APPENDIX 5-2

BAT BASELINE REPORT

Planning and Environmental Consultants

Baseline Bat Report

Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare

DOCUMENT DETAILS

Client:	**Roadstone Ltd**
Project Title:	**Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare**
Project Number:	**211137**
Document Title:	**Baseline Bat Report**
Document File Name:	**BBR - F - 2024.11.07 - 211137**
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Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	10.10.2024	DC	SF
02	Final	07.11.2024	DC	SF

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1. INTRODUCTION

1.1 Purpose Of This Report

MKO has been commissioned by Roadstone Ltd. to complete an assessment of the potential effects on bats, as part of an Environmental Impact Assessment Report (EIAR), for an application for planning permission for the construction of a soil inspection shed, refuelling area, settlement ponds, road improvements, drainage network and environmental berms along with the extraction, processing and washing of sand and gravel from an area measuring approximately 16.3 hectares (ha) which will allow for the extraction of approximately 1,428,571 tonnes of material. The development proposals also include for the infilling and restoration of an existing and future quarry void back to original land contour levels. This baseline bat report provides the relevant baseline information required for an impact assessment on the bat populations recorded at the site, which is presented in Chapter 6 of the EIAR. Details of the bat surveys undertaken, including survey design, methods and results are presented below, as well as recommendations to safeguard bats.

1.2 Site Description

The Proposed Development site comprises land in the townlands of Ballyquin More, Leitrim, Woodpark and Fahy More North, Co. Clare (ITM: X 562651, Y 669425). It is located approximately 8 kilometres southwest of the town of Killaloe and 1.5 kilometres to the northwest of the village of Bridgetown, Co. Clare.

2. METHODOLOGY

2.1 Field Study

2.1.1 Bat Habitat Appraisal

A walkover survey of the Study Area was carried out during daylight hours on the 27th July 2023. The site was revisited on the 28th of August for the purpose of carrying out a barn owl survey. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). The aim of the survey was to identify suitable habitats within the site to guide further survey efforts. A new edition of the BCT Guidelines (Collins, 2023) was published after the site visits were undertaken and was taken into consideration when undertaking this assessment.

Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats, which is summarised in Table 2-1. The protocol is divided into four Suitability Categories: *High, Moderate, Low* and *Negligible*.

Table 2-1 BCT protocol for bat habitat appraisals (Collins, 2016)

Assessment	Rationale
High	Structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions, and surrounding habitat. Continuous, high-quality, well-connected habitats, connected to known roosts.
Moderate	A structure used by bats due to their size, shelter, protection, conditions and surrounding habitat, but are unlikely to support a roost of high conservation status, and suitable, connected habitats.
Low	Structures with one or more potential roost sites that could be used by an individual bat opportunistically, and suitable, but isolated habitats that could be used by a small number of bats.
Negligible	No obvious features present, but a level of uncertainty remains.

New Collins guidelines were published in September 2023 (Collins, 2023), after the bat habitat appraisal was undertaken. The new protocol includes the 'None' category, where no uncertainty exists on the lack of potential roost features (PRFs) on a tree or structure. Trees where further assessment is required are marked as FAR, and trees with obvious PRF are marked PRF, which can be assessed as either PRF-I, which corresponds to the previous Negligible and Low categories, or PRF-M, which marks a sizeable feature suitable to host a maternity roost.

2.1.1.1 Preliminary Roost Assessment

A search for roosts was undertaken within the boundary of the Proposed Development site by two licenced ecologists to identify any PRFs. The licence, issued by National Park and Wildlife Service (NPWS), is intended for professionals carrying out surveys with the potential to disturb roosting bats. The aim of the survey was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

The site was visited on the 27th of July 2023. All structures identified within the site were assessed for their potential to support roosting bats. A systematic search of all accessible interiors, including all attic spaces,

was undertaken. The exterior of each building was inspected first from ground level and included all accessible windowsills, walls, eaves, roof ridge and roof slates. Inspections were carried out with the aid of torches, a ladder, and binoculars, and searches for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises, as well as potential access points into the structure.

The Proposed Development site contains a number of trees spread within woodland and treeline habitats. Roosting suitability was assessed in clusters and at feature level, and areas were marked in accordance to BCT Guidance (Collins, 2016) during the initial walkover surveys to inform the need for further surveys and assessment.

Trees present within the Proposed Development site were examined from ground level for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other PRFs identified by Andrews (2018). Notes were initially compiled on any trees marked as PRF and FAR, including location and species.

The vast majority of vegetation within the site consists of immature trees unsuitable for roosting. The tree assessment concentrated within the proposed extraction area, as no works potentially affecting existing vegetation are proposed elsewhere within the site boundary. Four trees were assessed, together with four structures, and are described in Section 3.1 below.

2.2 Bat Activity Surveys

2.2.1 Manual Surveys

Manual activity surveys included roost surveys of any feature identified as a potential roost, as well as a night-time bat walkover (NBW). For the survey, surveyors were equipped with active full spectrum bat detectors, Batlogger M (Elekon AG, Lucerne, Switzerland). Where possible, species identification was made in the field and any other relevant information was also noted, e.g., numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications, as detailed in Section 2.4. The survey effort is summarised in Table 2-2 and presented in Figure 2-1.

Table 2-2 Bat Activity survey effort

Date	Surveyors	Type	Sunrise /Sunset	Weather
27/07/2023	David Culleton & Sara Fissolo	Roost Emergence & NBW	21:35	14°C, Dry-Light Drizzle, Calm-Gentle Breeze

2.2.1.1 Roost Surveys

Any structure identified during the bat habitat appraisal as having potential to host roosting bats was subject to presence/absence surveys in the form of emergence surveys. Rationale for survey effort was based on guidelines proposed by Collins in Tables 7.1 and 7.2 (Collins, 2016).

