

# Rampion 2 Wind Farm

## **Category 6: Environmental Statement Volume 4, Appendix 22.18: Passive and active bat activity report 2023**

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# 1. Introduction

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## 1.1 Project background

- 1.1.1 This report forms an addendum to [Appendix 22.8: Passive and active bat activity report \[APP-186\]](#) which accompanied [Chapter 22: Terrestrial ecology and nature conservation, Volume 2](#) of the Environmental Statement (ES) [\[APP-063\]](#), which is provided in support of the delivery of an Environmental Impact Assessment (EIA) associated with the Rampion 2 Offshore Wind Farm, hereafter referred to as the ‘Proposed Development’ or ‘Rampion 2’.
- 1.1.2 Information on the Proposed Development is provided in [Chapter 4: The Proposed Development, Volume 2](#) of the ES [\[APP-045\]](#).
- 1.1.3 Where appropriate, reference is also made in this report to the ‘Study Area’, as shown on [Figure 22.18.1, Annex A](#). The Study Area is defined as the area within the proposed DCO Order Limits plus an additional 50 metre (m) buffer to address the potential disturbance of bats. The inclusion of such a buffer is in line with good practice guidelines (Bat Tree Habitat Key (Andrews, 2020); British Standards Institution, 2015; Collins, 2016). This guidance has recently been superseded by Collins (2023) Good practice guidelines (4<sup>th</sup> Edition). However, the bat surveys were completed prior to the release of the new guidance and therefore not available at the time of the surveys. Any further survey recommendation or updated survey visits will be in line with the new guidance.
- 1.1.4 The proposed DCO Order Limits evolved over time between 2020 and 2022, the period over which the majority of ecology surveys, including bats, were completed. [Appendix 22.8: Passive and active bat activity report, Volume 4](#) of the ES [\[APP-186\]](#) details all bat data captured during this time. The evolving proposed DCO Order Limits necessitated further bat surveys to be undertaken in 2023 to account for additional areas of land not previously surveyed.

## 1.2 Purpose of this Appendix

- 1.2.1 Habitats of suitability to support roosting, foraging and commuting bats were recorded within the Study Area during the Extended Phase 1 habitat surveys undertaken between 2020 and 2023. For the full results of those surveys, refer to [Appendix 22.3: Extended Phase 1 habitat survey report, Volume 4](#) of the ES [\[APP-181\]](#).
- 1.2.2 Based on the findings of [Appendix 22.3: Extended Phase 1 habitat survey report, Volume 4](#) of the ES [\[APP-181\]](#) it was recommended that specific survey for bats be undertaken. The purpose of these surveys has been to:
- establish what habitats are currently being utilised by bats;
  - record bat species diversity;
  - estimate relative bat activity levels; and

- highlight important bat foraging and commuting corridors.

- 1.2.3 This Appendix details the findings of surveys relating to bat activity monitoring. Full details of the roosting suitability of trees can be found at [Appendix 22.17: Bat tree ground level visual assessment survey report, Volume 4](#) of the ES [APP-195]).
- 1.2.4 This Appendix does not include requirements for mitigation and/or compensation in respect of bats, nor does it assess the potential effects that proposals might have upon them, as both issues are covered in detail as part of the EIA ([Chapter 22: Terrestrial ecology and nature conservation, Volume 2](#) of the ES [APP-064]).
- 1.2.5 **Annex C** provides the scientific species names for bats described in this Appendix.

## 1.3 Structure of this Appendix

- 1.3.1 This Appendix is structured as follows:
- **Section 2: Methodology;**
  - **Section 3: Deviations, Limitations and Constraints;**
  - **Section 4: Results;**
  - **Section 5: Summary;**
  - **Section 6: References;**
  - **Annex A: Figures;**
  - **Annex B: Full survey details;** and
  - **Annex C: Scientific species names**

## 2. Methods

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### 2.1 Overview

- 2.1.1 In line with good practice survey guidance and using professional experience; a variety of methods have been used to assess suitability of habitats within the survey area to support bats. Collins, 2016 was the main source of guidance. In addition, the 'Bat Tree Habitat Key' (Andrews, 2020), 'Landscape and urban design for bats and biodiversity' (Gunnell, Grant & Williams, 2021) and the 'British Standard 8596:2015' (British Standards Institution, 2015) provided further guidance that has been considered when designing the survey methodology and programme of survey work.
- 2.1.2 The 'Bechstein's Bat survey protocol' (Miller et al., 2011), and 'Conserving Grey Long-eared Bats in our Landscape' (Razgour et al., 2013) were also consulted, as these species are known to be recorded within the Study Area.
- 2.1.3 The remainder of this Section describes the survey methods that have been applied throughout the survey work in 2023, and are common with those of previous years. These are as follows:
- manual transects (**Section 2.2**); and
  - passive monitoring (**Section 2.3**).
- 2.1.4 This Section then goes on to describe the following elements:
- methods used throughout field survey work to aid with species identification;
  - how environmental conditions were considered in survey design and recorded during field survey work;
  - limitations which affected the field surveys; and
  - personnel responsible for applying survey methods.
- 2.1.5 **Appendix 22.8: Passive and active bat activity report, Volume 4** of the ES **[APP-186]** also describes a desk study and habitat scoping exercise. These are not repeated within this report as updates have not been made and therefore have already been described in the DCO Application.

### 2.2 Manual transect surveys

- 2.2.1 A series of manual transect surveys were undertaken between April and October 2023 inclusive. Each month a walked transect survey was completed at dusk, with a pre-dawn survey also completed in July 2023 within the same 24-hour period as the dusk survey. The bat activity transect surveys were carried out taking into account current good practice guidance (Collins, 2016). Each month a pre-defined transect was walked by two surveyors to record levels of bat activity.

- 2.2.2 Each dusk walked transect began at sunset and continued for approximately 180 minutes afterwards. The pre-dawn survey commenced 180 minutes before sunrise and terminated at sunrise.
- 2.2.3 During each transect, the surveyors noted the bat species heard and seen, including the time, location, and, where possible behaviour type and direction of flight. Surveyors were equipped with full spectrum bat detectors (Elekon BatLogger M) to listen to and record bat activity. Calls were subsequently analysed using BatExplorer software to aid species identification.
- 2.2.4 Surveyors recorded the number of bat passes of each species and the type of activity heard (foraging or social calls). A “pass” is defined as the sequence of calls<sup>1</sup> a bat emits as it flies past, typically going from louder to softer as the distance between bat and surveyor changes.
- 2.2.5 A plan showing the manual transect routes walked during the survey is provided in **Figure 22.18.1**, **Figure 22.18.2** and **Figure 22.18.3** in **Annex A**. A description of the manual transect routes and locations of passive monitoring devices can be found in **Annex B, Table B2-1**. Dates, times and weather conditions of each of the transect survey visits are provided **Annex B, Table B2-2** and **Annex B, Table B2-5**.
- 2.2.6 Manual transect routes were named the following:
- AT23-1;
  - AT23-2; and
  - AT23-3.

## 2.3 Passive monitoring

- 2.3.1 In combination with the walked transect surveys, additional bat activity data was gathered using automated static bat detectors. Automated (static) bat detectors (Elekon BatLogger A+) were installed in pre-determined locations during each of the survey months (April to October 2023 inclusive). The location of the automated static bat detectors is shown in **Annex A, Figure 22.18.4** and **Figure 22.18.5** and **Annex B, Table B2-7**. It must be noted that automated static bat detectors were not deployed on manual transect AT23-3 due to land access constraints.
- 2.3.2 A total of four static bat detectors (two static bat detectors per transect route – noting on transect AT23-3 static detectors could not be deployed due to land access) were deployed in each month in accordance with the current good practice guidance (i.e. for a minimum of five nights in each month (Collins, 2016)). The automated static bat detectors were set to commence recording at least 30 minutes before sunset and cease recording 30 minutes after sunrise. The dates selected for passive monitoring are shown in **Annex B, Table B-8**.
- 2.3.3 Calls were subsequently analysed using BatExplorer software to aid species identification.

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<sup>1</sup> Bat “calls” are the individual clicks made by bats as they echolocate.

## 2.4 Environmental conditions

- 2.4.1 Manual transect survey visits were undertaken in line with standard good practice guidance (Collins, 2016) with respect to optimal weather conditions. That is, when there was little or no rain, no excessive wind and the temperature was above 10° Celsius (°C). Temperature, humidity, cloud cover and rainfall levels were recorded by the surveyors during each survey visit. Any other environmental conditions that might affect bat activity, such as high noise or artificial light levels, were also noted.
- 2.4.2 Full details of weather conditions experienced during active survey work are provided in **Annex B, Table B-5** and conditions during passive monitoring **Annex B, Table B-6**.

