Proposed Solar PV Development

Byers Gill Solar
EN010139

6.4.6.4 Environmental Statement Appendix 6.4 Static Detector Bat Survey Report

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APFP Regulation 5(2)(q)

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Static Detector Bat Survey Report

Project number 2483386

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RSK biocensus
EXPERTS IN ECOLOGY

EXECUTIVE SUMMARY

1. RSK Biocensus was commissioned by Arup (the client) to carry out bat surveys on behalf of RWE (the Applicant). This report has been prepared to accompany Chapter 6 of the Environmental Statement (ES) (Document Reference 6.2.6).
2. This report presents the results of bat surveys comprising a background data search and static bat surveys. The surveys were carried out between May and September 2022.
3. Throughout the monitoring period, nine species and two genus groups were recorded: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Daubenton's (*Myotis daubentonii*), Natterer's (*Myotis nattereri*), Brandt's (*Myotis brandtii*), whiskered (*Myotis mystacinus*), noctule (*Nyctalus noctula*), brown long-eared bat (*Plecotus auritus*), *Myotis* spp. and *Nyctalus* spp.
4. A total of 222,698 bat registrations were recorded for the study area with a mean registration rate of 38.58 per hour (B/h).
5. Most bat activity originated from common pipistrelle (71.8%) and soprano pipistrelle (13.7%) bats which accounted for 85.5% of all activity within the Proposed Development, followed by noctule (4.4%), *Myotis* spp. (4.1%), Brandt's/whiskered (2.1%), Daubenton's (2.1%), brown long-eared (0.8%), *Nyctalus* spp. (0.7%), Natterer's) (0.3%) and Nathusius' pipistrelle (0.004%).
6. The results of the survey would indicate that the levels of bat activity within the study area were high at monitoring point 6 (>100 B/h), moderate to high at monitoring points 1, 11, 16 and 20 (50 - 100B/h) and low to moderate (<50) for all other monitoring points.
7. Habitat of high value for commuting, foraging and roosting, were shown to be the woodland edge and hedgerow network across the study area. These areas support invertebrate activity and also provide a roosting network for bats.
8. When considering the information available, the nature conservation value across the study area is assessed as being of County nature conservation importance for Nathusius' pipistrelle based on regional populations with a restricted distribution in the north of England and due to a near-threatened conservation status.
9. The nature conservation value of common pipistrelle, soprano pipistrelle, *Myotis* spp. brown long-eared bat and noctule bat across the study area is assessed to be Local due to the favorable conservation status of these species and their widespread distribution.
10. A detailed impact assessment has been undertaken in ES Chapter 6 Biodiversity (Document Reference 6.2.6).

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1.0 INTRODUCTION

1.1 Purpose of this report

1.1.1 RSK Biocensus was commissioned by Arup (the client) to carry out bat surveys on behalf of RWE (the Applicant). This report has been prepared to accompany Chapter 6 of the Environmental Statement (ES) (Document Reference 6.2.6).

1.1.2 This report describes the results of static detector bat surveys undertaken to obtain baseline ecological information, to inform the Ecological Impact Assessment (EcIA) for Byers Gill Solar (the Proposed Development).

1.1.3 The report presents the methods and results of the static detector bat surveys undertaken between May and September 2022 inclusive. The purpose of the surveys was to obtain detailed information regarding bats within the Proposed Development. The aims of the surveys were to:

- identify the bat species present;
- assess relative activity levels; and
- assess relative abundance.

1.1.4 The following terminology is used throughout this report:

- The Proposed Development – outlined by the red line boundary including all infrastructure, cables and Panel Areas as shown in Figure 6.4.1.
- study area – the land within the application boundary where bat field surveys were carried out as shown in Figure 6.4.1.
- Order Limits – the land area within the application boundary outlined by the red line boundary including all infrastructure, cables and Panel Areas.

1.1.5 Habitats were assessed for their suitability for foraging, commuting and roosting bats, which including a Preliminary Roost Assessment (PRA) of trees during the Preliminary Ecological Appraisal (PEA) (RSK, 2024), the result of which are reported on separately in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

1.2 Landscape context

1.2.1 The Order Limits comprises numerous land parcels north- east of Darlington (Ordnance Survey Grid reference: NZ 35750 21286). The Order Limits is dominated by agricultural land and hedgerows with some areas of broadleaved woodland. The cable route runs along minor road networks (often lined by hedgerows), agricultural land and rural residential areas.

1.2.2 The Proposed Development consists of a solar farm capable of generating over 50 MW Alternating Current (AC) of electricity with co-located Battery Energy Storage Systems

(BESS), located between Darlington and Stockton-on-Tees in north-east England. The Proposed Development comprises six solar photovoltaic (PV) panel areas (Panel Areas A-F). The solar PV panels would be mounted on a metal frame in groups, fixed in position and aligned in east-west rows with panels facing south. An on-site substation would be located within Panel Area C.

1.2.3 The Proposed Development includes up to 32.5 km of 33 kilovolt (kV) underground cabling between the Panel Areas and the on-site substation, as well as approximately 10 km of 132 kV underground cable to connect the Proposed Development to the grid connection at the existing Norton substation (located to the north-west of Stockton-on-Tees) with both on-road and off-road options. A range of supporting infrastructure is required for the Proposed Development, comprising BESS; transformers and inverters for managing the electricity produced; storage containers to hold this equipment; and security measures such as fencing, CCTV and lighting. The Proposed Development includes environmental mitigation and enhancement measures to avoid or reduce adverse impacts on the surrounding environment and nearby communities.

1.2.4 The majority of the Proposed Development's planning boundary (the 'Order Limits') is located within the administrative boundary of Darlington Borough Council, with a section of the cable route situated within the administrative boundary of Stockton-on-Tees Council. A very small section of the Order Limits is within the administrative boundary of Durham County Council.

1.2.5 A full description of the Proposed Development and a detailed description of the design and environmental mitigation is provided in ES Chapter 2 The Proposed Development (Document Reference 6.2.2).

1.3 Policy and Guidelines

1.3.1 All bat species found in England are classed as European protected species. They receive full protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats, &c.) Regulations 2017. Details on the legal status of bats are included within Appendix A.

1.3.2 In the UK, guidelines have been produced with regards to assessing the ecological impact upon bats from development. These guidelines help to inform survey and mitigation strategies and have been used in the preparation of this report:

- Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London.

2.0 METHODS

2.1 Background Data Search

2.1.1 To provide context for the results of the bat surveys, a background data search (BDS) was carried out for recent (0 – 10 years) biological records from the Environmental Records Information Centre Northeast. The BDS was undertaken on 17 March 2022 for the production of a PEA report (RSK, 2024) and included a 1 km radius for notable species such as bats.

