



**CLEARSTONE
ENERGY**

DARTFORD ENERGY HUB

BAT ACTIVITY SURVEY REPORT

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Dartford Energy Hub

Bat Activity Survey Report

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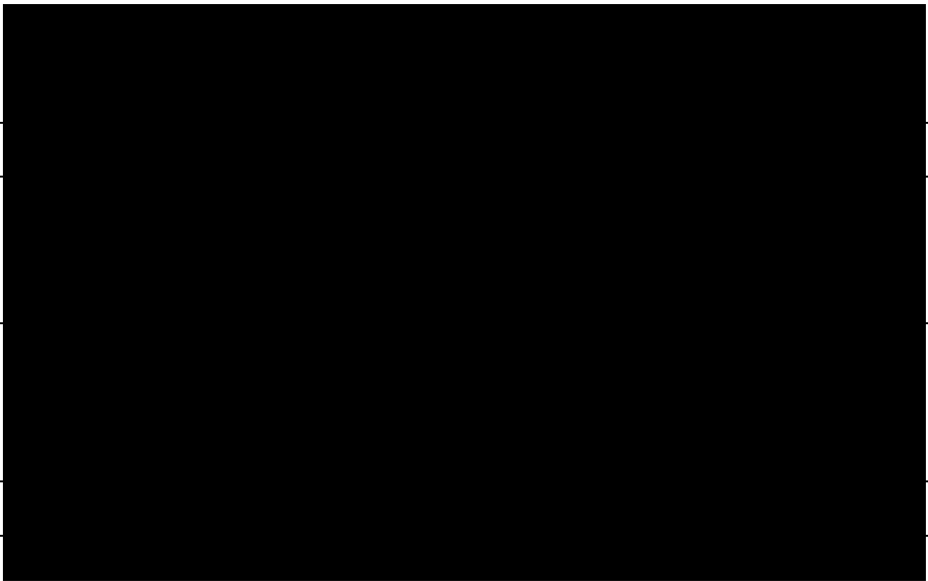
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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

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EXECUTIVE SUMMARY

This report presents the results of bat activity surveys undertaken in relation to the proposed Dartford Energy Hub (hereafter referred to as 'the proposed development') on land west of Millbrook Garden Centre, Southfleet, Kent, DA13 9PA (the 'site') to establish the potential effects of the proposed development on bats. These surveys were conducted by RSK Biocensus on behalf of Clearstone Energy.

The proposed development is to construct a battery energy storage system (BESS), with battery units and a substation compound with associated infrastructure, security fencing and cameras, access tracks (the 'BESS site') and associated cable connection to the national grid. The site is the area within which development would take place (and includes the proposed BESS site and cable connection) and is denoted by the planning application boundary shown in *Figure 1*.

The ecological 'survey area' included the 6.58 ha BESS site and an offsite area where habitat enhancements could take place as part of the biodiversity net gain (BNG) proposals and is shown in *Figure 2*. The survey area comprised two fields: Field 1 was identified as species-poor pasture, cut for hay and sheep-grazed; Field 2 was identified as neutral grassland managed by occasional mowing. Both fields were bounded by hedgerows with trees and woodland strips or tree lines.

A desk study revealed that nine species of bat had been recorded within 1 km of the survey area.

Field surveys recorded bat activity levels using static bat detectors. Bat echolocation calls were recorded to determine the importance of the survey area for foraging and commuting bats. Two detectors were positioned within the survey area along treelines; one along the northern boundary of Field 1 and the other on the southern boundary of Field 2. Surveys were carried out in suitable weather, over at least five consecutive nights in May, June and September 2024 (spring, summer and autumn). The results informed an evaluation of the potential impact of the proposed development on bats.

A total of 5,489 bat registrations were recorded on the survey area during the three static detector surveys (a relatively high number given the small size of the survey area). At least nine species of bat were recorded as present; these were: barbastelle, serotine, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle, noctule, Leisler's bat, brown long-eared bat, and *Myotis* species (potentially comprising both Daubenton's and Natterer's bats).

Barbastelle bats are rare and activity was identified in the southern area of the survey area, but was limited to only three registrations in total.