## 2.5 Data processing and analysis

- 2.5.1 Analysis of bat call recordings were carried out using Elekon BatExplorer, with reference to Russ (2013) to aid species identification. Social and foraging calls were identified with reference to Middleton *et al.* (2014), to aid in providing an indication of behaviour and habitat use.
- 2.5.2 It should be recognised that a series of separate sound files may represent a series of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g. bats making repeated foraging passes within the range of a detector).
- 2.5.3 Where possible, bat calls are identified to species level. However, species of the genus *Myotis* are grouped together in most cases as their calls are similar in structure and have overlapping call parameters, making species identification problematic (Russ, 2012). For *Pipistrellus* species, the following criteria based on measurements of peak frequency are used to classify calls:
- Common pipistrelle (CP)  $\geq 42$  and  $<49$ KHz;
  - Soprano pipistrelle (SP)  $\geq 51$ KHz;
  - Nathusius pipistrelle (NP)  $<39$ KHz;
  - Common/soprano pipistrelle (CP/SP)  $\geq 49$  and  $<51$ KHz; and
  - Common/Nathusius pipistrelle (CP/NP)  $\geq 39$  and  $<42$ KHz.
- 2.5.4 In addition, the following categories are used for calls which cannot be identified with confidence due to the overlap in call characteristics between species or species groups:
- Common pipistrelle or soprano pipistrelle (CP/SP);
  - Common pipistrelle or Nathusius' pipistrelle (CP/NP);
  - Noctule, serotine (*Eptesicus serotinus*) or Leisler's bat (NSL);
  - *Nyctalus* sp. (noctule or Leisler's bat);
  - *Myotis* sp. (bat species in the genus *Myotis*); and

- *Chiroptera* sp. (calls that could not be ascribed to a species group).

## 3. Deviations, limitations and constraints

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### 3.1 Land access and weather limitations

- 3.1.1 Land access was requested for all land parcels assessed as having high suitability to support foraging and commuting bats.
- 3.1.2 Field surveys have been conducted at locations within the Study Area where landowner permission was formally agreed, or where access was possible via Public Right of Way (PRoW). This has restricted coverage in some locations of the proposed DCO Order Limits where land access was not possible.
- 3.1.3 Land access restrictions constituted a major limitation for the manual transect surveys. AT23-3 was only accessible via PRoW due to lack of land access. The lack of land access also meant that passive monitoring was not possible on this transect.
- 3.1.4 Due to poor weather and land access restrictions, no manual transect surveys were completed in September 2023 on any of the transect routes.
- 3.1.5 Despite land access and weather limitations the type of bats present and levels of activity representative of the transects was gathered. This observation is based on the information gathered at other transects along the route of the cable corridor and comparative desk study information.
- 3.1.6 Limitations relating to the manual transect surveys can be found in **Annex B, Table B-3**.

### 3.2 Ecological considerations

- 3.2.1 Differences in detectability between bat species means that some species may be underrepresented in the data. *Pipistrellus* species, *Nyctalus* species, and Serotine bats for example all produce loud, easy to detect calls. In comparison the *Plecotus* and *Myotis* species produce quieter calls that can often be missed during surveys. Therefore, it is important to note that low levels of detection do not necessarily equate to low activity or low numbers within an area.
- 3.2.2 In 2022, Sussex Bat Group recorded Kuhl's pipistrelle in Eastbourne. There is significant overlap in the echolocation parameters of Kuhl's and Nathusius' pipistrelle, making identification difficult when social calls are not present. Therefore, it is noteworthy that Kuhl's pipistrelle is possibly present in the area but may not have been detected or identifiable in the data collected. Again, it is important to note that low levels of detection do not necessarily equate to low activity or low numbers within an area.

### 3.3 Passive monitoring

- 3.3.1 Passive detector surveys aimed to record for a minimum of five nights per month at each monitoring location. However, this was not possible in certain months due to either technical failures with the bat detectors or that the detectors were stolen/damaged. During August 2023, static 23-1b only recorded for four nights due to poor battery life. A summary of such instances is provided in **Table B-4, Annex B**.
- 3.3.2 Where the passive detectors could not record for five consecutive nights, it meant that selecting dates with the optimal weather conditions was sometimes not possible. Therefore, there were surveys where data was obtained under sub-optimal conditions (for further details see **Section 4.2**). Technical faults also sometimes resulted in fewer than five nights of data.
- 3.3.3 The passive detectors were set to record from 30 minutes before sunset to 30 minutes after sunrise. However, on occasion the internal software did not trigger and therefore no recording took place (for further details see **Section 4.2**), or the recording occurred over the incorrect time period. This can be because the device did not acquire an accurate GPS location which affects the time it registers as sunset and sunrise. This in turn limits the ability to detect bats at time times of peak activity.
- 3.3.4 Due to the nature of the passive static bat detectors, quieter species of bats (for example *Plecotus* species) are often underrepresented as the microphones can fail to be triggered by their calls.
- 3.3.5 At location AT23-2a during July 2023, the passive static bat detector was stolen which resulted in an absence of data for that month. A new static bat detector was deployed in this location.
- 3.3.6 Despite limitations the level of data gathered was adequate to understand the types of bats present and the general levels of activity. This observation is based on the information gathered at other transects along the route of the cable corridor and comparative desk study information.

### 3.4 Unavailable software

- 3.4.1 In previous reports on the proposed development, data has been further analysed using Ecobat (The Mammal Society, 2017; updated 2022) software. The software enables the objective comparison of survey data within the Study Area to bat records within 100km. However, the Ecobat software is currently unavailable. This has meant that the 2023 data has not been subject to this analysis.



## 4. Results

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### 4.1 Manual transect surveys

4.1.1 Active manual transect surveys commenced in April 2023 and were completed in October 2023 and included three manual transect routes (**Figure 22.18.1**, **Figure 22.18.2** and **Figure 22.18.3, Annex A**).

4.1.2 The manual transect surveys confirmed at least nine bat species utilising the habitats within the Study Area. These species are as follows:

- Common pipistrelle (CP);
- Soprano pipistrelle (SP);
- Common / Nathusius' pipistrelle (CP/NP);
- Serotine (S);
- Barbastelle (B);
- Noctule (N);
- Leisler's bat (L);
- Myotis sp. (M); and
- Brown long-eared (BLE).

4.1.3 In total, 667 bat passes were recorded during the 2023 season with AT23-2 recording the highest proportion of these bat calls (51 percent of all bat calls). AT23-2 included woodland and well-connected hedgerows as well as arable habitats. Bats were recorded using most of the transect, with the highest levels of bat activity being focused on woodland edges. This transect recorded at least eight bat species with common pipistrelle being the most frequently recorded species, accounting for 75 percent of the total recordings on this transect.

4.1.4 AT23-3 recorded the second highest proportion bat calls (37 percent of all bat calls) and was the southernmost sampling point. This transect also included woodland and well-connected hedgerows in addition to arable habitats. The western part of the transect saw the least bat activity whereas the centre and eastern parts of the transect contained the highest levels of bat activity, particularly focused within woodlands and hedgerows. This transect recorded at least seven bat species with common pipistrelle being the most frequently recorded, accounting for 43.7 percent of the total recordings on this transect.

4.1.5 The lowest total bat passes were recorded for AT23-1 (12 percent of all bat calls), this transect notably supports arable habitats of highest intensification in addition to small parcels of woodland. Bat activity across this transect was more scattered, with the highest levels of bat activity focused around hedgerows and tree lines. This transect recorded at least three bat species with common pipistrelle being the most frequently recorded species, accounting for 78 percent of the total recordings on this transect. **Table 4-1** and **Table 4-2** summarise the results of the active

transect work in terms of the number of bat passes made by each species recorded within each month (Table 4-1) and on each transect (Table 4-2).

**Table 4-1 Total number of bat passes (average number of passes per hour) for each species per month for all transects surveyed April to October 2023**

Month	April	May	June	July dusk	July dawn	August	October	Total passes
<b>CP</b>	25 (2.7)	42 (4.6)	76 (8.4)	92 (10.2)	69 (7.6)	75 (8.3)	45 (5)	<b>424</b> <b>(6.7)</b>
<b>SP</b>	15 (1.6)	10 (1.1)	23 (2.5)	19 (2.1)	5 (0.5)	16 (1.7)	18 (2)	<b>106</b> <b>(1.7)</b>
<b>SP/CP</b>	9 (1)	9 (1)	15 (1.6)	0 (0.0)	6 (0.6)	0 (0.0)	0 (0.0)	<b>39</b> <b>(0.6)</b>
<b>CP/NP</b>	0 (0.0)	1 (0.1)	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	<b>2</b> <b>(0.03)</b>
<b>N</b>	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	3 (0.3)	0 (0.0)	0 (0.0)	<b>4</b> <b>(0.06)</b>
<b>S</b>	2 (0.2)	7 (0.7)	28 (3.1)	9 (1)	2 (0.2)	3 (0.3)	0 (0.0)	<b>51</b> <b>(0.8)</b>
<b>L</b>	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.2)	<b>2</b> <b>(0.03)</b>
<b>NSL</b>	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)	2 (0.2)	<b>3</b> <b>(0.05)</b>
<b>M</b>	7 (0.7)	0 (0.0)	1 (0.1)	3 (0.3)	0 (0.0)	2 (0.2)	0 (0.0)	<b>13</b> <b>(0.2)</b>
<b>BLE</b>	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	<b>1</b> <b>(0.02)</b>
<b>NYC</b>	0 (0.0)	0 (0.0)	13 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	<b>13</b> <b>(0.2)</b>
<b>B</b>	0 (0.0)	2 (0.2)	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	<b>3</b> <b>(0.05)</b>
<b>BAT</b>	0 (0.0)	0 (0.0)	3 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	<b>3</b> <b>(0.05)</b>
<b>Total</b>	<b>58</b> <b>(6.4)</b>	<b>72</b> <b>(8)</b>	<b>161</b> <b>(17.9)</b>	<b>125</b> <b>(13.9)</b>	<b>85</b> <b>(9.4)</b>	<b>96</b> <b>(10.7)</b>	<b>70</b> <b>(7.8)</b>	<b>667</b> <b>(10.6)</b>