2.1.2 There are several known statutory designated sites in England with bats as a qualifying species, however there are none situated in the north-east and therefore a search for sites was not undertaken for the purpose of this report.

2.1.3 As part of the BDS, a search for existing solar and wind farms within the surrounding area (10 km) was sought in order to inform an assessment of the potential cumulative pressures.

2.2 Solar Farms and Bats Risks

2.2.1 A recent study was conducted at 19 solar PV developments in southwest England to determine the impact on bat species in the UK. The study found the activity of six of eight species/species groups analysed to be negatively affected by solar PV panels. In particular, *Pipistrellus pipistrellus* and *Nyctalus* spp. activity was lower at solar PV sites regardless of the habitat type. While activity at sites with solar PV panels was lower for *Myotis* spp. and *Eptesicus serotinus* along field boundaries and lower for *Pipistrellus pygmaeus* and *Plecotus* spp. in open fields (Tinsley *et al*., 2023).

2.2.2 Solar panels can horizontally polarize light and reflect sound in a similar way to water, this may lead to bats mistaking panels for waterbodies when using their visual system or echolocating, encouraging them to attempt to drink from the panel surfaces. Fortunately, studies have found that bats tend to land on the panels to drink rather than colliding (i.e. non-fatal interaction), they also show signs of learnt behaviour by eventually avoiding the panels following several unsuccessful drinking attempts (Greif and Siemers, 2010; Russo *et al*., 2012).

2.2.3 Collisions between bats and solar panels may occur for other reasons. Vertically aligned plates can induce higher collision risk during flight as the smooth vertical surfaces can be interpreted as open flight paths due to acoustic mirror properties interfering with echolocation (echoes not returned to the bat but reflected between the panels). There is a possibility that bats could learn to navigate these ‘holes’ in the landscape, however tilting the panels is likely to provide a more effective preventative measure (Greif *et al*., 2017; Montag *et al*., 2016; Toussaint, 2016).

2.2.4 The horizontal polarization of light by solar panels could also impact bat’s insect prey as several aquatic insect species show strong attraction to panels and subsequently exhibit oviposition on the surfaces, leading to inviable offspring and increasing predation risk (Egri *et al*., 2016; Farkas *et al*., 2016; Gibson *et al*., 2017; Horvath *et al*., 2010). The

population-level effects of solar farms on aquatic insects are currently unknown, if they do prove to lead to population declines then UK bats could be at risk as several species are highly reliant on aquatic insects as a food source (e.g. *Myotis spp., Pipistrellus spp.* and *Nyctalus leisleri*) (Wickramasinghe et al. 2004).

2.2.5 Other general potential impacts of solar farms on bats include disturbance during construction and operation of solar farms due to noise and light pollution, as well as habitat degradation and fragmentation as a result of water and soil pollution, tall panels interrupting flight paths, vegetation clearance and water body drainage, which can reduce bat insect prey availability, drinking water sources and bat socialising and commuting habitat (Toussaint, 2016). There may also be indirect effects to bats via solar farms inducing environmental change over the long-term, for example, the formation of microclimates, reductions in plant biomass (particularly under the panels) and top soil destabilisation (Armstrong *et al*., 2016; Fthenakis *et al*., 2011; Gibson *et al*., 2017; Montag *et al*., 2016; Toussaint, 2016; Tsoutos *et al*., 2005).

2.2.6 Habitat loss and fragmentation of bat foraging/commuting areas can significantly impact local, regional and national populations due to bats' long lifespan and low reproductive rate.

2.3 Bat Call Analysis

2.3.1 Full spectrum Wildlife Acoustics Song Meter 4 (SM4) detectors were set to record five second registration files for the majority of the deployment periods, any that were not split into five second files during analysis to ensure a fair comparison between deployments.

2.3.2 All recordings were analysed using specialised software (Kaleidoscope Pro). Kaleidoscope automatically identifies bat calls to species level by comparing the echolocation pulses to an integrated library of bat calls which then assigns a species label to every five second registration file. Following the batch analysis, all non-pipistrellus calls (excluding *Pipistrellus nathusii*) and no ID calls (which included noise), were manually checked by an experienced bat ecologist (Bat Acoustics Analysis-Certified, Grade A) using Kaleidoscope Pro in order to confirm identification. A percentage of calls were also spot-checked for quality assurance.

2.3.3 This method of analysis is in line with current guidelines (Collins, 2016) for data analysis which recommends the manual checking of all non-pipistrellus calls when using automated methods. Guidance on call parameters was taken from Russ (2012).

2.3.4 Echolocation calls were identified down to species or genus level depending on the type of bat encountered. It was not always possible to reliably identify species belonging to the genus groups *Myotis* and *Nyctalus*, due to quality of the call or the shortness of the call on a sonogram (visual picture of the call) with these groups sometimes only analysed to genus level. However, the distribution of Leisler's (*Nyctalus leisleri*) in the north of England is rare according to this species known range (Mathews, et al., 2018) and the *Nyctalus* spp. calls recorded within the study area are most likely noctule.

2.3.5 The echolocation calls of whiskered (*Myotis mystacinus*) and Brandt's (*Myotis brandti*) bat are very similar, and it is only possible to tell apart these bats when holding them in

the hand, and looking at differences in their coat, teeth and male genitalia. Therefore, these species were classed as whiskered/Brandt's bat.

2.3.6 The level of bat activity was quantified by the number of five second files (registrations) recorded for each recorded species for each night and monitoring period. As night length varies between months, the number of bat registrations recorded was divided by the number of recording hours, to provide an indication of bat activity – bat registrations per hour (B/h).

2.4 Static Detector Surveys

2.4.1 A map outlining the Order Limits was provided by the applicant in 2022. This was used to define the extent of the study area for static detector deployment. A total of 20 monitoring points across the study area were surveyed each month over a five-month period (May – September) in 2022. A number of amendments were subsequently made to the Order Limits boundary with three static locations no longer with the application boundary (monitoring points 11, 19 & 20).

2.4.2 Full spectrum Wildlife Acoustics Song Meter 4 (SM4) detectors with omnidirectional microphones were deployed within the study area. Each microphone was mounted at a minimum height of 2 m to maximize the probability of recording bat calls in addition to reducing the likelihood of noise interference from insects and moving vegetation.

2.4.3 Detectors were deployed across the study area to cover different habitats and topographical features including improved grassland, arable crop, hedgerows, streams and woodland edges. Detectors were deployed in suitable weather conditions for bats where possible. Each detector recorded bats from dusk to dawn with detectors starting 30 minutes before dusk and finishing 30 minutes after dawn. The monitoring points of the detectors, deployment dates and complete operating nights at each monitoring point are detailed in Table 4 of Appendix B and are the location of the monitoring points shown in Figure 6.4.1.

