaken has achieved to determine:

- Presence / absence of bat within the survey area;
- A bat species list for the survey area;

- Extent and pattern of usage by bats within the survey area.

Surveying was completed according Collins (2016 and 2023) and the timing and survey level meets this guidance document. It is therefore deemed that the survey completed is appropriate in order to complete the aims of the bat survey.

5. Bat Ecological Evaluation

5.1 Bat Species Recorded & Sensitivity

Three bat species were recorded during the bat surveys in vicinity of Poolbeg, Co. Dublin: soprano pipistrelle, common pipistrelle and Leisler's bat. These are considered to be the three most common bat species in Ireland. The three bat species were recorded foraging and commuting primarily in the southern section of the survey area.

The walking transects undertaken in 2021, 2022, 2023 and 2025 was undertaken along the ESBN network cable route to the Poolbeg 220kv substation, local road network and green spaces in vicinity of Poolbeg, Co. Dublin. A low level of bat activity for three species of bat (common pipistrelle, Leisler's bat and soprano pipistrelle) was recorded along the shoreline adjacent to the proposed cable route from landfall to onshore substation. This area and the adjacent habitats was the primary area that bats were recorded foraging and commuting (i.e. Irishtown Nature Park). The level of bat activity on the statics units was considered to a be a low level in 2021 and 2022 while a higher level of activity was recorded in 2023. Overall, common pipistrelles was the most frequently recorded bat species during the surveys but there was considerable variation in bat activity between the years and seasons that the surveys were undertaken.

The walking transects undertaken in 2021, 2022, 2023 and 2025 was undertaken in vicinity of the proposed cable route from landfall to onshore substation. A low level of bat activity for two species of bat (common pipistrelle and soprano pipistrelle) was recorded along the shoreline adjacent to the proposed cable route from landfall to onshore substation.

None of the buildings surveyed were recorded as bat roosts during the array of surveys undertaken in 2021, 2022 and 2023. However, a small satellite roost for common pipistrelles was recorded in Building 1 during the 2025 dusk surveys. As indicated by static surveillance undertaken over the years of surveys, it is likely that this roost is a new one due to the much higher level of bat activity recorded within and adjacent to the building in 2025 compared to previous years. However, there are no proposed works for this building and therefore the proposed development will unlikely impact on this roost.

Leisler's bat

- Leisler's bat is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national Leisler's bat population is considered to be significantly increasing trend (Aughney *et al.,* 2021).
- The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820km^2). The Bat Conservation Ireland Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.,* 2014). The landscape model emphasised that this is a species that cannot be defined by habitats preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5km.
- The population estimates (2023 figures) indicates that population is between 112,800 and 202,300 individuals and this this represents a 49.92% increase compared to 2012 population estimates (Roche & Langton, 2024).

The overall trend for the national population of brown long-eared bat in Article 17 reporting (NPWS, 2019) is as follows:

- Range = Favourable
- Population = Favourable
- Habitat for species = Favourable
- Overall Assessment of Conservation Status = Favourable
- Overall trend in Conservation Status = Stable

Common pipistrelle

- Common pipistrelle is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national common pipistrelle population is considered to be significantly increasing trend (Aughney *et al.,* 2021).
- The modelled Core Area for common pipistrelle is a relatively large area that covers much of the island of Ireland (56,485km^2). The Bat Conservation Ireland Irish Landscape Model indicated that the Common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.,* 2014).
- The population estimates (2023 figures) indicates that population is between 1,074,000 and 2,416,500 individuals and this this represents a 75.4% increase compared to 2012 population estimates (Roche & Langton, 2024).

The overall trend for the national population of brown long-eared bat in Article 17 reporting (NPWS, 2019) is as follows:

- Range = Favourable
- Population = Favourable
- Habitat for species = Favourable
- Overall Assessment of Conservation Status = Favourable
- Overall trend in Conservation Status = Stable

Soprano pipistrelle

- Soprano pipistrelle is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national soprano pipistrelle population is considered to be significantly increasing trend (Aughney *et al.,* 2021).
- The modelled Core Area for soprano pipistrelle is a relatively large area that covers much of the island of Ireland (62,020km^2). The Bat Conservation Ireland Irish Landscape Model indicated that the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.,* 2014).
- The population estimates (2023 figures) indicates that population is between 1,204,800 and 2,709,600 individuals and this this represents a 140.2% increase compared to 2012 population estimates (Roche & Langton, 2024).