Based on 9 hours of total recording per month

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or

Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

**Table 4-2 Total number of bat passes per hour (average number of passes per hour) recorded on each transect April to October 2023**

Species	AT23-1	AT23-2	AT23-3
<b>CP</b>	60 (0.9)	254 (4.0)	110 (1.7)
<b>SP</b>	11 (0.2)	21 (0.3)	74 (1.2)
<b>CP/SP</b>	4 (0.1)	7 (0.1)	28 (0.4)
<b>CP/NP</b>	0 (0.0)	2 (0.03)	0 (0.0)
<b>N</b>	0 (0.0)	4 (0.06)	0 (0.0)
<b>S</b>	2 (0.03)	41 (0.7)	8 (0.1)
<b>L</b>	0 (0.0)	0 (0.0)	2 (0.03)
<b>NSL</b>	0 (0.0)	1 (0.02)	5 (0.08)
<b>M</b>	0 (0.0)	5 (0.08)	8 (0.1)
<b>BLE</b>	0 (0.0)	1 (0.02)	0 (0.0)
<b>NYC</b>	0 (0.0)	0 (0.0)	13 (0.2)
<b>Bat</b>	0 (0.0)	0 (0.0)	3 (0.05)
<b>B</b>	0 (0.0)	2 (0.03)	1 (0.02)
<b>Total</b>	<b>77</b> <b>(1.2)</b>	<b>338</b> <b>(5.4)</b>	<b>252</b> <b>(4.0)</b>

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or

Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (Bat).

- 4.1.6 Overall, as shown in **Table 4-1**, bat activity for all species and all manual transects combined across the Study Area were highest during June 2023, with an average of 17.9 bat passes recorded each hour. This was closely followed by the July 2023 dusk survey with an average of 13.9 bat passes recorded each hour.

## Barbastelle

- 4.1.7 Barbastelle bat accounted for 0.4 percent (3 total passes) of all bats recorded. Barbastelle were only recorded on AT23-2 and AT23-3.

## Common pipistrelle and soprano pipistrelle

- 4.1.8 Common pipistrelle and soprano pipistrelle bats were the most frequently recorded bat species. Passes by these two species combined accounted for 86 percent (571 total passes) of all bat passes recorded (67 percent and 19 percent respectively).
- 4.1.9 When comparing the three transects, AT23-2 recorded the highest proportion of common pipistrelle (4.0 bat passes per hour) whereas AT23-3 recorded the highest proportion of soprano pipistrelle (1.2 bat passes per hour).
- 4.1.10 For all transects, pipistrelle bat activity was highest within hedgerows, treelines and woodland edge habitats.

## Myotis species

- 4.1.11 Myotis species accounted for 1.9 percent (13 total passes) of all bat passes recorded during the transect survey visits. Myotis species activity levels were highest in April 2023, with an average of 0.7 passes per hour.

## Noctule/serotine/Leisler's bat

- 4.1.12 Noctule, serotine and Leisler's accounted for 9 percent (60 total passes) of all bat passes recorded during the surveys. This included 0.6 percent of noctule, 7.6 percent of serotine, 0.3 percent of Leisler's and 0.4 percent of noctule / serotine / Leisler's.
- 4.1.13 Passes for noctule were highest during the July 2023 dawn transects, at an average of 0.3 passes per hour recorded, whereas serotine passes were highest in June at an average of 3.1 passes per hour. Leisler's was only recorded during October 2023. Noctule was only recorded at AT23-2, whereas Leisler's was only recorded at AT23-3. Serotine was recorded on all three transects.

## Brown long-eared bat

- 4.1.14 Brown long-eared accounted for 0.1 percent (1 total pass) of all bats recorded. The single bat was recorded on AT23-2 during May 2023.

## 4.2 Passive monitoring

4.2.1 At least nine species of bat were confirmed to be using the Study Area during the passive monitoring survey work. These are as follows:

- Barbastelle (B);
- Common pipistrelle (CP);
- Soprano pipistrelle (SP);
- Nathusius' pipistrelle (NP);
- Noctule (N);
- Serotine (S);
- Leisler's bat (L);
- *Myotis* sp. (M); and
- Brown long-eared (BLE).

4.2.2 **Table 4-3** summarises the results of the passive monitoring survey in terms of the total number of bat passes per hour recorded on each transect.

4.2.3 The figures in **Table 4-3** are intended to give an indication of the relative levels of bat activity at each location, and do not represent actual numbers of bats. A single bat may pass the same location repeatedly during the same evening, thus increasing the number of files recorded at that location. Equally, the same bat may pass more than one monitoring location, therefore being recorded on more than one detector during the same recording period.

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**Table 4-3 Summary of passive monitoring results. Total number of bat passes recorded on each transect, for all months in 2023 combined**

Location	Total no. of files per species														
	CP	SP	CP/SP	NP	CP/NP	N	S	L	NSL	NYC	M	B	BLE	BAT	Total
<b>AT23-1a</b>	996	154	0	0	0	8	5	0	16	3	38	1	2	0	1,193
<b>AT23-1b</b>	1,472	407	2	1	0	50	28	0	28	209	195	246	38	0	2,676
<b>AT23-2a</b>	6,844	858	35	8	356	297	164	0	92	9	513	90	29	56	9,351
<b>AT23-2b</b>	4,762	682	325	1	0	47	164	0	44	2	297	555	48	1	6,928

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler’s (NSL), Leisler’s bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler’s bat (NYC), Bat species (BAT).

**Table 4-4 Passive monitoring survey results by month: April 2023**

Location		CP	SP	CP/ SP	NP	CP/ NP	N	S	L	NSL	NYC	M	B	BLE	BAT	Total
<b>AT23-1a</b>	Technical fault															
<b>AT23-1b</b>		0	0	0	0	0	2	0	0	0	0	1	0	1	0	4
<b>AT23-2a</b>		680	67	0	0	0	4	0	0	2	1	56	6	10	0	826
<b>AT23-2b</b>		255	14	0	0	0	0	74	0	13	0	9	70	10	0	445

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler’s (NSL), Leisler’s bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler’s bat (NYC), Bat species (BAT).



**Table 4-5 Passive monitoring survey results by month: May 2023**

Location		CP	SP	CP/ SP	NP	CP/ NP	N	S	L	NSL	NYC	M	B	BLE	BAT	Total
<b>AT23-1a</b>	Technical fault															
<b>AT23-1b</b>	Technical fault															
<b>AT23-2a</b>		1,461	108	0	0	0	37	99	0	68	3	28	36	3	0	1,843
<b>AT23-2b</b>		2,546	33	315	0	0	5	30	0	28	2	76	224	18	0	3,277

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

**Table 4-6 Passive monitoring survey results by month: June 2023**

Location	CP	SP	CP/ SP	NP	CP/ NP	N	S	L	NSL	NYC	M	B	BLE	BAT	Total
<b>AT23-1a</b>	110	35	0	0	0	2	2	0	15	3	0	0	0	0	167
<b>AT23-1b</b>	Technical fault														
<b>AT23-2a</b>	Technical fault														
<b>AT23-2b</b>	Technical fault														

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

**Table 4-7 Passive monitoring survey results by month: July 2023**

Location	CP	SP	CP/ SP	NP	CP/ NP	N	S	L	NSL	NYC	M	B	BLE	Bat	Total
<b>AT23-1a</b>	13	0	0	0	0	0	0	0	0	0	0	0	0	0	13
<b>AT23-1b</b>	395	10	2	0	0	0	4	0	2	1	4	13	0	0	431
<b>AT23-2a</b>	Technical fault														
<b>AT23-2b</b>	229	37	0	0	0	9	6	0	0	0	4	0	1	0	286