Surveyors were located across the site with a focus on potential access point and roosting features identified during the daylight walkover surveys. The purpose was to identify any bat species, numbers, access points and roosting locations within each the PRF structure.

Surveys were carried out in favourable weather conditions (Table 2-2). Roost emergence surveys commenced at least 15 minutes before sunset and concluded approximately 1.5 hours after sunset.

2.2.1.2 Night-time Bat Walkover

Manual activity surveys also comprised a walked transect at dusk, which was carried out on the 27th of July 2023. The aim of this survey was to observe bat species using the site and visually assess bat behaviour and important features used by bats within the site.

The transect was walked by two surveyors, recording bats in real time. It followed the manual roost survey and was completed within 3 hours after sunset. Surveyors were equipped with one active full spectrum bat detector, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland). The transect route was prepared with reference to the desktop and walkover survey results, as well as any health and safety considerations and access limitations. As such, it followed existing roads and tracks. The transect route is presented in Figure 2-1.

2.2.2 Static Detectors Surveys

Six full spectrum SM4 bat detectors (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity for a minimum 10-day period. Three detectors were initially deployed on 17th July 2023 by Brónagh Boylan and Aran van der Geest Moroney during the ecological walkover survey. They were moved on 27th July to three new locations and were finally collected on 15th August 2023. The six locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats.

Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates. Static detector locations are shown in Figure 2-1 and presented in Table 2-3.

*Table 2-3 Static Detector Location. *Detector stopped recording on 06/08/2023 due to battery failure.*

Detector ID	IG Reference	Habitat	Deployment	Collection
D01	R 63129 68824	Treeline	17/07/2023	27/07/23
D02	R62884 69402	Wet Grassland	17/07/2023	27/07/23
D03	R62794 69100	Wet Grassland/ Immature Willow woodland	17/07/2023	27/07/23
D04	R 63014 69195	Treeline and scrub	27/07/2023	15/08/23
D05	R 62597 69398	Edge of willows	27/07/2023	15/08/23
D06*	R 62678 69993	Open tipping pit, recolonising bare ground	27/07/2023	15/08/23

2.3 Bat Call Analysis

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.8 (Wildlife Acoustics, MA, USA). The aim of this was to identify, to a species or genus level, what bats were present at the Proposed Development site. Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified.

Echolocation signal characteristics (including signal shape, peak frequency of maximum energy, signal slope, pulse duration, start frequency, end frequency, pulse bandwidth, inter-pulse interval and power spectra) were compared to published signal characteristics for local bat species (Russ, 1999). *Myotis* species (potentially Daubenton's bat *(M. daubentonii),* Whiskered bat *(M. mystacinus),* Natterer's bat *(M. nattereri)*) were considered as a single group, due to the difficulty in distinguishing them based on echolocation parameters alone (Russ, 1999). The echolocation of Soprano pipistrelle *(P. pygmaeus)* and Common pipistrelle *(P. pipistrellus)* are distinguished by having distinct (peak frequency of maximum energy in search flight) peak frequencies of ~55 kHz and ~46 kHz respectively (Jones & van Parijs, 1993). Some overlapping is possible between these species: where no certainty could be achieved, calls were identified to genus level.

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2023). A bat pass was defined as a recording of an individual species/species group's echolocation containing at least two echolocation pulses and of maximum 15s

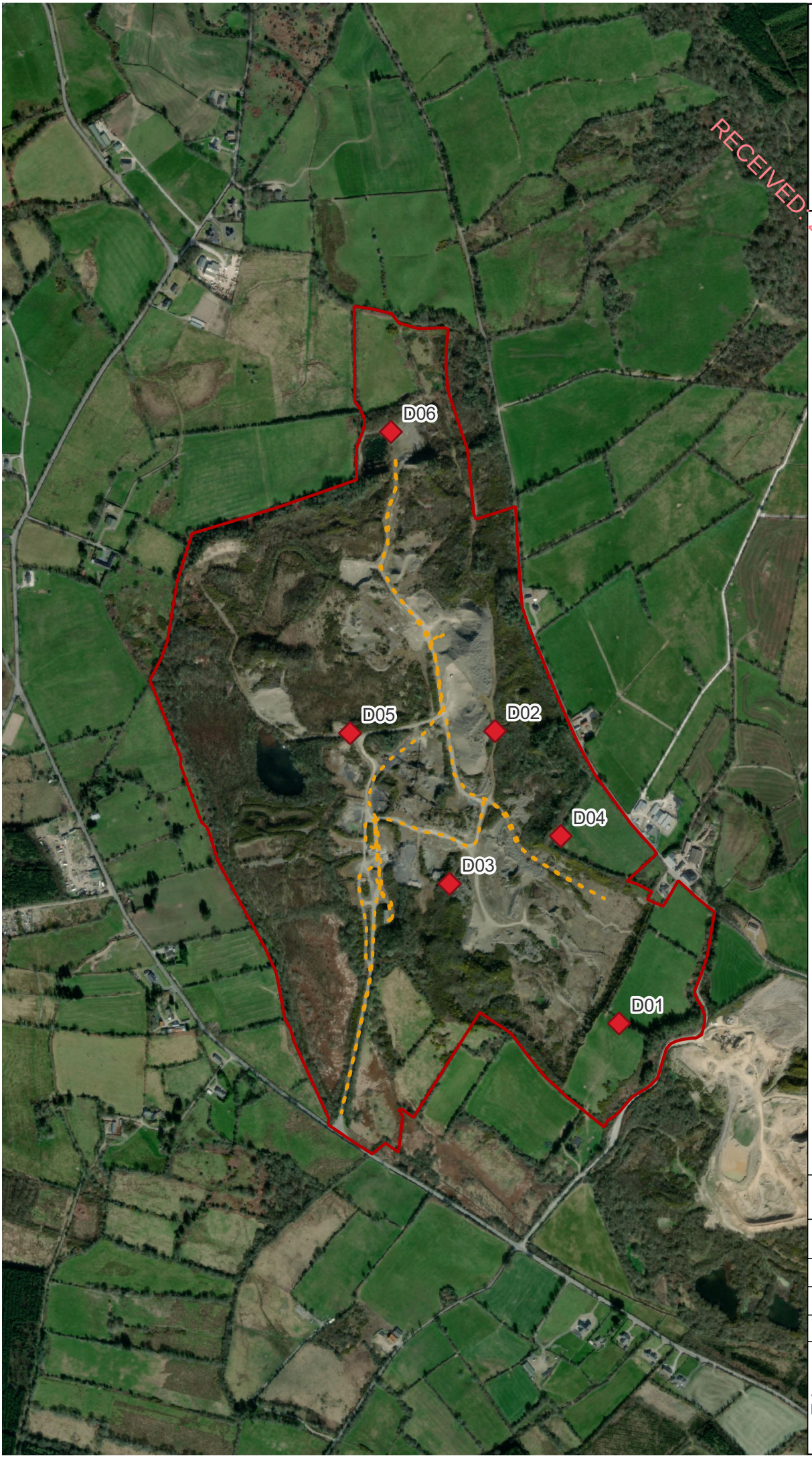
duration. All bat passes recorded in the course of this study follow these criteria, allowing comparison. Due to the volume of bat activity data recorded, where multiple bat passes were recorded within the same registration, rarer or harder to record species were identified. Underreporting of common species is possible using this method, and is accounted for within the assessment.