2.4.4 Collins (2016) guidance stipulates that bat activity data should be recorded for five consecutive nights in appropriate weather conditions for bats. Therefore, detectors were deployed for a minimum of five complete nights. Survey dates were spaced out where possible between each deployment at each monitoring point. In addition, detectors were deployed when the predicted weather forecast indicated suitable weather conditions for foraging and commuting bats (i.e., air temperature above 8°C, wind speed below 5 m/s and light or no precipitation).

2.4.5 Collins (2016) states the minimum level of pre-application survey required using static detectors is five nights in each of: spring (April-May), summer (June-mid-August) and autumn (mid-August-October). As the number of detectors available was limited, 10 detectors were deployed at monitoring points 1-10 during the first half of each month and then the same detectors were re-deployed at monitoring points 11-20 during the second half of each month from May to September.

2.5 Constraints and Limitations

2.5.1 Several landowners left the solar farm scheme during the deployment period and there were changes to the Order Limits boundary with monitoring points 11, 19 and 20, no longer within the Order Limits. The revised Order Limits boundary is not seen to be a limitation to the data collected as bats are a highly mobile species and the monitoring points covered a range of habitats and topographical features typical to the Proposed Development, including hedgerows, fields and woodland edges, providing an indication of how bats are using the Order Limits and the surrounding area.

2.5.2 During deployment, several detectors (and/or components) were stolen. The surrounding detectors were operational, and it is considered that sufficient data was collected from these operational detectors to identify species and activity levels for the Proposed Development during these deployment periods.

2.5.3 Further data was lost due to malfunctioning equipment, including the detector deployed at monitoring point 11 in June, which was knocked down by cattle and some monitoring points in August. This loss of data is not considered to have affected the overall assessment and conclusion of this report.

2.5.4 For some *Myotis* spp. calls it was only possible to identify the call to genus level. It is possible that for *Myotis* spp. these recordings could represent species not identified in the analysis of the recorded data.

2.5.5 There is some overlap with *Nyctalus* spp. calls (Leisler's and noctule bats), therefore, for some of these recordings it was only possible to identify to genus level. The distribution of Leisler's in the north of England is rare according to this species known range (Mathews, et al., 2018), therefore the *Nyctalus* spp. calls recorded within the study area are most likely noctule.

2.5.6 Due to passive (static) monitoring methodologies depending on sound reaching the microphone, the detection rate of bat calls varies with a bias towards loud bat calls; with quieter calls, namely brown long-eared bats potentially being under-recorded.

3.0 RESULTS

3.1 Background Data Search

3.1.1 The desk study returned 40 records of following bats within 1 km of the study area.

- Noctule bat (*Nyctalus noctule*) (2 records).
- Daubenton's bat (*Myotis daubentonii*) (4 records).
- Whiskered bat (*Myotis mystacinus*) (1 record).
- Common pipistrelle bat (*Pipistrelle pipistrelle*) (18 records, 2 within 100 m of the site).
- Soprano pipistrelle (*Pipistrelle pygmeaus*) (1 record).
- Nathusius's Pipistrelle (*Pipistrellus nathusii*) (1 record).
- In addition, there are 4 records of unidentified pipistrelles, 4 unidentified *Myotis* species and 5 unidentified bats.

3.1.2 The UK Renewable Energy Map[1] was accessed in February 2023 to search for operational solar and wind farm developments within 10 km of the Proposed Development.

3.1.3 There are seven operational solar farms and four operational wind farm developments within this radius. Details on these developments are provided below in Table 1.

Table 1 Operational Solar and Wind Farms within 10 km

Solar/Wind Farm	Grid Reference	Location and approx. distance from the Proposed Development	Size
High Meadow Solar Farm	NZ 40320 21958	1 km east	4.0 MW
Moor House Wind Farm	NZ 32599 20053	1 km south	12.0 MW
Aldi Distribution Centre – Darlington Solar Farm	NZ 27658 17108	4 km southwest	1.2 MW
Field at School Aycliffe Lane Solar Farm	NZ 26360 23762	4.1 km northwest	5.0 MW
Eaglescliffe Solar Farm	NZ 41718 16841	5.5 km southeast	5.0 MW
Lambs Hill Wind Farm	NZ 43682 16981	6.2 km southeast	8.0 MW
Stob House Solar Farm	NZ 45555 26689	7.3 km northeast	4.9 MW
Red Gap Moor Wind Farm	NZ 43942 28174	7.4 km northeast	12.5 MW
Walkway Wind Farm	NZ 39000 30000	7.5 km north	14.0 MW

[1] http://www.mygridgb.co.uk/map/

Solar/Wind Farm	Grid Reference	Location and approx. distance from the Proposed Development	Size
Land West Of Hunger Hill Solar Farm	NZ 32733 12972	8 km south	5.0 MW
Land at Bluehouse Solar Farm	NZ 47326 26636	8.9 km northeast	5.0 MW

3.2 Static Detector Surveys

3.2.1 A total of 222,698 bat registrations were recorded for the study area with a mean registration rate of 38.58 B/h. Throughout this period, nine species and two genus groups were recorded: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Daubenton's, Natterer's, Brandt's, whiskered, noctule, brown long-eared bat, *Myotis* spp. and *Nyctalus* spp. The assemblage of bats recorded within the Proposed Development is provided in Chart 1.

3.2.2 The majority of bat activity, as illustrated on Chart 1 originated from common pipistrelle (71.8%) and soprano pipistrelle (13.7%) bats which accounted for 85.5% of all activity within the Proposed Development followed by noctule (4.4%), *Myotis* spp. (4.1%), Brandt's/whiskered (2.1%), Daubenton's (2.1%), brown long-eared (0.8%), *Nyctalus* spp. (0.7%), Natterer's (0.3%) and Nathusius' pipistrelle. (0.004%).

3.2.3 The total number of bat registrations recorded at the 20 different monitoring points are provided in Table 2 with the mean registration rate (B/h) per month shown in Table 3.

3.2.4 Common pipistrelle bats recorded the highest registration count, as shown in Table 2 and Table 3 and Chart 2 with an overall total of 159,954 registrations, followed by soprano pipistrelle with an overall total of 30,457 registrations. Common and soprano pipistrelle have a combined registration rate of 32.99 B/h for the study area.

3.2.5 Noctule recorded a total registration count of 9,820, *Myotis* spp. recorded 9,234, Brandt's/whiskered recorded 4,641, Daubenton's recorded 4,605, brown long-eared 1,695, *Nyctalus* spp. 1,535, Natterer's 747 and Nathusius' pipistrelle recorded 10 overall.