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

**Table 4-8 Passive monitoring survey results by month: August 2023**

Location	CP	SP	CP/SP	NP	CP/NP	N	S	L	NSL	NYC	M	B	BLE	Bat	Total
<b>AT23-1a</b>	44	2	0	0	0	1	1	0	0	0	2	0	0	0	50
<b>AT23-1b</b>	252	58	0	0	0	11	8	0	10	0	16	42	15	0	412
<b>AT23-2a</b>	3,058	284	0	0	0	29	65	0	11	0	86	7	12	0	3,552
<b>AT23-2b</b>	316	153	0	0	0	6	35	0	0	0	19	21	5	0	555

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

**Table 4-9 Passive monitoring survey results by month: September 2023**

Location	CP	SP	CP/ SP	NP	CP/ NP	N	S	L	NSL	NYC	M	B	BLE	Bat	Total
<b>AT23-1a</b>	787	117	0	0	0	5	2	0	1	0	33	1	2	0	948
<b>AT23-1b</b>	814	317	0	1	0	31	16	0	16	0	70	190	22	0	1,477
<b>AT23-2a</b>	1,645	399	35	8	356	227	0	0	11	5	343	41	4	56	3,130
<b>AT23-2b</b>	1,153	396	0	1	0	27	19	0	3	0	74	184	5	0	1,862

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

**Table 4-10 Passive monitoring survey results by month: October 2023**

Location	CP	SP	CP/ SP	NP	CP/ NP	N	S	L	NSL	NYC	M	B	BLE	Bat	Total
<b>AT23-1a</b>	12	0	0	0	0	0	0	0	0	0	3	0	0	0	15
<b>AT23-1b</b>	11	22	0	0	0	6	0	0	0	208	104	1	0	0	352
<b>AT23-2a</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>AT23-2b</b>	263	49	10	0	0	0	0	0	0	0	115	56	9	1	503

Barbastelle (B), Common pipistrelle (CP), Myotis species (M), Noctule (N), Noctule or Serotine or Leisler's (NSL), Leisler's bat (L), Serotine (S), Soprano pipistrelle (SP), Brown long-eared (BLE), Noctule or Leisler's bat (NYC), Bat species (BAT).

## 4.3 Summary of passive monitoring data

- 4.3.1 A total of 20,148 bat recordings were made during the passive monitoring survey work during 2023. Between monitoring locations there were large variations in the levels of bat activity recorded.
- 4.3.2 AT23-2a and AT23-2b recorded the highest amount of bat calls (9,351 and 6,928 total calls respectively), with AT23-1a and AT23-1b recording the lowest (1,193 and 2,676 total calls respectively).

### Barbastelle

- 4.3.3 During the passive monitoring surveys in 2023, Barbastelle was the fifth most frequently recorded bat species, accounting for 4.4 percent of all bat activity recorded. They were recorded at all monitoring locations. The peak in bat activity for barbastelle was recorded at location AT23-2b, with an average of 18.5 recordings per night. The second highest levels of bat activity were recorded at AT23-1b, with an average of 10.3 recordings per night. AT23-2a had the third highest levels of bat activity, with an average of 4.1 recordings per night. AT23-1a only recorded a single individual during the passive monitoring surveys.
- 4.3.4 Across the survey period in 2023, Barbastelle were rarely recorded within 30 minutes of sunset or sunrise. Locations AT23-2a and AT23-2b both had passes of this species within 30 minutes of sunset during May 2023. However, passes were never made within 30 minutes of sunrise. This suggests there may be bat roosts nearby, although the bats may not be recorded returning at dawn. However, if the bats had emerged early and had successful foraging, they may be returning to the bat roosts well before dawn due to changes in insect assemblage which can be affected by weather.

### Common pipistrelle

- 4.3.5 During the passive monitoring surveys in 2023, common pipistrelle were the most frequently recorded species, accounting for 70 percent of all bat activity recorded, with a further 1.8 percent classed as soprano / common pipistrelle due to their overlapping call parameters. They were recorded at all four monitoring locations. The peak in bat activity for common pipistrelle was recorded at location AT23-2a, with an average of 311.1 recordings per night. High levels of bat activity were also recorded at AT23-2b, with an average of 158.7 recordings per night. AT23-1b had the third highest level of recordings, with an average of 61.3 recordings per night. AT23-1a had the lowest levels of bat activity recordings, with an average of 38.6 recordings per night.
- 4.3.6 Across the survey period in 2023, common pipistrelle were frequently recorded within 30 minutes of sunset or sunrise at all locations. Where they were observed within 30 minutes of sunrise and sunset this suggests there may have been bat roosts nearby, and the bats were returning to them frequently.

## Soprano pipistrelle

- 4.3.7 During the passive monitoring surveys in 2023, soprano pipistrelle were the second most frequently recorded bat species, accounting for 10.4 percent of all bat activity recorded, with a further 1.8 percent classed as soprano / common pipistrelle due to their overlapping call parameters. This species was recorded at all four bat survey locations. The highest level of bat activity was recorded at AT23-2a, with an average of 39 recordings per night. AT23-2b had the second highest levels of bat activity, with an average of 22.7 recordings per night. AT23-1b had the third highest levels of bat activity, with an average of 17 recordings per night and AT23-1a had the lowest levels of bat activity with an average of 6.2 recordings per night.
- 4.3.8 Across the survey period in 2023, soprano pipistrelle were regularly recorded within 30 minutes of sunset or sunrise. Where they were observed within 30 minutes of sunrise and sunset this suggests there may be bat roosts nearby.

## Nathusius' pipistrelle

- 4.3.9 During the passive monitoring surveys in 2023, Nathusius' pipistrelle accounted for 0.05 percent of all bat activity recordings. A further 1.8 percent of all bat activity recordings were allocated to the species group common / Nathusius' pipistrelle, due to overlapping call parameters of these species. This species was not recorded at location AT23-1a. The highest levels of bat activity were recorded at AT23-2a, with an average of 0.4 recordings per night. AT23-1b and AT23-2b both recorded a single bat across the whole survey season.
- 4.3.10 Across the survey period in 2023, Nathusius' pipistrelle were never recorded within 30 minutes of sunset or sunrise. This suggests there were no bat roosts nearby.

## Myotis species

- 4.3.11 During the passive monitoring surveys in 2023, *Myotis* species was the fourth most frequently recorded bat species or species group, accounting for 5.2 percent of all recordings. *Myotis* species were recorded at all monitoring locations, with a clear peak at AT23-2a, where an average of 23.3 recordings per night were recorded. All other locations recorded an average of less than ten passes per night.
- 4.3.12 Across the survey period in 2023, *Myotis* species were recorded within 90 minutes of sunset or sunrise at all locations. In addition, they were recorded within 30 minutes of sunset and sunrise at locations AT23-1b and AT23-2a. they were more frequently recorded closer to sunset than sunrise. Where they were observed within 90 minutes of sunset and sunrise this suggests there may have been bats roosts nearby, and the bats were returning to them frequently.

## Noctule/serotine/Leisler's bat

- 4.3.13 During the passive monitoring surveys in 2023, noctule, serotine and Leisler's bat were the third most frequently recorded species group, accounting for 5.8 percent of all recordings (2 percent confirmed noctule, 1.8 percent confirmed serotine, 1.1



percent confirmed *Nyctalus* species). A further 0.9 percent were classed as noctule/serotine/Leisler's due to their overlapping call parameters. No confirmed Leisler's bat was recorded. Species from this group were recorded at all monitoring locations, with a clear peak at AT23-2a, where an average of 25.5 recordings per night (recordings of noctule, serotine and Leisler's bat combined).

- 4.3.14 Across the survey period in 2023, noctule, serotine and Leisler's bat were recorded within 30 minutes of sunset or sunrise at locations AT23-1b and AT23-2a. Noctules were recorded during this time at AT23-2a and *Nyctalus* species were recorded within 30 minutes of sunrise at location AT23-1b on a single occasion. Noctules were found more frequently closer to sunset than sunrise. This suggests that there may have been bat roosts nearby, but the bats may not have been returning to them frequently. Alternatively, it could indicate a change in insect density meaning they were returning to bat roosts well before sunrise. Another explanation could be that the bats were switching their roosting locations.

### **Brown long-eared bat**

- 4.3.15 During the passive monitoring surveys in 2023, brown long-eared bat were the second least recorded bat species, accounting for 0.6 percent of all activity recorded. This species was recorded at all four monitoring locations. All monitoring locations had averages of less than 2 recordings per night.
- 4.3.16 Across the survey period in 2023, brown long-eared bat was frequently recorded within 90 minutes of sunset or sunrise. This occurred at all locations other than AT23-1a and were never recorded within 30 minutes of sunrise. Brown long-eared bat was rarely recorded within 30 minutes of sunset or sunrise and was only recorded at location AT23-2b during this time. Where this species was recorded within 90 minutes of sunset or sunrise, this suggests there may have been bat roosts nearby, and the bats were returning to them frequently.