Common pipistrelle accounted for 77% of the total bat registrations and were by far the most frequently recorded species in the survey area, followed by the 'big bats' (noctule, Leisler's bat and serotine combined: 8.7%) and then *Myotis* species (5.9%).

The treelines along the northern and southern survey area boundaries were considered to be primarily used for foraging and commuting bats, with the grassland areas likely used for foraging only. The railway line along the southern boundary of the survey area was a strong commuting/foraging corridor with potentially a common pipistrelle and serotine maternity roost

functionally linked to it. Early registrations (i.e. close to typical emergence times indicating roosts) were recorded for almost all species other than barbastelle and Nathusius' pipistrelle, but roosts on the survey area itself or in close proximity are less likely. Trees were not surveyed as they are to be retained.

A nighttime lighting assessment of the survey area revealed that much of the eastern half of it is affected by light-spill from nearby roads and the adjacent garden centre.

The survey area itself was considered to be of 'County' importance for bats. The apparent value of this small area was raised by its proximity to the adjoining railway line to the south and its wider connectivity in the landscape, which may merit 'Regional' importance because of its connectivity within the wider landscape. However, the railway line will be unaffected by the proposed development.

The construction phase of the proposed development has the potential to cause minor disturbance to active bats in the proximity of the survey area, through noise, temporary lighting and the removal of short sections of hedgerow along Station Road to accommodate new site accesses. However, this disturbance will be temporary, short term and not likely to affect commuting bats (part of the site is already affected by lightspill from adjacent land uses).

Operational impacts are likely to be low and related to short range noise emissions from the battery units.

Hedgerow loss will be compensated on the BESS site, and grassland and hedgerow habitats created both on and off the BESS site, through the implementation of the site Landscape Strategy and the biodiversity net gain Habitat Mitigation and Management Plan (HMMP). On establishment, these habitats will provide suitable foraging and commuting habitats for bats.

Construction impacts to commuting and foraging bats should be managed through a Construction Environmental Management Plan.

No trees are to be affected by the current development proposals; however, should this change further assessment of those trees for bats would be required. Tree-roosting bats move roosts regularly, so trees with suitable features anywhere on the site should be treated as potential roosts.

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1.0 INTRODUCTION

1.1 Purpose of this Report

- 1.1.1 This report presents the results of bat activity surveys undertaken in relation to the proposed Dartford Energy Hub (hereafter referred to as 'the proposed development') on land west of Millbrook Garden Centre, Southfleet, Kent, DA13 9PA (hereafter referred to as 'the site'). These surveys were conducted by RSK Biocensus on behalf of Clearstone Energy.
- 1.1.2 The proposed development is to construct a battery energy storage system (BESS), with battery units and a substation compound with associated infrastructure, security fencing and cameras, access tracks (the 'BESS site') and associated cable connection to the national grid (see section 1.2). The site is the area within which development would take place (and includes the proposed BESS site and cable connection) and is denoted by the planning application boundary shown in drawing CST010-DF4.0_rev10 Proposed Site Layout Plan (*Figure 1*).
- 1.1.3 The ecological 'survey area' included the 6.58 ha BESS site and an offsite area where habitat enhancements could take place as part of the biodiversity net gain (BNG) proposals and is shown in *Figure 2*. The cable connection was not included in the field surveys as the route was decided after surveys started and the majority of which will be underground or within roads.
- 1.1.4 A preliminary ecological appraisal undertaken at the site in August 2023 by RSK Biocensus identified that the survey area supported habitat suitable for commuting and foraging bats and that trees in the survey area may be suitable for roosting bats (RSK 2023a).
- 1.1.5 The aim of the bat activity surveys were to record bat echolocation calls to determine the importance of the survey area for bat foraging and commuting activities, to inform an evaluation of the potential impact of the proposed development on bat populations. This report presents the methods, results and evaluation of these surveys undertaken in Spring (May), Summer (June) and Autumn (September) 2024. The aims of the surveys were to:
- identify the bat species present;
 - assess relative activity levels;
 - identify any important features or habitats for bats in the survey area; and
 - provide recommendations for any further surveys, mitigation or enhancement.