The overall trend for the national population of brown long-eared bat in Article 17 reporting (NPWS, 2019) is as follows:

- Range = Favourable
- Population = Favourable
- Habitat for species = Favourable
- Overall Assessment of Conservation Status = Favourable
- Overall trend in Conservation Status = Stable

No Annex II bat species are known to occur in County Dublin (i.e. lesser horseshoe bat) and were not recorded within the survey.

Precautionary bat mitigation measures are provided to ensure that the development of the onshore transmission infrastructure does not impact on local bat populations.

5.2 Bat Foraging Habitat & Commuting Routes

The majority of bat activity recorded during the walking transects was located outside the red line boundary of the proposed development. A low level of common pipistrelle and soprano pipistrelle bat activity was recorded adjacent to the red line boundary of the proposed development. Bats were recorded on the static unit located there in 2023 (common pipistrelle and soprano pipistrelle) and 2025 (common pipistrelle, soprano pipistrelle and Leisler's bat).

For the most part, bats were not recorded foraging or commuting directly along the proposed cable routes from landfall to onshore substation during both the walking transects of 2021, 2023 and 2025. But bats were recorded foraging or commuting in vicinity of the proposed cable route at the junction of Pigeon House Road just south of the decommissioned Poolbeg Powerstation and along the landfall section of the cable route east of Irishtown Nature Park. Bats were also recorded on the static units located in Irishtown Nature Park and the majority of the bat activity for the three species of bat recorded was primarily associated with the treelines of the nature park. An increased level of common pipistrelle bat activity was recorded in 2025 due to the presence of a small satellite roosts in Building 1 (decommissioned Poolbeg Powerstation).

The area where the proposed Construction Compound A and for the landfall works above the high water mark (HWM) including the adjacent habitats was the primary area that bats were recorded foraging and commuting. The level of bat activity on the statics units is considered to a be a low level. Overall, common pipistrelles was the most frequently recorded bat species during the surveys. This area has habitats suitable for foraging and commuting bats.

5.3 Zone of Influence – Bat Landscape Connectivity

There is little bat habitat located in vicinity of the onshore development area and therefore little bat habitat connectivity in the immediate landscape. As a consequence, a low level of were recorded foraging or commuting in vicinity of this area.

Three bat species were recorded where the proposed Construction Compound A and the landfall works above the high water mark (HWM). This area has suitable bat habitat and there is landscape connectivity to provide bat commuting habitat. The majority of bat activity recorded during the bat surveys was associated with Irishtown Nature Park which is connected to the proposed construction compound and site for bringing cables offshore export cables onshore.

6. Assessment of Potential Impact

The bat mitigation measures described below take into consideration Marnell *et al.* (2022) as well as best practice guidelines from Collins (2016) and BCT (2018). The measures described are those considered to be practical and effective based on past experience of the principal bat specialist, for the development of the onshore transmission infrastructure. Measures are also reflective to published scientific research, where available and applicable to Irish bat populations. As stated by Marnell *et. Al.* (2022) "Any mitigation intended to ensure that there is no impact or minimal impact on the bats must be clearly described in detail, giving examples of how it worked in other places". Please see Section 1.2.3 for more information.

Three bat species were recorded during the bat surveys in vicinity of Poolbeg, Co. Dublin: soprano pipistrelle, common pipistrelle and Leisler's bat. These are considered to be the three most common bat species in Ireland. The three bat species were recorded foraging and commuting primarily in the southern section of the survey area. There are no trees considered to be of PBR value in this area but the treelines do provide commuting and foraging habitat. A small satellite common pipistrelle bat roost was recorded in Building 1 during the 2025 surveys. Individuals of this roost briefly foraged in the immediate area and commuted away from Building 1 soon after emergence. No bat roosts were recorded in the buildings in all previous years of surveying. In general, the bat activity recorded indicates that bat species such as soprano pipistrelles and Leisler's bats commuted to the survey area and foraged where tall vegetation is present.