Echolocation calls by Brown long-eared bats (*Plectous auritus*) are intrinsically quiet and hard to record by static equipment. All data collected, including Noise files and Auto ID files are checked to ensure all calls for this species have been captured. However, a level of under-representation is expected for this species and is accounted for in the assessment of activity levels.

Echolocation by Lesser horseshoe bats (*Rhinolophus hipposideros*) is directional and can be missed by detectors, particularly manual detectors. MKO employs omni-directional microphones to limit under-recording for the species.

2.4 Assessment of Bat Activity Levels

The online database tool Ecobat (mammal.org.uk) is recommended by Collins to assess bat activity levels within a site. This web-based interface, launched in August 2016, allows users to upload activity data and to contrast results with a comparable reference range, allowing objective interpretation. Uploaded data then contributes to the overall dataset to provide increasingly robust outputs. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting levels of bat activity in order to provide objective and consistent assessments.). Ecobat was unavailable for a cross-site analysis of static data as the platform has been undergoing maintenance since late 2022 with no proposed timeline of a relaunch. Therefore, activity levels were assessed based on professional experience gained from performing bat surveys in a wide variety of Irish habitats.



Map Legend

- EIAR Site Boundary
- Static Detector Locations
- Manual Transect 27.07.2023

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Drawing Title: 2023 Survey Effort

Project Title: Proposed Quarry Extraction nd Restoration, Ballyquin

Drawn By	Checked By
DC	SF
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3. RESULTS

3.1 Bat Habitat Appraisal

A detailed description of the habitats located onsite are presented in the accompanying EIAR. A bat walkover and inspection survey were conducted on the 27th of July 2023. During this survey, habitats within the study area were assessed for their suitability for bats to roost, forage and commute. Connectivity with the wider landscape was also considered to determine habitat suitability.

With regard to foraging and commuting bats, the proposed works site is considered of *Moderate* suitability due to the high habitat diversity and presence of conifer woodland, watercourses and treelines throughout. Built and open areas are also considered of *Moderate* suitability, as they are usually surrounded by linear habitats and do not limit connectivity within the site.

Details of the assessment of existing man-made structures for their suitability to host roosting bats are presented below. Trees within the Proposed Development footprint are also assessed in more detail.

3.1.1 Preliminary Roost Assessment

3.1.1.1 PRF Structures

Four structures were identified and inspected as part of the roost assessment effort, the weighbridge office, a large shed, a water pump building and a hopper. The weighbridge office was also the subject of roost emergence surveys. Details of the emergence survey are presented in Section 3.2.1.

Weighbridge Office

This structure is an office building with a tiled roof (R 62648 69120). The structure is located north of the site entrance gate, and west of the proposed extraction boundary. The building has a separate attic space (Plate 3-3). Access points were identified underneath gaps the fascia board, and underneath roof tiles (Plate 3-2). Bat droppings and feeding remains were found inside the building on the ground floor (Plate 3-4). No evidence was found within the attic space, however this was not fully inspected due to health and safety concerns. It was assigned a *Moderate* roosting potential. The weighbridge office was subject to a dusk emergence survey on 27th of July 2023. No further surveys were considered necessary as good coverage was achieved.

Plate 3-1 South aspect of Weighbridge office

Plate 3-2 Gaps in fascia board

Plate 3-3 Separate attic space

Plate 3-4 Feeding remains found inside the building

Large Shed

The large shed is a corrugated iron structure located southeast of the weighbridge office (IG Ref: R 62668 69037) (Plate 3-5). Panels on the walls and roof illuminate it during the daylight hours (Plate 3-6). However, the northern end of the building has rooms that are dark throughout. Within these rooms, evidence of feeding bats was found, along with droppings (Plate 3-7). A single dead bat was found in an old disused toilet during the 27th of July inspection (Plate 3-8). No ID was possible on the carcass. A second dead bat impossible to ID was found in the same location on the 28th of August. A single feeding bat was also seen inside the structure during the same night following a barn owl survey. The bat's behaviour was indicative of a brown long-eared bat, however no ID was possible. The shed is in regular use by bats, but was assigned a *Low* roosting potential, as it is likely favoured for limited roosting, particularly feeding and night roosting.