3.2.6 The monitoring point that recorded the highest registration count was monitoring point 6 which recorded 34,869 registrations during the monitoring periods with a mean registration rate of 133.18 B/h. The high registration count could be the result of a nearby bat roost. Registration numbers peaked at this monitoring point during July as shown in Table 3, however, it should be noted that no data was collected from this monitoring point during the August deployment. Monitoring point 6 was positioned on a field boundary close to farm buildings. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 95% of the registrations recorded, which was the highest number of pipistrelle spp. registrations recorded at any monitoring point during the monitoring period. The second most abundant species recorded at this monitoring point was *Myotis* species accounting for 2.5% of the registrations recorded. Other species recorded at this monitoring point, in descending order of frequency, include noctule, Daubenton's, Brandt's/whiskered, *Nyctalus* spp., brown long-eared bats, Natterer's and Nathusius' pipistrelle. Nathusius's pipistrelle were recorded in low

numbers (only ever 1 or 2 individuals) across the monitoring points, at monitoring points 3, 6, 9, 12, 13, 15 and 16.

3.2.7 Monitoring point 1 recorded the second highest registration count with 24,125 registrations and a mean registration rate of 54.9 B/h. It should be noted that, as shown in Chart 2, monitoring point 11 recorded a higher mean registration rate despite having a lower count than monitoring point 1, this is due to the lower total hours spent recording at that point. Monitoring point 1 was positioned on a field boundary. Registration numbers peaked at monitoring point 1 during May as shown in Table 3. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 89% of the registrations recorded. Other species recorded which are listed in descending order of their abundance include noctule, *Myotis* spp., Brandt's/whiskered, Daubenton's, brown long-eared bats, Natterer's and *Nyctalus* spp.

3.2.8 The third highest registration count was recorded at monitoring point 11 with 17,360 registrations recorded and a mean registration rate of 64.03 B/h. Registration numbers peaked at this monitoring point during the May deployment period as shown in Table 3, however, it should be noted that no data was collected from this monitoring point during the August deployment. Monitoring point 11 was situated on a field boundary close to a stream and near a woodland edge (Byers' Gill Wood and Galloping Hill Plantation). The species composition at this monitoring point was primarily pipistrelle spp. accounting for 76% of the registrations recorded. Other species recorded which are listed in accordance of their abundance from highest to lowest include noctule, *Myotis* spp., Daubenton's, Brandt's/whiskered, Natterer's, brown long-eared bats and *Nyctalus* spp.

3.2.9 The fourth highest registration count was recorded at monitoring point 16 with 17,357 registrations recorded and a mean registration rate of 58 B/h. Registration numbers peaked at this monitoring point during the June deployment period due to pipistrelle numbers, as shown in Table 3, however, it should be noted that no data was collected from this monitoring point during the August deployment. Monitoring point 16 was positioned on a field boundary along a line of trees near a stream and adjacent to Bulmerside Hill. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 81% of the registrations recorded. Other species recorded which are listed in accordance with their abundance from highest to lowest include Daubenton's, *Myotis* spp., Brandt's/whiskered, noctule, brown long-eared bats, Natterer's, *Nyctalus* spp. and Nathusius' pipistrelle.

3.2.10 The fifth highest registration count was recorded at monitoring point 9 with 13,707 registrations recorded and a mean registration rate of 31.86 B/h. Registration numbers peaked at this monitoring point during the September deployment period as shown in Table 3. Monitoring point 9 was positioned on a field boundary between three separate areas of woodland. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 88% of the registrations recorded. Other species recorded which are listed in accordance with their abundance from highest to lowest include noctule, *Myotis* spp., Daubenton's, Brandt's/whiskered, brown long-eared bats, *Nyctalus* spp., Natterer's and Nathusius's pipistrelle.

3.2.11 The sixth highest registration count was recorded at monitoring point 4 with 12,547 registrations recorded and a mean registration rate of 41.88 B/h. Registration numbers

peaked at this monitoring point during the May deployment period as shown in Table 3, however, it should be noted that the detector was not deployed at this monitoring point during June due to theft risk, which meant that no data was collected. Monitoring point 4 was positioned on a field boundary containing scattered trees. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 92% of the registrations recorded. Other species recorded which are listed in accordance with their abundance from highest to lowest include *Myotis* spp., noctule, Brandt's/whiskered, Daubenton's, brown long-eared bats, *Nyctalus* spp. and Natterer's.

3.2.12 The seventh highest registration count was recorded at monitoring point 8 with 11,144 registrations recorded and a mean registration rate of 32.20 B/h. Registration numbers peaked at this monitoring point during the August deployment period as shown in Table 3. Monitoring point 8 was positioned on a field boundary near Byers' Gill Wood. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 86% of the registrations recorded. Other species recorded which are listed in accordance with their abundance from highest to lowest include Brandt's/whiskered, noctule, *Myotis* spp., Daubenton's, brown long-eared bats, *Nyctalus* spp. and Natterer's.

3.2.13 The eighth highest registration count was recorded at monitoring point 5 with 11005 registrations recorded and a mean registration rate of 30.98 B/h. Registration numbers peaked at this monitoring point during the May deployment period as shown in Table 3. Monitoring point 5 was positioned on a field boundary near a short strip of woodland and a stream, not far from several farm buildings. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 88% of the registrations recorded. Other species recorded which are listed in accordance with their abundance from highest to lowest include *Myotis* spp., noctule Brandt's/whiskered, Daubenton's, brown long-eared bats, *Nyctalus* spp. and Natterer's.

3.2.14 The ninth highest registration count was recorded at monitoring point 20 with 10,656 registrations recorded and a mean registration rate of 51.85 B/h. Registration numbers peaked at this monitoring point during the May deployment period as shown in Table 3, however, it should be noted that the detector was not deployed at this monitoring point during August and September due to the landowner no longer being within the scheme, which meant that no data was collected. Monitoring point 20 was positioned on a field boundary close to the corner of a small patch of woodland. The species composition at this monitoring point was primarily pipistrelle spp. accounting for 82% of the registrations recorded. Other species recorded which are listed in accordance with their abundance from highest to lowest include noctule, *Nyctalus* spp., Daubenton's, Brandt's/whiskered, *Myotis* spp., brown long-eared bats and Natterer's.

3.2.15 After monitoring point 20, all other monitoring points recorded < 10,000 registrations. The remaining monitoring points had a species composition dominated by pipistrelle species with registration numbers for this species peaking during the May deployment period.