Therefore, the potential impact of the onshore transmission infrastructure is, overall, considered to be Permanent Negative and to have a scale of impact of Slight impact on named bat species (according to criteria set out in Tables 2c and d, Section 1.2.2). This is primarily in relation to the lighting plan for the construction and operational phases of the onshore transmission infrastructure and removal of linear and scrub habitats.

Bat mitigation measures are presented to reduce the potential impact of the lighting scheme for the development of the onshore transmission infrastructure with additional measures relating to tree felling and the erection of a bat box scheme. Additional bat conservation measures are also presented for the conservation of local bat populations. If the mitigation measures presented below are strictly implemented, the scale of impact is likely to be reduced to Non-significant Negative impact on local bat populations.

6.1 Bat Mitigation Measures

Due to the fact that bats are nocturnal mammals outdoor lighting will impact on local bat populations. Therefore, the lighting plan is an important element of the development of the onshore transmission infrastructure that needs to consider its potential impact on commuting and foraging bats. Consultation is required to ensure that any proposed lighting does not impact on commuting and foraging bats, especially lighting located adjacent to boundary habitats with particular reference to the area of the proposed construction compound and site for bringing offshore export cables onshore. This area is adjacent to Irishtown Nature Park which is the primary area for bat activity recorded during the four years of surveys.

Consultation is also required in relation to the potential tall vegetation removal in vicinity of the proposed construction compound and site for bringing offshore export cables onshore. While there are no trees considered to be of PBR value in this area, the treelines do provide commuting and foraging habitat. Therefore, it is important that vegetation removal is minimal and compensatory

planting is undertaken to ensure that there is no, overall, reduction in bat habitat within the development of the onshore transmission infrastructure.

6.1.1 Lighting Plan

This element of the proposed planning application is 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.

Bats are light sensitive species, hence their nocturnal activities. The three bat species recorded commuting and foraging within the survey area are Light Tolerant or Semi-tolerant bat species. However, it is still important that strict lighting guidelines are required to reduce the potential impact of the development of the onshore transmission infrastructure on local bat populations as standard best practice.

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. This BCT (2018) guidelines provided a list of recommendations in relation to luminaire design, which was based on the extensive research completed at the time on the potential impact of lighting on bats, and therefore provides best practice mitigation measures. These recommendations have been updated with the new BCT (2023) guidelines:

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp-cut-off, lower intensity, good colour rendition and dimming capability,
- A warm white light source (2700 Kelvin or lower) should be adopted to reduce blue light component.
- Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.

DEFINITION: Red Light refers to the light sources in the red spectrum and mainly consist of long wavelength light above 600nm with an RA value of 60 (for good colour recognition). This wavelength of light is considered to the have the least impact on bats.

- Internal luminaires can be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill.
- Waymarking inground markers (low output with cowls or similar to minimised upward light spill) to delineate path edges.
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ration, and with good optical control, should be considered.
- Luminaires should always be mounted horizontally, with no light output above 90^{o} and/or no upward tilt.

- Where appropriate, external security light should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow (e.g. 1-2 minute timer).
- Use of a Central Management System (CMS) with additional web-enables devices to light on demand.
- Use of motion sensors for the local authority street lighting may not be feasible unless the authority has the potential for smart metering through a CMS.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

The following text was provided by TOBIN Consulting Engineers in relation to lighting:

Lighting

- *Security fencing is required around the perimeter of the onshore substation to prevent unauthorised access onto potentially dangerous areas. The height of the fencing will be 2.6 m.*
- *Lighting shall be provided for in the substation compound to facilitate operations during night time as per relevant EirGrid specification 'XDS-GFS-14-001 110/220/400 kV Substation General Requirements'.*
- *External lighting of the substation during the operational phase will be only required for the following purposes:*
  - *access and egress;*
  - *security lighting;*
  - *car park lighting; and*
  - *repair/maintenance.*
- *At night substation lighting will be switched off as the substation will be unmanned. Lights will only be used during periods where and when work is to be carried out (i.e. maintenance) and lights will be positioned to suit the work.*
- *The substation lighting system will be controlled manually via switches within the buildings. Exterior lighting to buildings will be controlled by PIR-based motion detectors (passive infrared). Luminaires selected will ensure reduction in spill light and glare and sky glow.*
- *The onshore substation electrical infrastructure will be monitored remotely, however there may be O&M staff visiting the site to undertake works on a regular basis (expected to be once per week). The onshore substation will not be manned, and lighting will only be required during O&M activities.*

Therefore, this external lighting for the development of the onshore transmission infrastructure should strictly follow the above guidelines and these should be strictly implemented during construction and operation phase of the development of the onshore transmission infrastructure.

In addition, any construction proposed to be undertaken during the hours of darkness must adhere to the luminaire type as specified and where possible only directed where works are proposed to be undertaken (i.e. lighting spillage is kept to a minimum).

6.1.2 Bat Box Scheme

The total number of bat boxes required to mitigate for general conservation of local bat populations:

- 4 summer bat boxes (Schwegler Woodcrete 1FF bat box or equivalent – source www.nhbs.com or www.veldshop.nl) to be erected on poles within the red line boundary of the development of the onshore transmission infrastructure.

Bat boxes scheme be sited carefully and this will be undertaken by a bat specialist. Bat boxes will be erected prior to construction works. The bat specialist will erect the bat boxes with assistance from the contractor. Some general points that will be follow include:

- 6m poles.
- Diameter of poles should be wide and strong enough to hold the required number of boxes.
- Locate bat boxes in areas where bats are known to forage or adjacent to suitable foraging areas. Locations should be sheltered from prevailing winds.
- Bat boxes should be erected at a height of 4-5 metres to reduce the potential of vandalism and predation of roosting bats.
- Locations for bat boxes should be selected to ensure that the lighting plan for the proposed site does not impact on the bat boxes. Therefore, the bat boxes are to be erected poles to the rear of the development of the onshore transmission infrastructure site and away from public street lighting.

6.1.3 Landscaping

The landscape plan proposes to plant native woodland areas, native shrub planting and wildflower planting in vicinity of sections of the cable routes. This will provide foraging and commuting habitat for local bat populations.

6.1.4 Pre-construction Surveys

If vegetation clearance is undertaken greater than 24 months from the current survey dates (i.e. 2023 surveys), please repeat walking transect of development of the onshore transmission infrastructure area of the onshore transmission infrastructure zone.

6.1.5 Monitoring

Monitoring is recommended post-construction works. This monitoring should involve the following aspects:

- Inspection of bat boxes within one year of erection of bat box scheme/rocket box. Register bat box scheme with Bat Conservation Ireland. This should be undertaken for a minimum of 2 years.
- Monitoring of any other bat mitigation measures. All mitigation measures should be checked to determine that they were successful. A full summer bat survey (static surveillance and a walking transect) is recommended post-works. This is recommended to compare the local bat population distribution and activity level pre- and post-development.

7. Survey Conclusions

Three bat species were recorded during the bat surveys in vicinity of Poolbeg, Co. Dublin: soprano pipistrelle, common pipistrelle and Leisler's bat. These are considered to be the three most common bat species in Ireland.

A static unit was in the proposed location of the CWP Onshore Substation and no bats were recorded during the five nights of surveillance completed in 2022. No bats were recorded during the walking transects completed in 2022. This was repeated in 2023 and two species of bat was recorded during this surveillance: common pipistrelle and soprano pipistrelle.