Plate 3-5 Eastern aspect of Large Shed

Plate 3-6 Large Shed interior

Plate 3-7 Feeding remains found within office area in Large Shed

Plate 3-8 Dead bat found in toilet of Large Shed

Water Pump Building

The water pump building is a flat roof concrete building located east of the weighbridge office (IG Ref: R 62677 69152). Numerous access points were identified in the structure, such as gaps in the concrete exterior and open windows (Plate 3-9 and 3-11). A large number of droppings and feeding remains were found inside the structure (Plate 3-12). No bats were found. Whilst evidence of bats using the building was evident, there is no capacity for hosting regular or significant day roosting, and the building is likely in use as a feeding perch or night roost. It was assigned a *Low* roosting potential.

Plate 3-9 Water pump building southern aspect

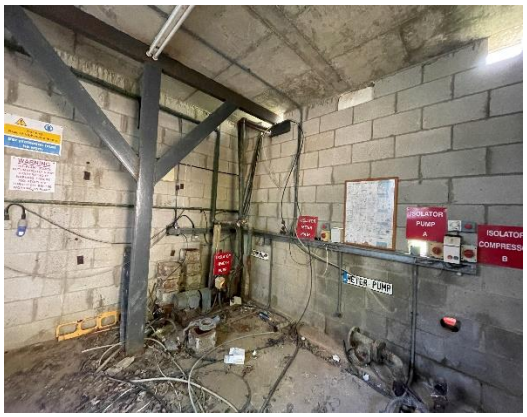

Plate 3-10 Interior of water pump building

Plate 3-11 Water pump building eastern aspect

Plate 3-12 Dropping and feeding remains found within water pump building.

Hopper

The hopper is a small concrete building once used for funnelling sand and gravel (Plate 2-13). It is located to the east of the water pump building (IG Ref: R 62700 69175). The interior of the structure is exposed and overgrown. However, a single Leisler's bat was found roosting between the northern wall and concrete support beam. The structure was assigned a *Low* roosting potential.

Plate 3-13 Top of the hopper

3.1.1.2 PRF Trees

The site comprised a network of treelines and hedgerows in the agricultural southwest area of the site. Conifer plantations bordering existing tracks and roads dominated the other areas of the site. These were identified as having *Negligible* roosting potential for bats. Deciduous treelines identified throughout the site were assessed for their potential to host roosting bats. The majority of linear features comprised hedgerows with sparse, immature trees with *No* potential roosting features.

A number of trees within the site boundary were assessed, as they will be felled as a result of the proposed works. Four trees assessed presented or were likely to present features suitable for roosting bats. Most of the trees were observed with binoculars and were located in inaccessible areas: the assessment was provided as a precaution. Details of the assessment are presented in Table 3-1, with pictures in Plates 3-14 to 3-17. In all four cases, no potential roost features were visible due to heavy ivy cover. Therefore, in the event that felling is required, further assessment will be needed to establish if potential roosting features are present. The location of the trees assessed is presented in Figure 3-1.

Table 3-1 Tree inspection results

#	Species	Potential	IG Reference	Notes	Plate
1	Ash	Low	R 63028 69219	Old tree with old ivy covering trunk	2-14
2	Ash	Moderate	R 63073 69148	Mature tree with old ivy cover.	2-17
3	Unknown	Low	R 63143 68923	Mature tree with old ivy cover.	2-18
4	*Fraxinus spp.*	Moderate	R 62583 69884	Mature trees with heavy ivy cover.	n/a

Plate 3-14 Tree 1; Ivy cover on trunk

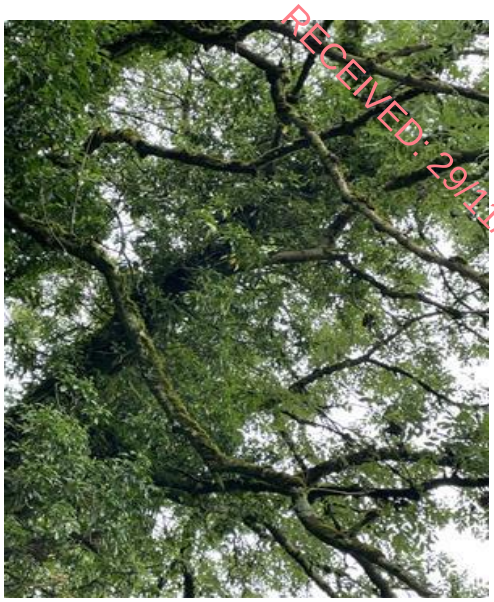

Plate 3-15 Tree 1; more ivy cover visible in upper sections

Plate 3-16 Tree 2; Mature tree with heavy ivy cover

Plate 3-17 Tree 3; Light ivy cover on trunk

Map Legend

- Application Boundary
- Assessed Trees

RECEIVED: 29/11/2024

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Drawing Title: Trees Assessed

Project Title: Proposed Quarry Extraction and Restoration, Ballyquin

Drawn By	Checked By
DC	SF
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3.2 Bat Activity Surveys

3.2.1 Manual Surveys

3.2.1.1 Dusk Emergence Survey

Four structures were identified within the site. Bat use was confirmed within three of the structures during the initial inspections carried out on 27th July 2023 and further surveys were not deemed necessary at early design stages. Roosting was also confirmed within the weighbridge office, however as the attic space was not fully accessed, a dusk emergence survey was also carried out. Table 3-2 summarises the survey effort in relation to dusk emergence survey carried out to identify and classify potential roosts. Individual surveys are described below.