1.2 Development Proposals

- 1.2.1 The proposed development is for the construction and operation of a battery energy storage system (BESS), comprising:

- 75 groups of battery units (2.75 metres (m) in height) and ancillary infrastructure
- 38 groups of medium voltage inverters and transformers (2.35 m and 2.50 m tall respectively)
- A new 400/33Kv substation compound, including two transformers and a switch building (9.6 m and 14 m in height).
- Galvanised steel palisade security fencing with (double) access gates (2.5m in height)
- CCTV and infrared cameras mounted on 3m high columns around the site compound perimeter.
- Site access points and internal access tracks
- 750m underground national grid cable connection from the site to Northfleet national grid substation (Grid Supply Point).
- The site will be laid to gravel around the battery units, inverters and transformers and within the substation. Outside these areas will be landscaping and habitat enhancements in accordance with the site's Landscape Strategy (Liz Lake Associates 2024).

The cable connection will be installed using horizontal directional drilling (HDD) and open-cut trenching techniques. Two HDDs are proposed, the first starting from within the BESS site red-line boundary to Nursery Road (north of the A2) and the second from Hall Road (B262) to Northfleet East substation. The final connection to the substation will be completed by National Grid. The cable route between the HDDs from Nursery Road to Hall Road will be open-cut and within the road. The proposed site layout is shown in *Figure 1*.

1.3 Landscape Context

- 1.3.1 The redline boundary of the site includes 5.68 hectares (ha) of land located either side of the B262 Station Road and west of Millbrook Garden Centre at Southfleet in north Kent. The A2 dual carriageway is 200m to the north of the survey area, with the town of Northfleet and the urban Thames Estuary development corridor immediately beyond.
- 1.3.2 The survey area lies on the northern edge of the semi-rural patchwork of fields, hedgerow, woodland and settlements to the south of the A2 dual carriageway. The village of Southfleet is 800m to the south of the Survey area and the hamlet of Betsham is 960m to the south-west; the villages of Bean and Instead Rise are 2km to the west and south-east respectively. It comprises two fields of permanent pasture, where high voltage power cables cross both fields.
- 1.3.3 The field to the north of Station Road (Field 1) was grazed, improved pasture and bounded by Millbrook Garden Centre to the east and DGP Logistics yard to the west. A tall hedgerow with scattered standard trees demarcates the southern field boundary adjacent to Station Road. A narrow woodland corridor runs along the northern survey area boundary, which is hereafter referred to as the 'northern tree line'. Springhead

Scheduled Ancient Monument (SAM) lies immediately beyond and is designated as a nationally important Roman site.

- 1.3.4 The field to the south of Station Road (Field 2) is an area of managed neutral grassland. A hedgerow comprising scattered woody hedgerow species, bramble scrub and mature standard trees, bound the field to the north adjacent to Station Road. A railway line and its associated wooded embankments lies immediately to the south of the survey area, which is hereafter referred to as the 'southern tree line'. To the south of the southern tree line is farmland and 9 ha of horticultural polytunnels 250 m beyond.

1.4 Further background information

- 1.4.1 Surveys undertaken during 2023 by RSK Biocensus, 2.2 kilometres (km) to the south of the survey area, recorded a high level of bat activity along the Disused Railway Cutting Local Wildlife Site (LWS), which was to the west of the assessed site (RSK 2023b). The bat activity survey results for the assessed site included records of commuting and foraging *Nathusius' pipistrelle*, which is a rare bat in the UK. The survey area is functionally linked to the assessed site, by the railway line to the south of the survey area, where the railway line continues south to the Disused Railway Cutting LWS.

2.0 LEGISLATION AND GUIDANCE

2.1 Legislation

- 2.1.1 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 or to replace the text of the legislation.

Wildlife and Countryside Act 1981 (as amended)

- 2.1.2 All species of bats in England and Wales are protected by The Wildlife and Countryside Act 1981 (as amended). Under Section 9 of the Wildlife and Countryside Act 1981, for 'European Protected Species' listed on Schedule 5, which includes bats, it is an offence to:

- intentionally or recklessly obstruct any place that a wild bat uses for shelter or protection;
- intentionally or recklessly disturb any wild bat while it is occupying a structure or place that it uses for shelter or protection; or
- publish, or cause to be published, any advertisement likely to be understood as conveying that they buy or sell, or intend to buy or sell, any live or dead wild bat or any part of, or anything derived from a wild bat.