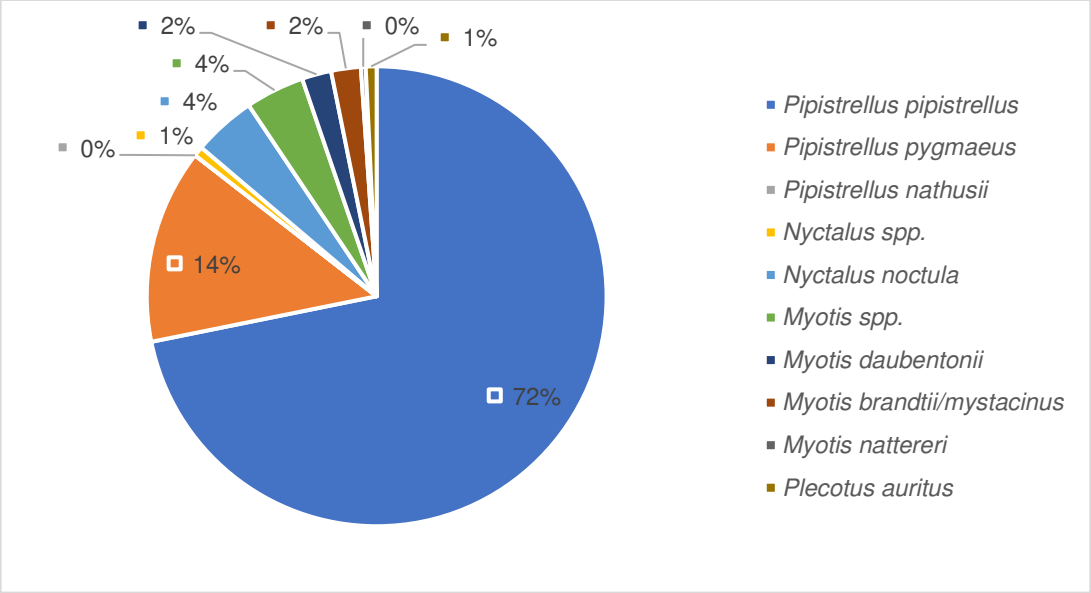

Chart 1: Static Results: Species Composition (%) of the Study Area

Table 2 Summary of Static Survey Results for the Study Area.

	Myo spp.		M.daub		M.bra/mys		M.nat		Nyc spp.		N.noc		C.pip		S.pip		N.pip		BLE	
Mon. Point	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h
1	789	1.80	326	0.74	528	1.20	31	0.07	29	0.07	815	1.85	18896	43.00	2567	5.84	0	00.00	144	0.33
2	594	1.55	126	0.33	225	0.59	20	0.05	70	0.18	241	0.63	5284	13.78	2618	6.83	0	0.00	90	0.23
3	244	0.79	45	0.15	63	0.20	4	0.01	50	0.16	226	0.73	5604	18.14	213	0.69	1	0.00	20	0.06
4	324	1.08	117	0.39	169	0.56	12	0.04	22	0.07	297	0.99	10895	36.36	672	2.24	0	0.00	39	0.13
5	499	1.40	122	0.34	253	0.71	28	0.08	30	0.08	336	0.95	9121	25.68	574	1.62	0	0.00	42	0.12
6	861	3.29	199	0.76	132	0.50	5	0.02	24	0.09	351	1.34	24705	94.36	8581	32.77	2	0.01	9	0.03
7	126	0.55	138	0.61	87	0.38	5	0.02	45	0.20	503	2.21	3622	15.95	65	0.29	0	0.00	100	0.44
8	293	0.85	199	0.58	541	1.56	33	0.10	44	0.13	364	1.05	8630	24.94	991	2.86	0	0.00	49	0.14
9	514	1.19	135	0.31	128	0.30	10	0.02	49	0.11	751	1.75	5677	13.19	6358	14.78	1	0.00	84	0.20
10	1055	3.12	155	0.46	210	0.62	55	0.16	21	0.06	344	1.02	6003	17.78	558	1.65	0	0.00	173	0.51
11	1226	4.52	648	2.39	493	1.82	129	0.48	127	0.47	1338	4.94	12177	44.92	1094	4.04	0	0.00	128	0.47
12	292	1.20	85	0.35	97	0.40	131	0.54	610	2.51	934	3.84	1403	5.77	1427	5.87	1	0.00	129	0.53
13	567	1.90	562	1.88	302	1.01	103	0.34	33	0.11	516	1.72	6011	20.09	868	2.90	1	0.00	134	0.45
14	229	1.22	239	1.28	378	2.02	15	0.08	21	0.11	221	1.18	3546	18.96	507	2.71	0	0.00	118	0.63
15	187	1.54	42	0.35	73	0.60	2	0.02	1	0.01	50	0.41	3055	25.17	38	0.31	2	0.02	10	0.08
16	927	3.10	963	3.22	582	1.94	133	0.44	28	0.09	414	1.38	13587	45.40	508	1.70	2	0.01	213	0.71
17	66	0.24	26	0.09	67	0.24	1	0.00	4	0.01	167	0.60	7073	25.22	406	1.45	0	0.00	27	0.10
18	109	0.40	180	0.66	38	0.14	3	0.01	9	0.03	722	2.67	3864	14.27	423	1.56	0	0.00	25	0.09
19	141	0.69	96	0.47	74	0.36	17	0.08	41	0.20	310	1.51	3507	17.09	494	2.41	0	0.00	95	0.46
20	191	0.93	202	0.98	201	0.98	10	0.05	277	1.35	920	4.48	7294	35.49	1495	7.27	0	0.00	66	0.32
Grand Total	9234	1.60	4605	0.80	4641	0.80	747	0.13	1535	0.27	9820	1.70	159954	27.71	30457	5.28	10	0.00	1695	0.29

*Mon. Point (Monitoring Point), B/h (bat passes per hour), Myo (*Myotis* spp.), M.daub (Daudenton's), M.bra/mys (Brandt's/Whiskered), M.nat (Natterers), Nyc (*Nyctalus* spp.), N.noc (Noctule), C.pip (Common pipistrelle), S.pip (Soprano pipistrelle), N.pip (Nathusius' pipistrelle) and BLE (Brown long-eared bat)

Table 3 Summary of Static Survey Results (mean B/h) for each Month

	May		June		July		August		September	
Mon. Point	Total	B/h	Total	B/h	Total	B/h	Total	B/h	Total	B/h
1	12455	221.90	3923	60.06	1659	11.11	4094	43.77	1994	26.54
2	2016	35.92	495	7.58	961	12.86	3857	34.39	1939	25.84
3	1815	27.76	0	0.00	1183	15.84	2742	29.34	730	9.67
4	4457	68.16	0	0.00	4117	55.08	2034	24.09	1939	25.84
5	6114	108.93	1662	25.45	994	13.31	1167	12.51	1068	16.23
6	11399	203.09	9679	172.89	12194	163.23	0	0.00	1597	21.29
7	1042	15.91	1267	22.63	2338	31.30	0	0.00	44	17.38
8	890	13.59	1850	33.05	2381	31.87	4044	48.07	1979	30.09
9	4458	68.08	763	13.63	1290	17.27	2403	25.78	4793	34.02
10	3937	60.13	957	17.09	967	12.94	0	0.00	2713	19.18
11	7503	133.78	2312	35.40	6295	84.20	0	0.00	1250	16.68
12	798	14.23	725	11.10	213	2.85	0	0.00	3373	71.97