Table 3-2 Manual activity surveys at PRFs.

PRF	IG Ref.	Date	Survey Type	Results
Weighbridge Office	R 62647 69121	27th July 2023	Dusk Emergence	Single Leisler's bat emerged at 21:50.

Weighbridge Office

One dusk emergence survey was carried out at the weighbridge office located 500 metres north of the main entrance gate. Leisler's bats were recorded 10 minutes before sunset. During the survey, one Leisler's bat was observed emerging from the southwest corner of the office, 25 minutes after the first recordings of bats. Leisler's bat, *Myotis* spp. and soprano and common pipistrelles were also recorded foraging during the survey by both surveyors, which were located at the north and south of the office. In particular, social calling by Leisler's bats was recorded, and bats were observed continuously flying in circles above the site's car park early during the survey. Bat activity reduced once barn owls were spotted flying across the site and above the office.

3.2.1.2 Night Walkover Survey

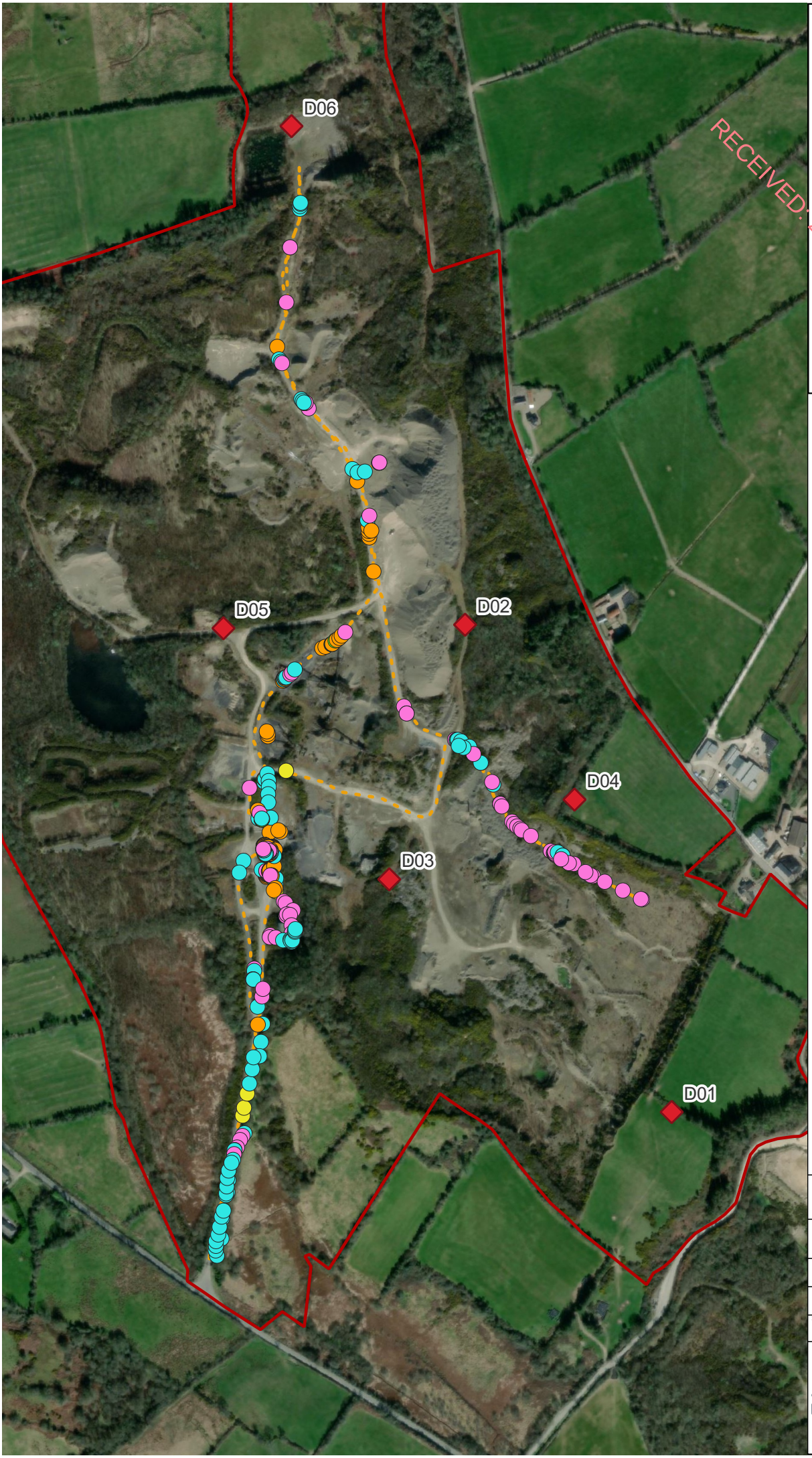
The manual activity survey also comprised of a night walkover transect at dusk. The night walkover survey followed the dusk emergence survey undertaken on the 27th of July 2023. The survey began at 23:00 and was completed at 00:28. Regular bat activity was recorded on the survey, with a total of 231 bat passes (Table 3-3).

Table 3-3 Night Walkover survey results

Date	Km	Common pipistrelle	Soprano pipistrelle	Leisler's bat	Brown long-eared bat	*Myotis* spp.	Lesser Horseshoe bat
27/07/2023	4.1	94	91	35	3	2	6

Bat activity was dominated by common and soprano pipistrelles. Common pipistrelles were predominantly recorded at the west of the site where immature conifer plantation was abundant. Soprano pipistrelles were principally found at the south of the site. Six lesser horseshoe bat passes were also recorded during the walkover survey in the southwest of the site.