The walking transects undertaken in 2021, 2022, 2023 and 2025 was undertaken along the ESBN network cable route to the Poolbeg 220kv substation, local road network and green spaces in vicinity of Poolbeg, Co. Dublin. A low level of bat activity for three species of bat (common pipistrelle, Leisler's bat and soprano pipistrelle) was recorded along the shoreline adjacent to the proposed cable route from landfall to onshore substation. This area and the adjacent habitats was the primary area that bats were recorded foraging and commuting (i.e. Irishtown Nature Park). The level of bat activity on the statics units was considered to a be a low level in 2021 and 2022 while a higher level of activity was recorded in 2023. Overall, common pipistrelles was the most frequently recorded bat species during the surveys but there was considerable variation in bat activity between the years and seasons that the surveys were undertaken.

The walking transects undertaken in 2021, 2022, 2023 and 2025 was undertaken in vicinity of the proposed cable route from landfall to onshore substation. A low level of bat activity for two species of bat (common pipistrelle and soprano pipistrelle) was recorded along the shoreline adjacent to the proposed cable route from landfall to onshore substation.

None of the buildings surveyed were recorded as bat roosts during the array of surveys undertaken in 2021, 2022 and 2023. However, a small satellite roost for common pipistrelles was recorded in Building 1 during the 2025 dusk surveys. As indicated by static surveillance undertaken over the years of surveys, it is likely that this roost is a new one due to the much higher level of bat activity recorded within and adjacent to the building in 2025 compared to previous years. However, there are no proposed works for this building and therefore the proposed development will unlikely impact on this roost.

Since bats are nocturnal mammals, outdoor lighting will impact on local bat populations. Therefore, the lighting plan is an important element of the development of the onshore transmission infrastructure that needs to consider its potential impact on commuting and foraging bats. Consultation is required to ensure that any proposed lighting does not impact on commuting and foraging bats, especially lighting located adjacent to boundary habitats with reference to the area of the construction compound and site for bringing offshore export cables onshore.

Consultation is also required in relation to the potential tall vegetation removal in vicinity of the construction compound and site for bringing offshore export cables onshore. While there are no trees considered to be of PBR value in this area, the treelines do provide commuting and foraging habitat. Therefore, it is important that vegetation removal is minimal and compensatory planting is undertaken to ensure that there is no, overall, reduction in bat habitat within the development of the onshore transmission infrastructure area.

Therefore, the potential impact of the development of the onshore transmission infrastructure is, overall, considered to be Permanent Negative and to have a scale of impact of Slight impact on

named bat species. This is primarily in relation to the lighting plan for the development of the onshore transmission infrastructure scheme and removal of linear and scrub habitats.

Bat mitigation measures are presented to reduce the potential impact of the lighting scheme for the development of the onshore transmission infrastructure with additional measures relating to tree felling and the erection of a bat box scheme. If the mitigation measures presented are strictly implemented, the scale of impact is likely to be reduced to Non-significant Negative impact on local bat populations.

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9. Appendices

9.1 Appendix 1 – Alternative Bat Roosts

Bat Boxes

Examples of bat box design (self-cleaning boxes i.e. opened at the bottom to allow bat droppings to fall out).

a) Woodcrete 1FF (Potential supplier - www.nhbs.com)

10. Bat Species Profile

10.1 Leisler's bat

Ireland's population is deemed of international importance and the paucity of knowledge of roosting sites, makes this species vulnerable. However, it is considered to be widespread across the island. The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820km^2). The Bat Conservation Ireland Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.,* 2014). The landscape model emphasised that this is a species that cannot be defined by habitats preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5km. In addition, of all Irish bat species, Leisler's bats have the most specific roosting requirements. It tends to select roosting habitat with areas of woodland and freshwater.

Irish Status	Near Threatened
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	73,000 to 130,000 (2007-2013) Ireland is considered the world stronghold for this species
Estimate Core Area (Lundy *et al. 2011)*	52,820 km^2

Taken from Roche *et al.,* 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

The principal concerns for Leisler's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Selection of maternity sites is limited to specific habitats;
- Relative to the population estimates, the number of roost sites is poorly recorded;
- Tree felling, especially during autumn and winter months; and
- Increasing urbanisation.