	May		June		July		August		September	
Mon. Point	**Total**	**B/h**	**Total**	**B/h**	**Total**	**B/h**	**Total**	**B/h**	**Total**	**B/h**
13	1238	22.07	2665	35.71	2640	35.31	0	0.00	2554	27.26
14	2251	40.13	0	0.00	2629	35.16	394	7.01	0	0.00
15	2900	51.71	560	8.58	0	0.00	0	0.00	0	0.00
16	5692	86.99	6513	99.74	2767	37.01	0	0.00	2385	25.44
17	2638	40.32	1254	19.20	2348	31.41	0	0.00	1597	21.29
18	480	7.34	1949	29.85	2492	33.32	0	0.00	452	6.92
19	2065	31.58	0	0.00	2710	36.36	0	0.00	0	0.00
20	7034	107.57	1207	18.47	2415	32.30	0	0.00	0	0.00
Grand Total	81182	66.29	37781	35.21	52593	35.19	20341	28.64	30801	24.81

*Mon. Point (Monitoring Point), B/h (bat passes per hour).

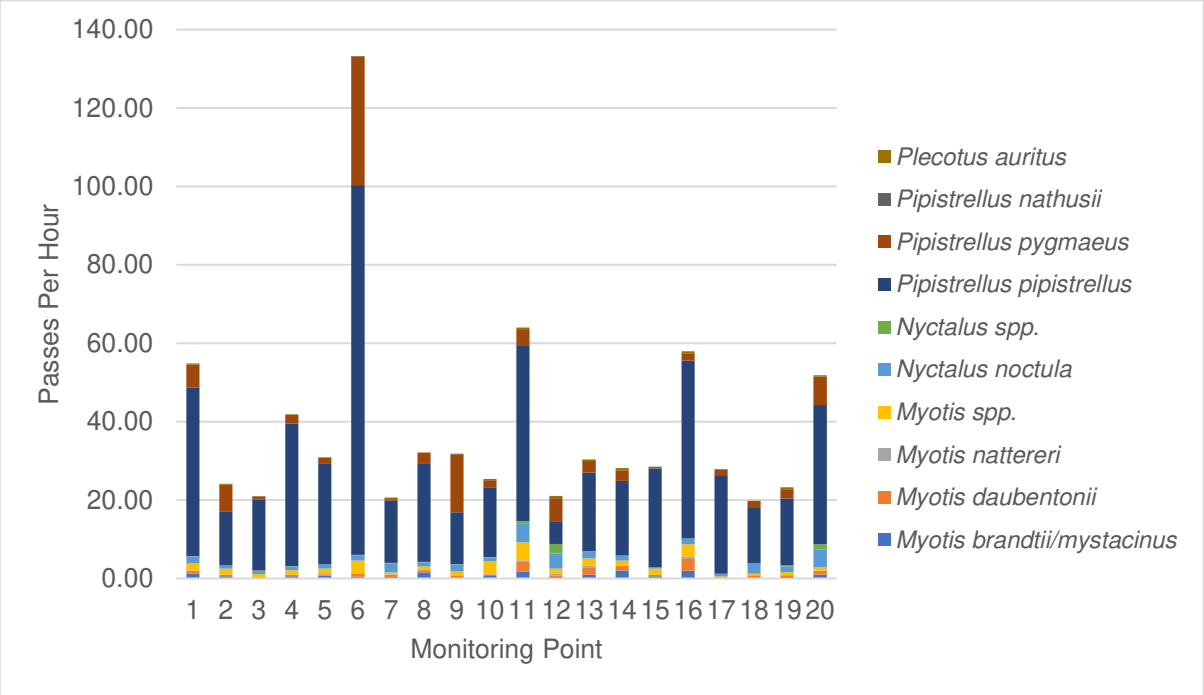

Chart 2: Summary of Static Survey Results (mean B/h) Recorded at each Monitoring Point