Figure 3-2 presents the spatial distribution of bat activity across the night walkover surveys.



Map Legend

- EIAR Site Boundary
- Static Detector Locations
- Manual Transect 27.07.2023

Species

- Lesser horseshoe bat
- Myotis spp.
- Brown long-eared bat
- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle

Drawing Title

Manual Survey Results

Project Title

Proposed Quarry Extraction and Restoration, Ballyquin

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3.2.2 Static Detectors Surveys

Six SM4 static detectors were deployed on the site for a minimum 10-day period. Three detectors were deployed on 17th July 2023. They were moved on 27th July to three new locations and were collected on 15th August 2023.

In total 25,368 bat passes were recorded. Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Common pipistrelle (*Pipistrellus pipistrellus*) made up the vast majority of the activity recorded within the site (n=15,005), followed by Soprano pipistrelle *(Pipistrellus pygmaeus*) (n=7,842). Leisler's bat (n=1,779) and *Myotis* spp. (n=526) were less frequently recorded, followed by brown long-eared bats (n=151). 65 instances of lesser horseshoe bat were recorded at the site. The Site is located within the current known range for this species. Plate 3-18 shows total bat species composition recorded at the site.

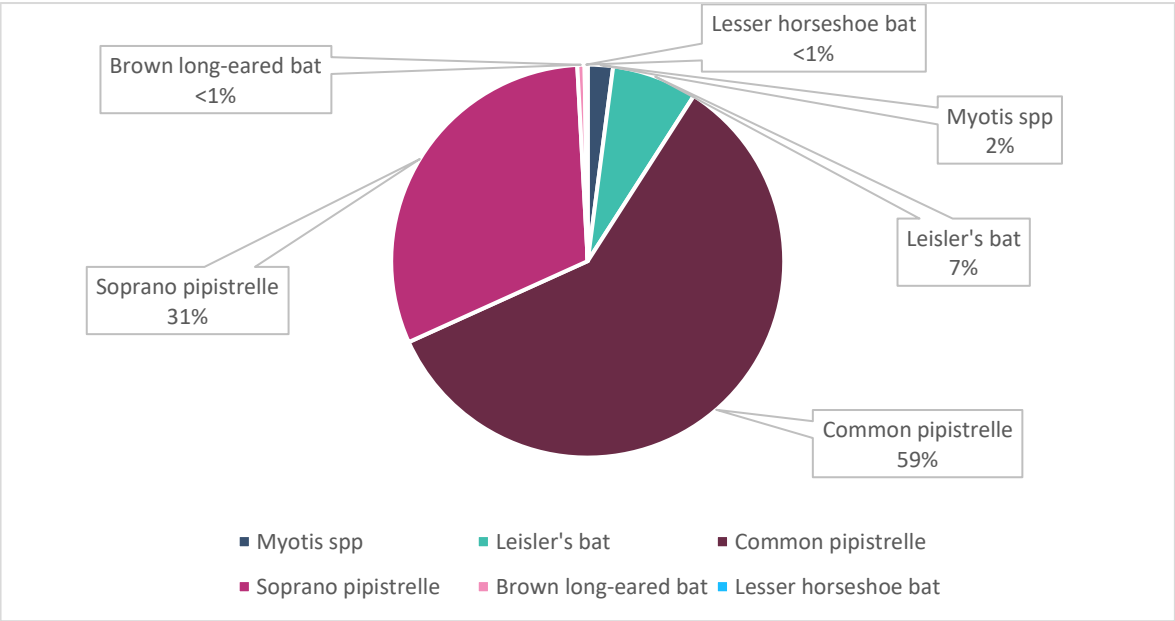

Plate 3-18 Total bat species composition.

Plate 3-19 shows total bat passes per detector, which are summarised in Table 3-4.

Table 3-4 Static detector results, total bat passes

Detector	Common Pipistrelle	Soprano Pipistrelle	Leisler's Bat	Brown Long-eared Bat	*Myotis* spp.	Lesser Horseshoe Bat
D01	2066	2435	108	10	214	1
D02	836	312	96	19	68	11
D03	2415	306	190	5	27	11
D04	5882	1973	248	23	72	18
D05	989	2204	941	58	91	24
D06	2817	612	196	36	54	0

Species composition was varied across the detectors. Common pipistrelles were recorded more frequently at locations D02, D03, D04 and D06. Soprano pipistrelle were recorded in higher numbers at D01 and D05, though instances of common pipistrelle were still high. Leisler's bat activity was highest at

D05. Instances of brown long-eared bats (n=151) were rare at across the site. *Myotis* spp. was recorded more often at D01 that at any other location.