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## 5. Summary

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- 5.1.1 The surveys undertaken to date confirm the presence on-site of habitats suitable to support bat roosting, commuting and foraging bats.
- 5.1.2 During the manual transects and passive monitoring surveys completed during 2023, at least nine species of bat were confirmed to be using the proposed DCO Order Limits.
- 5.1.3 During the manual transects completed in 2023, AT23-2 recorded the highest number of average bat passes per hour, followed by AT23-3, with AT23-1 recording the lowest number of average bat passes per hour.
- 5.1.4 Common pipistrelle bats were by far the most frequently recorded bat species during passive monitoring (70 percent of total recordings) with soprano pipistrelle the second most frequent accounting for 10.4 percent of all recorded bat activity. During manual transect surveys, common pipistrelle bats were also the most frequently recorded bat species (67 percent of all bat passes recorded), with soprano pipistrelle and serotine accounting for 19 percent and 7.6 percent respectively.
- 5.1.5 For an indication of relative activity levels, heat maps showing bat calls recorded during manual surveys of AT23-1, AT23-2 and AT23-3 are shown in **Annex A, Figure 22.18.1, Figure 22.18.2 and Figure 22.18.3.**
- 5.1.6 Overall, much lower levels of bat activity were found in the more open or arable habitats. AT23-1 had the lowest levels of bat activity overall, 11.5 percent of the overall bat calls recorded.

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# Annex A

## Figures

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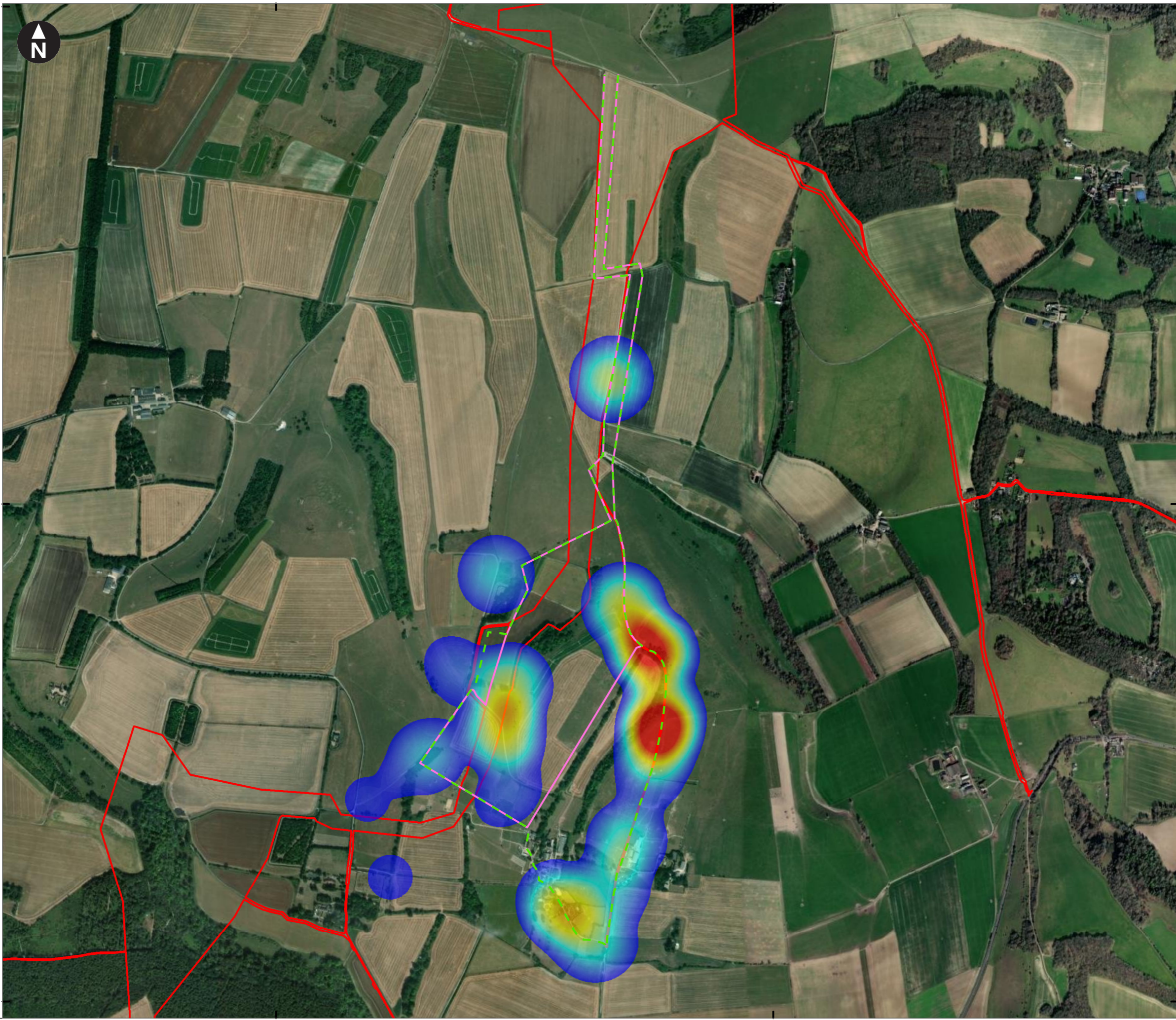
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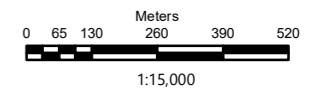
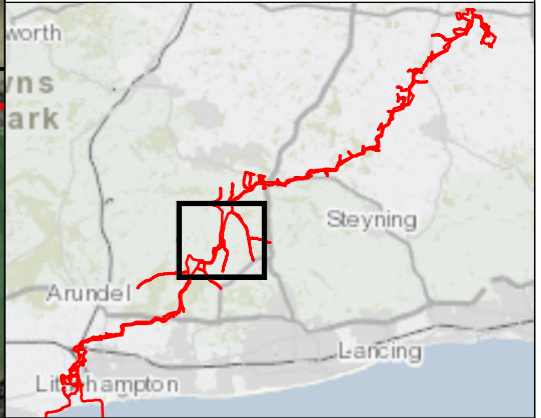
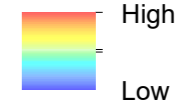
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**Key**

-  Proposed DCO Order Limits
-  Transect AT23-1 (version 1)
-  Transect AT23-1 (version 2)

**Bat activity**



Rampion Extension Development



Rampion 2 Offshore Wind Farm  
Passive and active bat report 2023

Figure 22.18.1 Manual transect route AT23-1  
heat map

System Identifier: 42285-WSPE-CO-ON-FG-OO-3598	Version: 2.0
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Company: WSP	Drawn By: HADJE	Chk/Prvd: SUTET	Drawn Date: 09/01/2024	Status: FINAL
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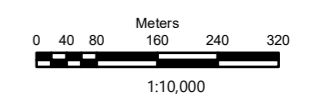
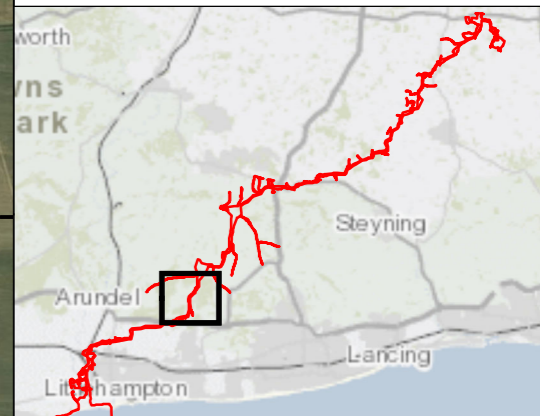
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**Key**

- Proposed DCO Order Limits
- Transect AT23-2

**Bat activity**

- High
- Low



Rampion Extension Development



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 Passive and active bat report 2023

Figure 22.18.2 Manual transect route AT23-2  
 heat map

System Identifier: 42285-WSP-EO-ON-FG-OO-9625				Version: 2.0
Company: WSP	Drawn By: HADJE	Chk/Aprvd: SUTET	Drawn Date: 05/01/2024	Status: FINAL