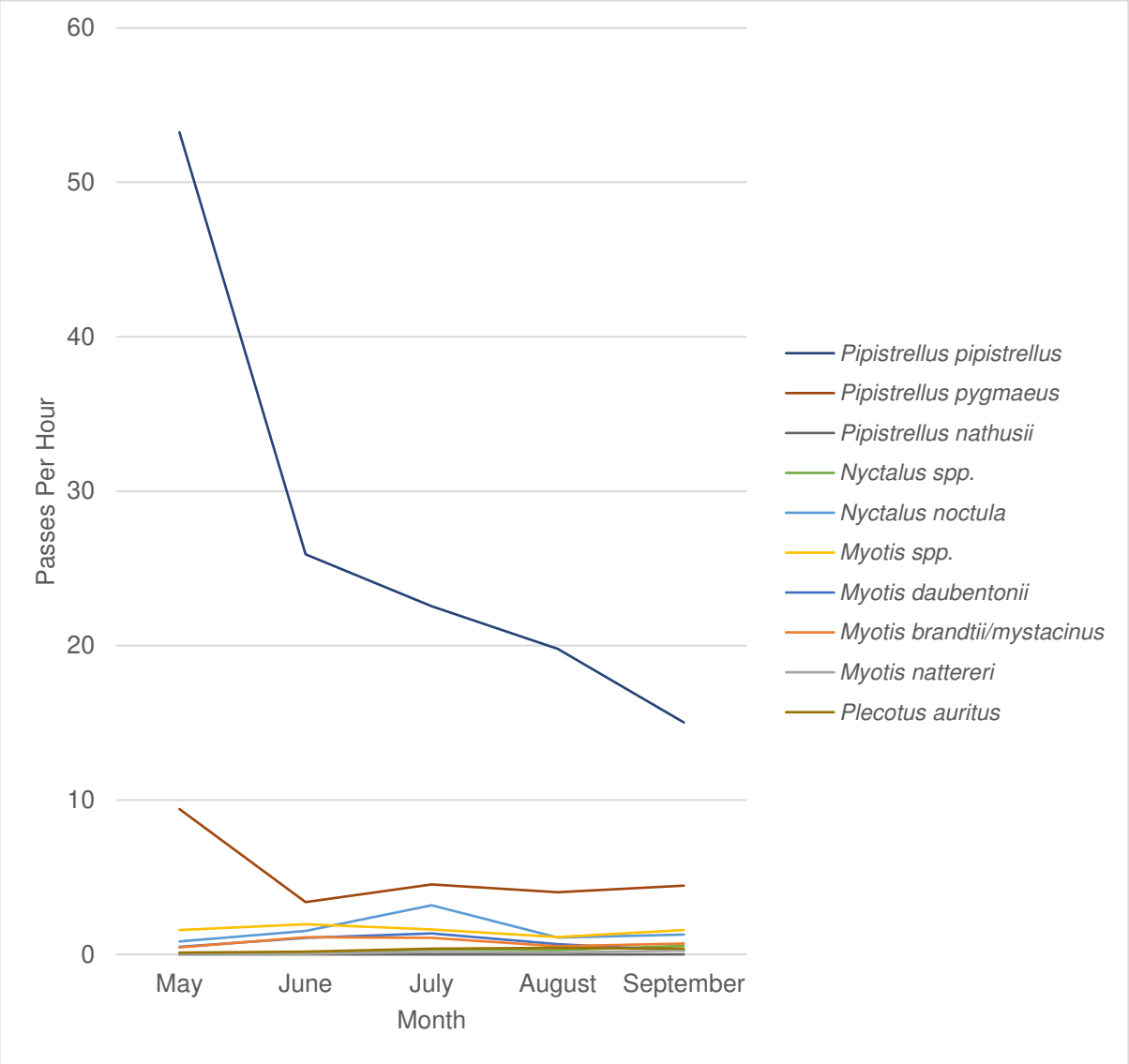

Chart 3: Summary of Static Survey Results (mean B/h) Recorded During each Month

4.0 EVALUATION

4.1 Species Assemblage

4.1.1 The majority of bat activity originated from common pipistrelle and soprano pipistrelle bats which accounted for 85.5% of all activity within the Proposed Development. Other species recorded, in descending order of frequency, include noctule, *Myotis* spp., Brandt's/whiskered, Daubenton's, brown long-eared, Nyctalus spp., Natterer's and Nathusius' pipistrelle.

4.2 Conservation status

4.2.1 Common pipistrelle, soprano pipistrelle, Daubenton's, Natterer's, noctule and brown long-eared bats are considered to have a favorable conservation status in England under Article 17 of the Habitats Directive and are listed as Least Concern (LC) under the IUCN Red List criteria (Mathews, et al., 2018). The conservation status of Brandt's bat and whiskered bat in England and in the UK is considered to be unknown and they are both listed as data deficient under the IUCN Red List. The conservation status of Nathusius's' pipistrelle is also unknown, but they are listed as near threated (NT) under the IUCN Red List in England and in the UK.

4.2.2 In northern England specifically, common and soprano pipistrelle and brown long-eared bats are widespread while *Myotis* spp. (Daubenton's, Brandt's, whiskered and Natterer's) and noctule bats are widespread in many areas but not as abundant in all. Nathusius's pipistrelle have a restricted distribution in the north of England.

4.3 Foraging and Commuting

4.3.1 A total of 222,698 bat registrations were recorded for the study area with a mean registration rate of 38.58 B/h. Throughout this period, nine species and two genus groups were recorded.

4.3.2 The results of the survey would indicate that the levels of bat activity within the study area were high at monitoring point 6 (>100 B/h), moderate to high at monitoring points 1, 11, 16 and 20 (50 - 100B/h) and low to moderate (<50B/h) for all other monitoring points.

4.3.3 Monitoring point 6 which is located in Panel Area B: Hauxley Farm was placed along a hedgerow which is adjacent to farm steadings with the hedgerow connected to Byer's Gill Wood in the east which recorded a number of trees with high roost suitability during PEA surveys (RSK, 2024).

4.3.4 Monitoring point 1 is located in Panel Area A: Brafferton along a hedgerow which contains a number of trees with bat roost suitability bordering arable land. This hedgerow is east of an unnamed tributary which drains into the River Skerne.

4.3.5 Monitoring point 16 is located in Panel Area F: North of Bishopton and was placed along a hedgerow bordering the Bishopton Beck with this hedgerow supporting a number of trees with bat roost suitability.

4.3.6 Monitoring points 11 and 20 are no longer within the Order Limits.

4.3.7 The high levels of activity at monitoring points 6, 1 and 16 would suggest a high degree of bat fidelity along these hedgerows with bat roosts most likely in the vicinity of these monitoring points.

4.3.8 Bats species such as common pipistrelle and soprano pipistrelle are strongly associated with edge habitats such as hedgerows and woodland edges. While bats such as *Myotis* species and brown long eared bats are more associated with cluttered habitats such as woodland with Daubenton's often associated with waterways. *Nyctalus* species often forage over open habitats. All of the bat species recorded within the study area are known to commute along linear landscape features. The relative bat activity levels indicate a reliance on linear habitats such as hedgerows, tree lines and woodland edge for foraging and commuting.

4.3.9 The hedgerows within the study area comprised mostly of native species, such as Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*) and were generally seen as species-poor. Trees were often present which were usually Ash (*Fraxinus excelsior*), though Sycamore (*Acer pseudoplatanus*) was also frequent. Occasionally other species were recorded such as included Hybrid Black Poplar (*Populus ×canadensis*), wild cherry (*Prunus avium*), pedunculate oak (*Quercus robur*) and Hybrid Crack-willow (*Salix* x *fragilis*). During the PEA survey a number of these trees contained potential roost features (PRF) that could be used by bats as summer and winter roosts, as discussed in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

4.4 Ecological value

4.4.1 The importance of the bat assemblage recorded within the study area was assessed based on the species recorded, local species distribution (BDS) and regional distributions. When taking these factors into consideration the species assemblage for the Order Limits was assessed as being of local value.

4.4.2 Habitats of high value for commuting and foraging, were shown to be the network of hedgerows across the study area and small pockets of woodland. These areas support invertebrate activity and provide a roosting network across the study area for bats.

4.4.3 The value of habitats across the Order Limits for commuting and foraging Nathusius' pipistrelle is assessed as being of County value based on the low number of registrations recorded across the study area and the regional populations of this species with a restricted distribution in the north of England and due to a near threatened conservation status.

4.4.4 The value of habitats across the Order Limits for commuting and foraging common pipistrelle, soprano pipistrelle, *Myotis* spp. brown long-eared bat and Noctule bats is

assessed as being of Local value due to the favourable conservation status of these species and their widespread distribution.

4.4.5 A detailed impact assessment has been undertaken in ES Chapter 6 Biodiversity (Document Reference 6.2.6) to determine the potential impacts of the Proposed Development on bats. The impact assessment will identify the requirement for mitigation and enhancement measures.