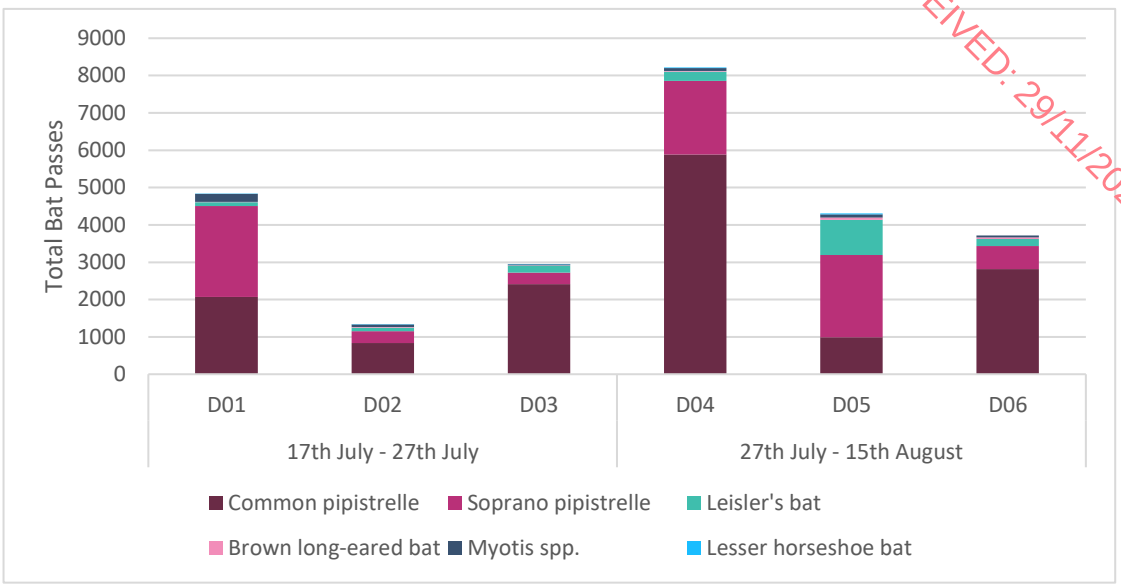

Plate 3-19 Total bat passes per detector.

Analysis of the detector recordings also highlighted the total bat passes per night, per detector. Species composition per night is shown in Plate 3-20 Total Bat Passes per Night, per Detector Location. Activity varied between locations and between nights during the two deployments. Species composition was dominated by common pipistrelles at D02, D03, D04 and D06. D01 and D05 activity was predominantly soprano pipistrelles, though Leisler's bat was more prevalent at this location than at any other. Lesser horseshoe bat was recorded at all detectors, with the exception of D06. Occasional increases in activity were recorded for all other species. The highest activity was recorded at D04 on the 7th and 8th of August.

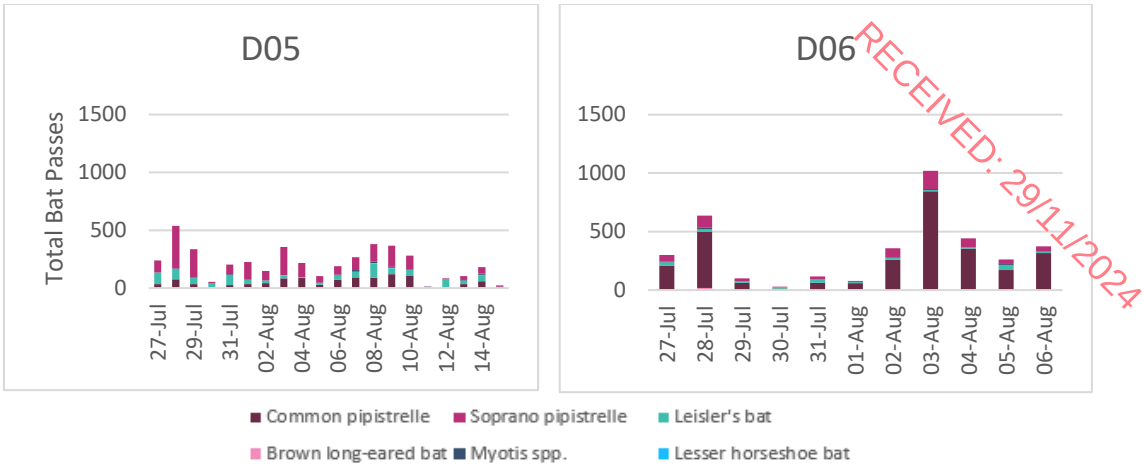

Plate 3-20 Total Bat Passes per Night, per Detector Location

4. DATA EVALUATION

4.1.1 Discussion and Interpretation

The Proposed Development site is located within the range of eight species of bats, Soprano pipistrelle, Common pipistrelle, Daubenton's bat, Whiskered bat, Natterer's bat, Leisler's bat, Brown long-eared bat and Lesser horseshoe bat. Five of these species were identified in the data gathered during the 2023 surveys. *Myotis* species were present but were not identified to species level. Bat activity varied across the site during the static surveys. D04 and D01, both located along separate treelines in the agricultural south and western areas of the site, showed the highest activity. The well-connected linear features at which these detectors were located likely accounts for this. The low activity at D02 is likely due to the unsuitable wet grassland habitat. D05 had higher Leisler's bat activity than any other location, and this activity was consistent throughout the deployment. Multiple potential roosting features were identified during the preliminary roost assessment and evidence of roosting bats was found in all buildings inspected. Four bat roosts were identified, at the weighbridge office, the large shed, the water pump building, and the hopper. The surveys recorded only single bats at both the hopper and the weighbridge office. Evidence of roosting bats, such as fresh droppings and feeding remains, was found in all four buildings. As shown in Section 3.1.1.1, the hopper does not have potential to support a large number of roosting bats and is seen as a satellite roost. The weighbridge office was identified as having potential to support a higher number of roosting bats. The water pump building and the large shed offer potential for roosting bats. An unidentified feeding bat was seen inside the large shed, though was unlikely to be day roosting there. During the dusk emergence, Leisler's bat activity was recorded ten minutes before sunset and 25 minutes before the emergence from the surveyed building. This may indicate the presence of another roost in close proximity to the proposed development site.

A number of treelines and hedgerows are present at the southeast of the site, and conifer plantations and scrub were identified throughout the site, which offer high quality foraging habitat for bats. Multiple trees were identified as having roosting potential for bats, though further assessment of these is required to definitively identify any potential roost features. The vast majority of trees within the site will be retained.