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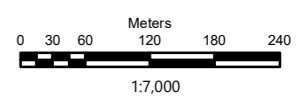
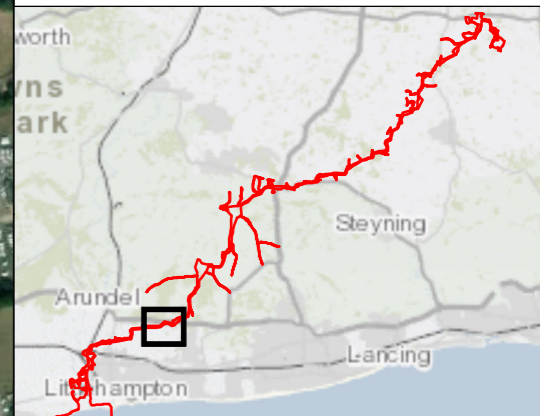
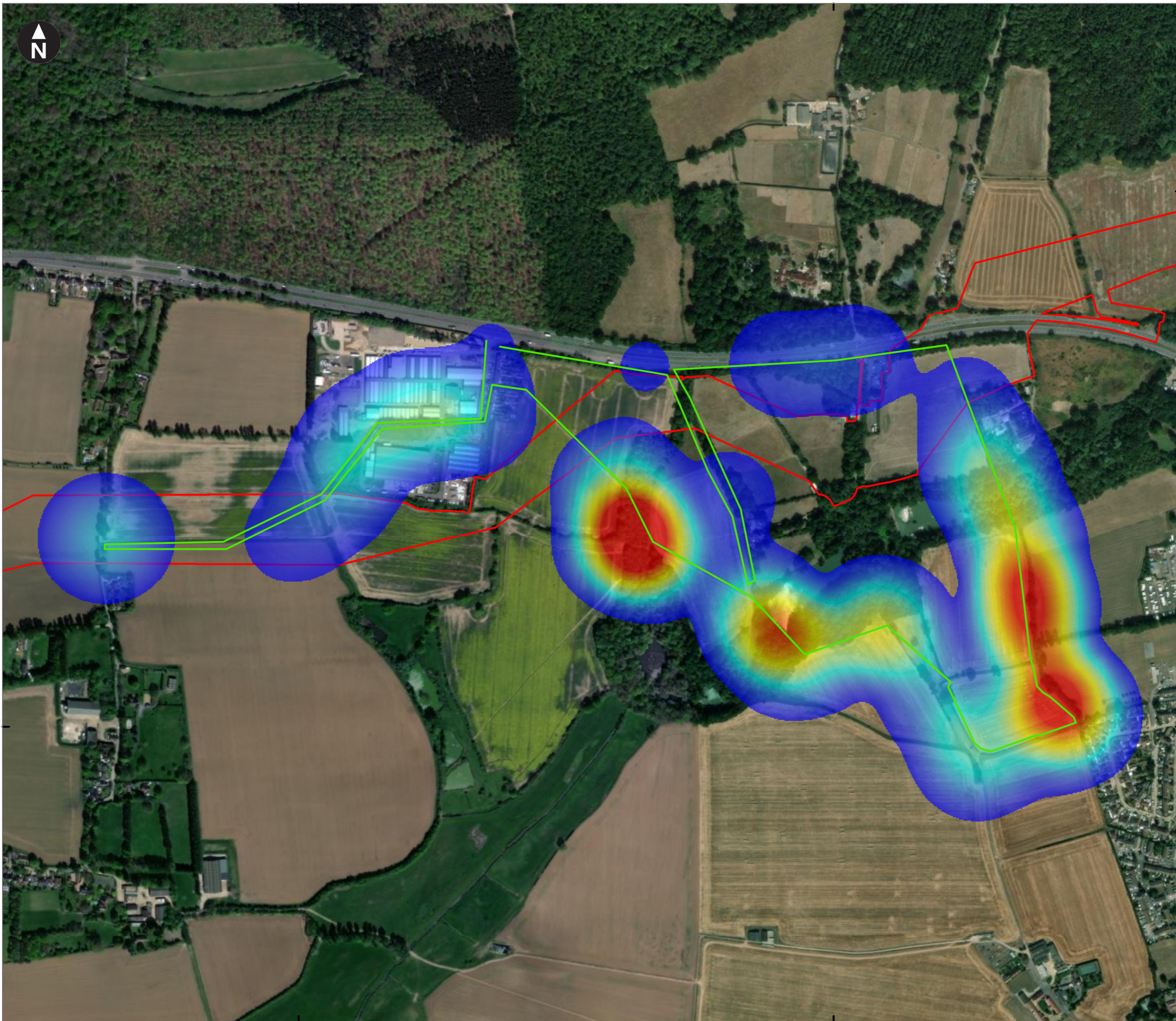
- Proposed DCO Order Limits
- Transect AT23-3

**Bat activity**

- High
- Low

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Rampion Extension Development

Rampion 2 Offshore Wind Farm  
 Passive and active bat report 2023

Figure 22.18.3 Manual transect route AT23-3  
 heat map

System Identifier: 42285-WSPE-CO-ON-FG-OO-2873				Version: 2.0
Company: WSP	Drawn By: HADJE	Chk/Aprvd: SUTET	Drawn Date: 05/01/2024	Status: FINAL



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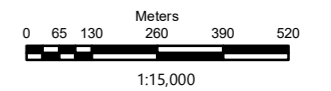
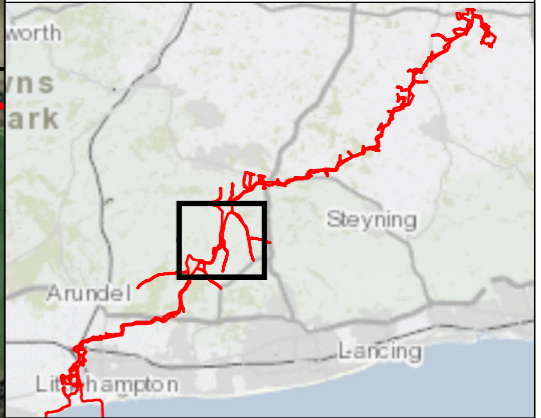


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**Key**

-  Proposed DCO Order Limits
-  Transect AT23-1 (version 1)
-  Transect AT23-1 (version 2)
-  Static location



Rampion Extension Development



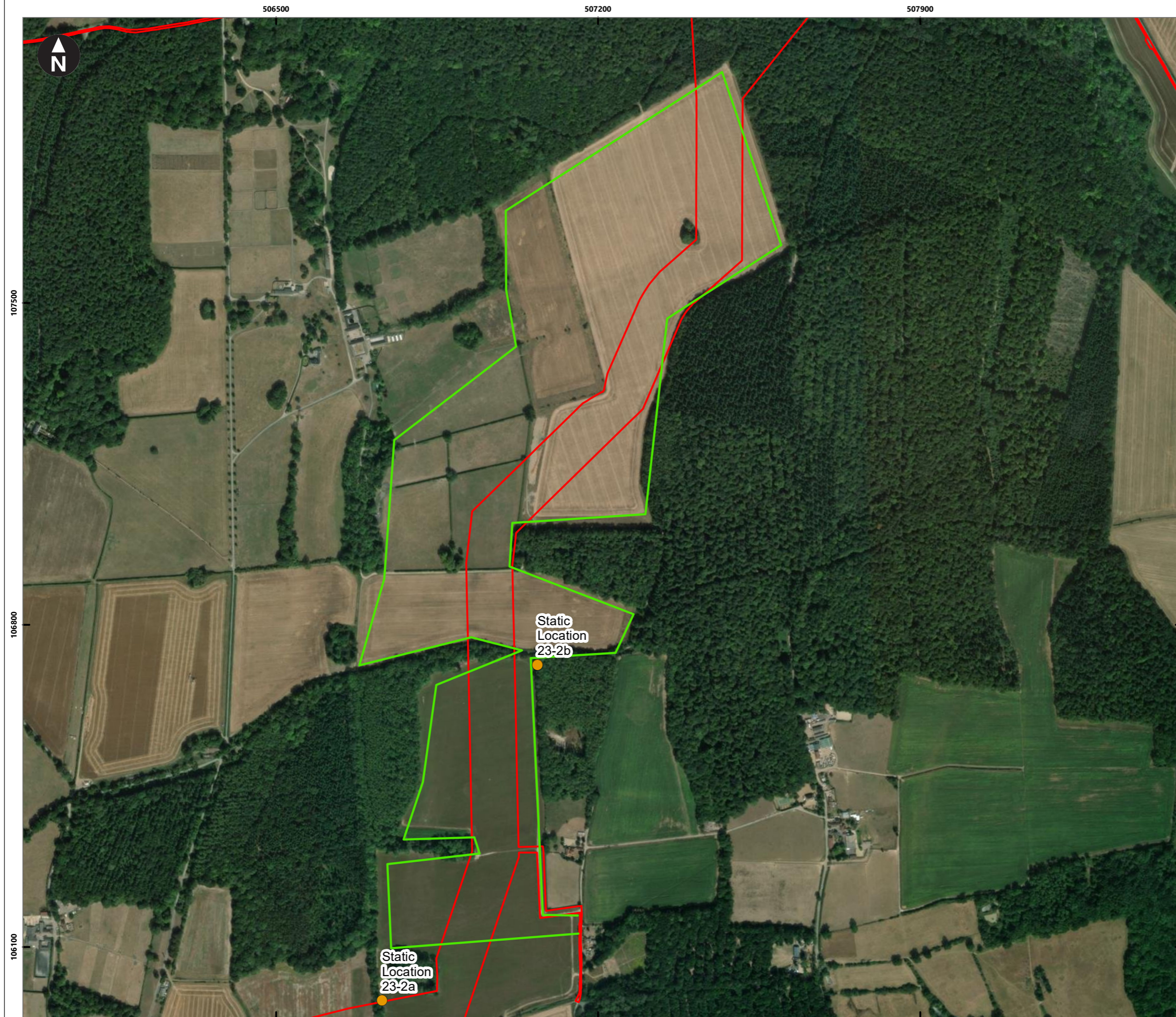
Rampion 2 Offshore Wind Farm  
Passive and active bat report 2023