10.2 Common pipistrelle

This species is generally considered to be the most common bat species in Ireland. The species is widespread and is found in all provinces. The modelled Core Area for common pipistrelles is a large area that covers much of the island of Ireland (56,485km^2) which covers primarily the east and south east of the area (Roche *et al.,* 2014). The Bat Conservation Ireland Irish Landscape Model indicated that the Common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.,* 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	1.2 to 2.8 million (2007-2012)
Estimate Core Area (km^2) (Lundy *et al. 2011)*	56,485

Taken from Roche *et al.,* 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Common pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosting requirements
- This species has complex habitat requirements in the immediate vicinity of roosts. Therefore, careful site specific planning for this species is required in order to ensure all elements are maintained.
- Renovation or demolition of derelict buildings.
- Tree felling
- Increasing urbanisation (e.g. increase in lighting)

10.3 Soprano pipistrelle

This species is generally considered to be the second most common bat species in Ireland. The species is widespread and is found in all provinces, with particular concentration along the western seaboard. The modelled Core Area for soprano pipistrelle is a large area that covers much of the island of Ireland (62,020km^2). The Bat Conservation Ireland Irish Landscape Model indicated that the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.,* 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	0.54 to 1.2 million (2007-2012)
Estimate Core Area (km^2) (Lundy *et al. 2011)*	62,020

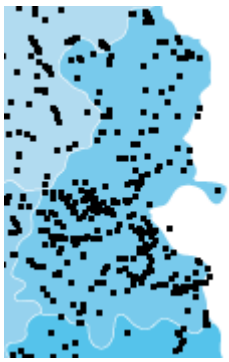
Taken from Roche *et al.,* 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Soprano pipistrelles in Ireland that are relevant for this survey area are as follows:

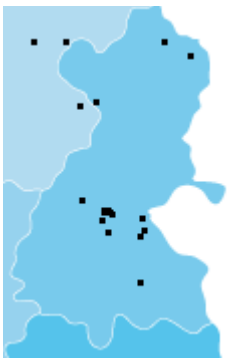
- Lack of knowledge of roosts;
- Renovation or demolition of structures;
- Tree felling; and
- Increasing urbanisation (e.g. increase in lighting).

10.4 Bat Conservation Ireland Bat Species Maps

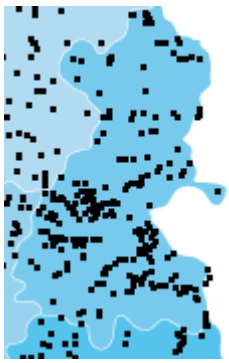
Bat records for County Dublin (Source: www.batconservationireland.org)



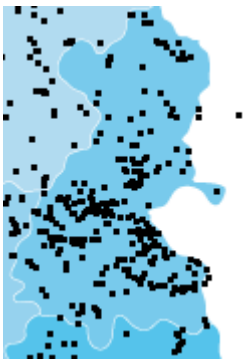
Common pipistrelle



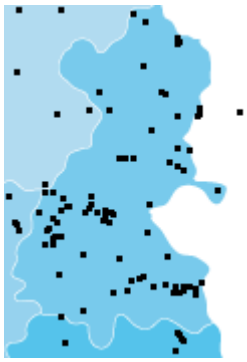
Nathusius' pipistrelle



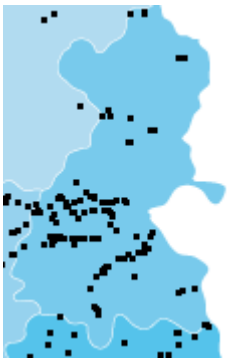
Soprano pipistrelle



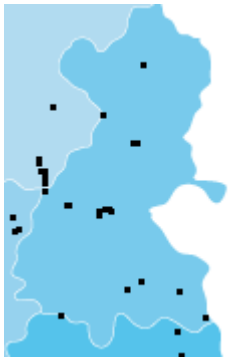
Leisler's bat



Brown long-eared bat



Daubenton's bat



Natterer's bat

Whiskered bat

Lesser horseshoe bat