Brown long-eared bats and Lesser horseshoe bats are often under recorded during manual and static surveys. This is due to their quiet echolocation calls. Therefore, it is likely that there is a higher level of activity for these species in the area.

4.1.2 Importance of Bat Population Recorded at the Site

Ecological evaluation within this section follows a methodology that is set out in Chapter three of the '*Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009).

All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts 1976 (as amended). Bats as an Ecological Receptor have been assigned ***Local Importance (Higher value)*** on the basis that the habitats within the study area are utilized by a regularly occurring bat population of Local Importance. Though Lesser Horseshoe bats were recorded at the site, no Special Area of Conservation (SAC) designated for this species is located within 2.5km of the Proposed Development site.

The Proposed Development site has the potential to support a roosting site of ecological significance, however no evidence of large roosts was found within the inspected structures, though roosting bats were observed in the hopper, and emerging from the weighbridge office during the survey carried out in 2023. No roosting site of National Importance (i.e. site greater than 100 individuals) was recorded within the site. It is likely that the structures are used by individual bats with possible day/night/feeding/satellite roosts present. The site also presents low to moderate roosting suitability within mature trees at the west of the site.

4.1.3 Survey limitations

A comprehensive suite of bat surveys were undertaken at the Proposed Development site. The surveys undertaken in accordance with BCT Guidance, provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Development on bats receptors.

Access limitations can relate to static deployments and roost inspections:

- No significant access issues were encountered with the site during static deployments, as the detectors were deployment where intended.
- Access was gained throughout the site and within all structures identified.

Survey limitations can relate to deployment coverage, data storage, equipment failure or deployment-related incidents:

- Good survey coverage of the site has been achieved, with six detectors being deployed in across the site covering the range of habitats present at the site.
- MKO employs data storage redundancy methods to ensure no data is lost from the field to final analysis - no data was lost.
- SD card corruption or fill-up can prevent data from being collected during deployments – no issues with data on-site data storage were encountered.
- Bat detector's microphones are checked before every season to ensure they have good sensitivity for data collection, and detectors' software updates are installed as soon as they become available - no issues related to equipment were encountered during the surveys.
- Incidents during deployments, such as tampering or livestock interference, can prevent data from being collected effectively. A battery issue at D06 prevented any data being recorded after 10 days of deployment. However, the data collected provided sufficient coverage of the location.

Activity assessment limitations can relate to data analysis procedures and a lack of standardised and Ireland-based assessment methods:

- MKO's data analysis methods include manually checking of 100% of bat passes identified by Auto ID Software, as well as noise and no ID files. Where multiple species, or multiple individuals of the same species, are identified within the same call, only one is reported, prioritising hard to detect species. This is due to the large volumes of data collected. While this method is likely to introduce a bias, it is not believed to affect the overall conclusions of the assessment, as only commonly recorded species might be underreported.
- No activity threshold currently exists for Irish bat species to objectively assess bat activity within a certain habitat, and no standardised assessment method has been proposed across the country. Ecobat software recommended by existing guidelines was not available for use at the time of the assessment, as under maintenance. MKO experience surveying habitats similar to those present within the site aided with the assessment.

No significant limitations in the scope, scale or context of the assessment have been identified.

5. CONCLUSION & RECOMMENDATIONS

The following points set out the main conclusions following the completion of the surveys described above:

- Five bat species, as well as Myotis sp. were recorded commuting and foraging across the Proposed Development site during the bat surveys carried out in July 2023, including soprano pipistrelle, common pipistrelle, Leisler's bat, brown long-eared bat, and lesser horseshoe bat.
- The existing landscape occurring within Ballyquin Quarry provides high quality habitats for commuting and foraging bats.
- Most of the buildings surveyed have the potential to support bat roosts. Droppings and feeding remains were found in the weighbridge office, the large shed and the water pump building. A live bat was found within the hopper. The accumulations of fresh bat droppings and feeding remains recorded suggest that the structures on site support use by bats.
- Two active Leisler's bat roosts were recorded during the 2023 surveys.
- No large permanent or maternity roosts were recorded.
- Trees within the Proposed Development area may have potential to support roosting bats, and further assessment is required to determine this.

A full assessment of the potential impacts on bats as a result of the Proposed Development is presented in the EIAR which will accompany the planning application. Consideration should be given to the following measures to mitigate for potential impacts:

- Roosting locations will be retained as part of the proposed works.
- Any potential felling of trees with suitable roosting features will be carried out with the assumption that bats may be present:
  - Trees with suitable potential roost features proposed for felling will be checked by a suitably qualified arborist at the time of felling.
  - A pre-commencement survey by a licensed ecologist will be undertaken prior to the removal any tree with bat roosting potential.
  - Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow bats to wake and move.
  - Rigged felling shall be used to lower the limbs and trunk carefully to ground level and cavities searched by a qualified ecologist.
  - Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape (National Roads Authority, 2006).
  - Any tree felling will be undertaken outside the main bat vulnerability periods (including maternity season & hibernating season) (Marnell, Kelleher and Muller, 2022).
- Landscaping favourable to bats will involve the retention and enhancement of linear features and woodland habitats. Any linear features lost during the proposed development should be replanted, and remaining habitat features should be bolstered to offset any potential loss of habitat features and provide additional opportunities for commuting and foraging bats. There will be no artificial lighting at night, with the exception of safety lighting. The lighting plan for the operational phase of the proposed works, will be designed with consideration of the following guidelines: Bat Conservation Ireland guidelines; Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/23 Bats and Artificial Lighting in the UK (BCT, 2023), to minimise light spillage, thus reducing any potential disturbance to bats.

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