Figure 22.18.4 Manual transect route AT23-1 with static locations

System Identifier: 42285-WSPE-CO-ON-FG-OO-5224	Version: 2.0
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Company: WSP	Drawn By: HADJE	Chk/Prvd: SUTET	Drawn Date: 05/01/2024	Status: FINAL
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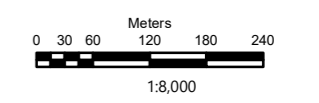
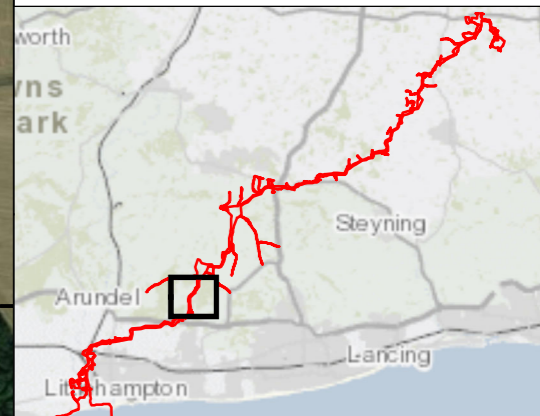




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**Key**

- Proposed DCO Order Limits
- Transect AT23-2
- Static location



Rampion Extension Development

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 Passive and active bat report 2023

Figure 22.18.5 Manual transect route AT23-2 with static locations

System Identifier: 42285-WSPE-CO-ON-FG-OO-4467				Version: 2.0
Company: WSP	Drawn By: HADJE	Chk/Aprvd: SUTET	Drawn Date: 05/01/2024	Status: FINAL



# Annex B

## Tables

**Table B-1 Manual transect route descriptions and locations of passive monitoring detectors in 2023**

Transect no.	Description of habitats and static locations
<b>AT23-1 (4.88mi)</b>	The transect covers a vast area of arable fields with multiple short hedgerow boundaries. Towards the south of the transect there is small parcels of woodland with some mature trees and field boundaries start to become larger, creating numerous linear features for commuting bats. These features connect the wider habitats to a large woodland in the south. Both static bat detectors AT23-1a and AT23-1b were placed along two different mature tree lines bordering arable fields. Static bat detector AT23-1a was placed in the southwest corner and static bat detector AT23-1b in the southeast corner of the transect.
<b>AT23-2 (3.93mi)</b>	The transect covers south of the woodland below AT23-1, where there is more arable farmland bordered by this larger woodland to the north. Some arable fields further south are bordered by mature treelines and smaller pockets of woodland and scrub. Static bat detector AT23-2a is located along a pocket of linear woodland with a PRoW that separates two arable fields to the southwest of the transect north of the A27 in Hammerpot. Static bat detector AT23-2b is located in woodland edge that borders an arable field in the middle of the transect.
<b>AT23-3 (3.35mi)</b>	The transect covers the sections south of the A27 and the arable fields surrounding the Vinery Industrial Estate to the east and west. The fields to the west have small hedgerow field boundaries with small areas of woodland directly under the industrial estate, and there are larger pockets of woodland to the west of the industrial estate connected by field boundaries and treelines. No static bat detectors were used for this transect.

**Table B-2** Dates of manual transect surveys

<b>Transect</b>	<b>Date</b>
<b>AT23-1</b>	20/04/2023, 11/05/2023, 08/06/2023, 27/07/2023, 28/07/2023, 10/08/2023 and 12/10/2023
<b>AT23-2</b>	20/04/2023, 11/05/2023, 08/06/2023, 27/07/2023, 28/07/2023, 10/08/2023 and 12/10/2023
<b>AT23-3</b>	20/04/2023, 11/05/2023, 08/06/2023, 27/07/2023, 28/07/2023, 10/08/2023 and 12/10/2023

**Table B-3 Limitations of manual transect surveys**

Transect no.	April 2023	May 2023	June 2023	July 2023	August 2023	September 2023	October 2023
<b>AT23-1</b>	No limitations	No limitations	No limitations	Poor weather, survey rescheduled, no further limitations	No limitations	Land access restricted, poor weather, no survey undertaken	No limitations
<b>AT23-2</b>	No limitations	No limitations	No limitations	Poor weather, survey rescheduled, no further limitations	No limitations	Land access restricted, poor weather, no survey undertaken	No limitations
<b>AT23-3</b>	Land access limited to PRow only	Land access limited to PRow only	Land access limited to PRow only	Poor weather, survey rescheduled, land access limited to PRow only	Land access limited by PRow only	Land access restricted, poor weather, no survey undertaken	No limitations



**Table B-4 Limitations of passive monitoring surveys**

<b>Bat static detector no.</b>	<b>April 2023</b>	<b>May 2023</b>	<b>June 2023</b>	<b>July 2023</b>	<b>August 2023</b>	<b>September 2023</b>	<b>October 2023</b>
<b>AT23-1a</b>	Technical fault	Technical fault	No limitations	No limitations	No limitations	No limitations	No limitations
<b>AT23-1b</b>	No limitations	Technical fault	Technical fault	No limitations	Battery failure – only 4 nights recorded	No limitations	No limitations
<b>AT23-2a</b>	No limitations	No limitations	Technical fault	Static bat detector stolen	No limitations	No limitations	Battery failure – only 2 nights recorded
<b>AT 23-2b</b>	No limitations	No limitations	Technical fault	No limitations	No limitations	No limitations	No limitations

**Table B-5 Environmental conditions for manual transects**

<b>Date</b>	<b>Sunset</b>	<b>Sunrise</b>	<b>Moon Phase</b>	<b>Start temp (°C)</b>	<b>End Temp (°C)</b>	<b>Precipitation</b>	<b>Start humidity (%)</b>	<b>End Humidity (%)</b>	<b>Cloud cover</b>	<b>Wind speed</b>	<b>Transect No.</b>
<b>20/04/23</b>	20:05	-	New	11	8	Light drizzle	81	90	100	4	AT23-1
<b>20/04/23</b>	20:05	-	New	8	7	Light drizzle	80	90	100	1	AT23-2
<b>20/04/23</b>	20:05	-	New	8	6	Light drizzle	89	86	80	2	AT23-3
<b>11/05/23</b>	20:38	-	Waning crescent	13	12	None	81	80	50	3	AT23-1
<b>11/05/23</b>	20:38	-	Waning crescent	12	10	None	77	82	70	0	AT23-2
<b>11/05/23</b>	20:38	-	Waning crescent	18.6	17.1	None	72	88	50	2	AT23-3
<b>08/06/23</b>	21:13	-	Waning gibbous	18	13	None	50	60	0	5	AT23-1
<b>08/06/23</b>	21:13	-	Waning gibbous	18	13	None	50	60	10	4	AT23-2
<b>08/06/23</b>	21:13	-	Waning gibbous	17	14	None	50	73	0	3	AT23-3

Date	Sunset	Sunrise	Moon Phase	Start temp (°C)	End Temp (°C)	Precipitation	Start humidity (%)	End Humidity (%)	Cloud cover	Wind speed	Transect No.
27/07/23	20:56	-	Waxing gibbous	18	16	None	96	95	100	2	AT23-1
27/07/23	20:56	-	Waxing gibbous	18	16	None	95	94	100	2	AT23-2
27/07/23	20:56	-	Waxing gibbous	18	16	None	95	94	100	2	AT23-3
28/07/23	-	02:22	Waxing gibbous	16	17	Light drizzle	98	95	100	2	AT23-1
28/07/23	-	02:22	Waxing gibbous	16	16	None	97	96	80	2	AT23-2
28/07/23	-	02:22	Waxing gibbous	17	17	None	97	96	100	1	AT23-3
10/08/23	20:32	-	Waning crescent	21	17	None	72	87	30	0	AT23-1
10/08/23	20:32	-	Waning crescent	20	17	None	70	85	40	0	AT23-2
10/08/23	20:32	-	Waning crescent	21	17	None	70	85	20	1	AT-23-3
12/10/2023	18:17	-	New	17	17	Drizzle	94	96	100	3	AT23-1

Date	Sunset	Sunrise	Moon Phase	Start temp (°C)	End Temp (°C)	Precipitation	Start humidity (%)	End Humidity (%)	Cloud cover	Wind speed	Transect No.
12/10/2023	18:17	-	New	17	17	Drizzle	94	96	100	3	AT23-2
12/10/2023	18:17	-	New	17	17	Drizzle	94	96	100	3	AT23-3

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**Table B-6 Environmental conditions for passive monitoring**