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FIGURE

Figure 6.4.1 Study Area and Monitoring Point Locations

429000 430000 431000 432000 433000 434000 435000 436000 437000 438000 439000 440000 441000

526000 525000 524000 523000 522000 521000 520000 519000 518000 517000 516000

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Legend:

- Order Limits
- Study Area
- Bat Static Detectors

Rev	Date	Description	Drn	Chk	App
00	03/11/2023	2483386	RG	SP	LP

Byers Gill Solar Farm

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 6.4.1:

Static Bat Detector Locations

0 500 1,000 1,500

Metres

SCALE: 1:40,000 @ A3

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APPENDIX A – PROTECTED SPECIES LEGISLATION

This section briefly describes the legal protection afforded to the protected species referred to in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation but summarises the salient points. More information on bats and the law can be found on the Bat Conservation Trust website https://www.bats.org.uk/advice/bats-and-the-law

Bats

All species of British bat are protected by *The Wildlife and Countryside Act 1981 (as amended).* This legislation makes it an offence to:

- intentionally kill, injure or take;
- possess or control;
- intentionally or recklessly damage, destroy or obstruct access to a breeding site or resting place; and
- intentionally or recklessly disturb while the animal occupies a breeding site or resting place.

The Habitats Directive is enacted in the UK through The Conservation of Habitats and Species Regulations 2017 (as amended). For species listed on Annex IV of the Directive (Schedule 2 of the Regulations), which includes all species of bat, this leglislation makes it an offence to:

- Deliberately capture, injure or kill,
- Deliberately disturb, including in particular any disturbance which is likely (a) to impar their ability – (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) to hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong,
- Damage or destroy a breeding site or resting place, and
- Possess, control, transport, sell, exchange, or offer for sale or exchange.

Under the Habitats Directive, certain habitats (listed on Annex I) and species (listed on Annex II) are afforded additional measures of protection through the designation of protected areas known as Special Areas of Conservation (SAC). These are designated to ensure the favourable conservation status of a habitat or species throughout its range across the EU. Bat species listed on Annex II that occur in the UK include greater and lesser horseshoe bat, Bechstein's bat and barbastelle.

APPENDIX B STATIC DETECTOR LOCATIONS AND OPERATING TIMES

Table 4 Static Detector Monitoring Points and Operating times

Monitoring Point	Grid Reference	Month	Deployment Period	Complete Night's Operative
1	NZ 29527 20290	May	06/05/22 – 12/05/22	6
		June	06/06/22 – 13/06/22	7
		July	12/07/22 – 29/07/22	16
		August	16/08/22 – 26/08/22	10
		September	13/09/22 – 21/09/22	8
2	NZ 29899 20511	May	06/05/22 – 12/05/22	6
		June	06/06/22 – 13/06/22	7
		July	12/07/22 – 20/07/22	8
		August	16/08/22 – 28/08/22	11
		September	13/09/22 – 21/09/22	8
3	NZ 29849 21278	May	20/05/22 – 27/05/22	7
		June	Not deployed	-
		July	12/07/22 – 20/07/22	8
		August	16/08/22 – 26/08/22	10
		September	13/09/22 – 21/09/22	8
4	NZ 30488 21109	May	20/05/22 – 27/05/22	7
		June	Not deployed	-
		July	12/07/22 – 20/07/22	8
		August	16/08/22 – 25/08/22	9
		September	13/09/22 – 21/09/22	8
5	NZ 31144 20858	May	06/05/22 – 12/05/22	6
		June	06/06/22 – 13/06/22	7
		July	12/07/22 – 20/07/22	8
		August	16/08/22 – 25/08/22	9
		September	No log file	7
6	NZ 31735 21951	May	06/05/22 – 12/05/22	6
		June	07/06/22 – 13/06/22	6

Monitoring Point	Grid Reference	Month	Deployment Period	Complete Night's Operative
		July	12/07/22 – 20/07/22	8
		August	No data	-
		September	21/09/22 – 29/09/22	7
7	NZ 33223 21864	May	06/05/22 – 13/05/22	7
		June	07/06/22 – 13/06/22	6
		July	12/07/22 – 20/07/22	8
		August	No data	-
		September	13/09/2022	0
8	NZ 32803 20887	May	06/05/22 – 13/05/22	7
		June	07/06/22 – 13/06/22	6
		July	12/07/22 – 20/07/22	8
		August	16/08/22 – 25/08/22	9
		September	14/09/22 – 21/09/22	7
9	NZ 33178 20549	May	06/05/22 – 13/05/22	7
		June	07/06/22 – 13/06/22	6
		July	12/07/22 – 20/07/22	8
		August	16/08/22 – 26/08/22	9
		September	13/09/22 – 21/09/22	15
10	NZ 33399 19889	May	06/05/22 – 13/05/22	7
		June	07/06/22 – 13/06/22	6
		July	12/07/22 – 20/07/22	8
		August	No data	-
		September	14/09/22 – 29/09/22	15
11	NZ 33583 20770	May	13/05/22 – 19/05/22	6
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8
		August	No data	-
		September	01/09/22 – 07/09/22	6
12	NZ 33930 21138	May	13/05/22 – 19/05/22	6
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8

Monitoring Point	Grid Reference	Month	Deployment Period	Complete Night's Operative
		August	No data	-
		September	01/09/22 – 04/09/22	3
13	NZ 34140 20927	May	13/05/22 – 19/05/22	6
		June	13/06/22 – 21/06/22	8
		July	21/07/22 – 29/07/22	8
		August	No data	-
		September	01/09/22 – 09/09/22	8
14	NZ 34539 21959	May	13/05/22 – 19/05/22	6
		June	No data	-
		July	21/07/22 – 29/07/22	8
		August	16/08/22 – 22/08/22	6
		September	No data	-
15	NZ 36027 21120	May	13/05/22 – 19/05/22	6
		June	14/06/22 – 21/06/22	7
		July	Not deployed	-
		August	Not deployed	-
		September	Not deployed	-
16	NZ 36088 21877	May	13/05/22 – 20/05/22	7
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8
		August	No data	-
		September	01/09/22 – 08/09/22	7
17	NZ 36661 21453	May	13/05/22 – 20/05/22	7
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8
		August	No data	-
		September	21/09/22 – 29/09/22	7
18	NZ 36621 22379	May	13/05/22 – 20/05/22	7
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8
		August	No data	-

Monitoring Point	Grid Reference	Month	Deployment Period	Complete Night's Operative
		September	01/09/22 – 06/09/22	5
19	NZ 35212 18626	May	20/05/22 – 27/05/22	7
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8
		August	Not deployed	-
		September	Not deployed	-
20	NZ 35777 18780	May	20/05/22 – 27/05/22	7
		June	14/06/22 – 21/06/22	7
		July	21/07/22 – 29/07/22	8
		August	Not deployed	-
		September	Not deployed	-