Date	Sunset	Sunrise	Moon Phase	Max temp (°C) am	Min temp (°C) am	Max temp (°C) pm	Min temp (°C) pm	Average temp (°C)	Precipitation (mm)	Max humidity (%)	Min humidity (%)	Wind speed (km/h) am	Wind speed (km/h) pm	Weather observations am	Weather observations pm
21/04/2023	20:06	05:54	New	10	6	14	4	7.7	0.65	89	51	11	7	Partly cloudy	Partly cloudy
22/04/2023	20:08	05:52	Waxing crescent	14	4	16	11	8.3	2.17	92	52	8	13	Partly cloudy	Rain
23/04/2023	20:10	05:50	Waxing crescent	12	10	14	8	10.5	9	92	63	14	12	Rain	Partly cloudy
24/04/2023	20:11	05:48	Waxing crescent	14	4	15	6	8.5	4	92	62	11	13	Partly cloudy	Scattered showers
25/04/2023	20:13	05:46	Waxing crescent	11	2	15	5	6.8	0.05	86	40	10	10	Rain	Partly cloudy
13/05/2023	20:41	05:15	Waning crescent	16	10	20	10	12.5	0	88	57	17	13	Partly cloudy	Partly cloudy
14/05/2023	20:43	05:13	Waning crescent	16	9	17	12	11.8	0.02	91	66	7	10	Fair	Rain
15/05/2023	20:44	05:12	Waning crescent	15	12	18	8	12.7	0.21	91	36	17	16	Partly cloudy	Rain
16/05/2023	20:45	05:10	Waning crescent	17	6	20	10	11.6	0	87	35	10	14	Partly cloudy	Partly cloudy
17/05/2023	20:47	05:09	New	19	8	17	12	12.3	0.19	86	51	9	8	Fair	Rain
27/06/2023	21:19	04:50	Waxing gibbous	21	13	22	18	17.6	0	86	62	11	12	Partly cloudy	Partly cloudy
28/06/2023	21:19	04:51	Waxing gibbous	22	18	23	18	19.6	0	90	68	7	13	Partly cloudy	Partly cloudy
29/06/2023	21:19	04:52	Waxing gibbous	20	15	25	16	18.4	2.38	92	38	12	11	Partly cloudy with rain	Partly cloudy with rain
30/06/2023	21:19	04:52	Waxing gibbous	19	11	18	16	15.5	0.39	92	65	12	17	Partly cloudy with rain	Partly cloudy with rain
01/07/2023	21:19	04:53	Full	21	17	24	15	18.5	0.24	92	41	12	15	Partly cloudy with rain	Partly cloudy with rain

Date	Sunset	Sunrise	Moon Phase	Max temp (°C) am	Min temp (°C) am	Max temp (°C) pm	Min temp (°C) pm	Average temp (°C)	Precipitation (mm)	Max humidity (%)	Min humidity (%)	Wind speed (km/h) am	Wind speed (km/h) pm	Weather observations am	Weather observations pm
28/07/2023	20:54	05:23	Waxing gibbous	20	17	22	17	18.4	0.34	94	69	9	12	Cloudy with rain	Cloudy with rain
29/07/2023	20:52	05:25	Waxing gibbous	21	16	21	16	18.2	0.2	92	67	12	16	Partly cloudy with rain	Partly cloudy with rain
30/07/2023	20:51	05:26	Full	19	15	19	16	16.9	1.41	92	69	17	16	Partly cloudy with rain	Partly cloudy with rain
31/07/2023	20:49	05:28	Full	19	17	19	16	17.3	3.48	93	83	15	11	Partly cloudy with rain	Partly cloudy with rain
01/08/2023	20:48	05:29	Full	20	15	21	15	17.1	0.74	92	67	10	14	Partly cloudy with rain	Partly cloudy with rain
10/08/2023	20:32	05:42	Waning crescent	22	13	25	17	18	0	94	57	11	12	Partly cloudy	Partly cloudy
11/08/2023	20:31	05:44	Waning crescent	22	16	21	17	18.6	0.29	92	76	10	8	Partly cloudy with rain	Partly cloudy with rain
12/08/2023	20:29	05:45	Waning crescent	21	16	21	17	17.8	0	90	72	14	15	Partly cloudy	Partly cloudy
13/08/2023	20:27	05:47	Waning crescent	20	17	21	17	17.9	0.62	90	70	14	13	Partly cloudy with rain	Partly cloudy with rain
14/08/2023	20:25	05:49	New	21	17	21	16	17.7	1.88	92	76	13	14	Partly cloudy with rain	Partly cloudy with rain
07/09/2023	19:34	06:26	Third quarter	25	19	26	20	22.1	0	80	64	6	4	Clear	Clear
08/09/2023	19:32	06:27	Waning crescent	24	24	26	21	20.8	0	74	59	6	4	Partly cloudy	Partly cloudy
09/09/2023	19:30	06:29	Waning crescent	27	21	28	20	21.9	0	73	59	7	5	Clear	Clear
10/09/2023	19:28	06:30	Waning crescent	26	22	27	22	20.7	0.57	71	69	9	8	Partly cloudy	Partly cloudy with rain
11/09/2023	19:26	06:32	Waning crescent	23	20	23	19	19.6	0	88	73	7	13	Partly cloudy	Partly cloudy

Date	Sunset	Sunrise	Moon Phase	Max temp (°C) am	Min temp (°C) am	Max temp (°C) pm	Min temp (°C) pm	Average temp (°C)	Precipitation (mm)	Max humidity (%)	Min humidity (%)	Wind speed (km/h) am	Wind speed (km/h) pm	Weather observations am	Weather observations pm
12/10/2023	18:16	07:21	Waning crescent	19	18	19	17	17.1	7.92	95	92	11	13	Cloudy with rain	Cloudy with rain
13/10/2023	18:14	07:23	Waning crescent	19	18	20	17	17.1	17.54	92	85	21	17	Partly cloudy with rain	Partly cloudy with rain
14/10/2023	18:12	07:24	New	13	11	15	9	10.1	0.11	74	63	11	9	Rain	Rain
15/10/2023	18:10	07:26	New	10	10	12	6	6.6	0	68	54	9	8	Clear	Clear
16/10/2023	18:08	07:28	Waxing crescent	13	5	13	10	7.6	0	77	66	11	11	Partly cloudy	Partly cloudy



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**Table B-7 Passive monitoring locations**

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<b>Bat static detector no.</b>	<b>National Grid Reference</b>
<b>AT23-1a</b>	TQ 09507 09408
<b>AT23-1b</b>	TQ 08951 09262
<b>AT23-2a</b>	TQ 06730 05983
<b>AT23-2b</b>	TQ 07069 06712

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**Table B-8 Passive monitoring dates selected for analysis**

<b>Static No.</b>	<b>April 2023</b>	<b>May 2023</b>	<b>June 2023</b>	<b>July 2023</b>	<b>August 2023</b>	<b>September 2023</b>	<b>October 2023</b>
<b>AT23-1a</b>	No data	No data	27/06/2023 to 01/07/2023	28/07/2023 to 01/08/2023	10/08/2023 to 14/08/2023	07/09/2023 to 11/09/2023	12/10/2023 to 16/10/2023
<b>AT23-1b</b>	21/04/2023 to 25/04/2023	No data	No data	28/07/2023 to 01/08/2023	10/08/2023 to 14/08/2023	07/09/2023 to 11/09/2023	12/10/2023 to 16/10/2023
<b>AT23-2a</b>	21/04/2023 to 25/04/2023	13/05/2023 to 17/05/2023	No data	No data	10/08/2023 to 14/08/2023	07/09/2023 to 11/09/2023	12/10/2023 to 16/10/2023
<b>AT23-2b</b>	21/04/2023 to 25/04/2023	13/05/2023 to 17/05/2023	No data	28/07/2023 to 01/08/2023	10/08/2023 to 14/08/2023	07/09/2023 to 11/09/2023	12/10/2023 to 16/10/2023

# Annex C

## Scientific species names

**Table C-1** below lists all species mentioned within this report, note some species mentioned below were not recorded during bat surveys.

**Table C-1 Scientific name of species mentioned in this report**

Common name	Scientific name
Alcathoe bat	<i>Myotis alcathoe</i>
Barbastelle	<i>Barbastella barbastellus</i>
Bechstein's bat	<i>Myotis bechsteinii</i>
Brandt's bat	<i>Myotis brandtii</i>
Brown long-eared bat	<i>Plecotus auritus</i>
Common pipistrelle	<i>Pipistrellus pipistrellus</i>
Daubenton's bat	<i>Myotis daubentonii</i>
Greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>
Greater mouse-eared bat	<i>Myotis myotis</i>
Grey long-eared bat	<i>Plecotus austriacus</i>
Kuhl's pipistrelle	<i>Pipistrellus kuhlii</i>
Leisler's bat	<i>Nyctalus leisleri</i>
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>
Natterer's bat	<i>Myotis nattereri</i>
Noctule	<i>Nyctalus noctula</i>
Serotine	<i>Eptesicus serotinus</i>
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Whiskered bat	<i>Myotis mystacinus</i>