The Conservation of Habitats and Species Regulations (Habitats Regulations) 2017

- 2.1.3 Bats are also European Protected Species listed on The Conservation (Natural Habitats, & c.) Regulations 2017 (as amended). This legislation makes it an offence to:

- deliberately capture, injure or kill such a bat;
- deliberately disturb bats, including in particular any disturbance which is likely (a) to impair their ability – (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) 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 of a bat; or
- possess, control, transport, sell, exchange, or offer for sale or exchange any live or dead bat or part of a bat or anything derived from a bat or any part of a bat.

- 2.1.4 Additionally, certain species are afforded additional protection as an Annex II species (under the Habitats Directive) for which Special Areas of Conservation may be designated. The four bat species listed on Annex II are barbastelle, Bechstein's (*Myotis bechsteinii*), greater horseshoe (*Rhinolophus ferrumequinum*) and lesser horseshoe (*Rhinolophus hipposideros*).

Natural Environment and Rural Communities Act 2006

- 2.1.5 The Natural Environment and Rural Communities (NERC) Act 2006 requires local and governmental authorities and departments to have regard to the conservation of biodiversity and measures associated with public rights of way and other rural affairs.
- 2.1.6 Barbastelle, Bechstein's bat, noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat are listed as being Species of Principal Importance for conservation in England under Section 41 (S41) and, as such, they are a material consideration during the planning process.

2.2 Guidance

National Planning Policy Framework

- 2.2.1 The National Planning Policy Framework (NPPF, 2023) sets out the Government's planning policies for England and how these are expected to be applied. This includes requirements for the contribution to and enhancement of the natural environment, including habitats and biodiversity. The NPPF specifies the obligations that local authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how these are to be delivered in the planning system.

Kent Biodiversity Strategy

- 2.2.2 The Kent Biodiversity Strategy 2020 to 2045 set out habitats and species of particular conservation value within the county in order to raise awareness of biodiversity issues and provide a mechanism through which conservation targets for these habitats and species could be delivered within the county (Kent Nature Partnership, 2020). The Kent Biodiversity Strategy includes 17 priority habitats and 13 priority species. Serotine is listed as an indicator species with a 2025 target to undertake colony counts of maternity roosts at known Kent serotine roosts.

3.0 METHODS

3.1 General

- 3.1.1 The work described below was undertaken following current best practice guidance (Collins 2023) with justification of where methodologies slightly deviate from the guidelines detailed below.

3.2 Background Data Search

- 3.2.1 A desk-based review, using the Multi-Agency Geographic Information for the Countryside (MAGIC) website, was undertaken to identify any international statutory designated sites (e.g. Special Areas of Conservation (SACs) within 10 km of the survey area, and any relevant national statutory designated sites (e.g. Sites of Special Scientific Interest (SSSIs)) within 2 km of the survey area. The MAGIC database was also interrogated to identify any licence applications for bats granted within 4 km of the survey area.
- 3.2.2 To provide supplementary data on bat species known to be present in the vicinity, bat species and roost records from the survey area and at least a 1 km buffer around it were obtained from the Kent and Medway Biological Records Centre (KMBRC) in March 2023.

3.3 Habitat Suitability for Bats

- 3.3.1 Habitat suitability is used to determine the appropriate level of survey effort. According to Table 4.1 in the Bat Survey Guidelines (Collins, 2023), a habitat with Low potential suitability for flight-paths and foraging habitats, is a 'habitat that could be used by small numbers of bats as flight-paths, such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Also, 'suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub'.
- 3.3.2 A habitat with Moderate potential suitability is described as a 'Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.'

During the PEA field survey, the survey area was considered to comprise habitat of Low to Moderate suitability; however, given its small size, three seasonal surveys (spring, summer and autumn) were considered to be sufficient to inform the impact assessment.

3.4 Static Detector Surveys

- 3.4.1 Two statics were positioned on the survey area, with one in Field 1 along the northern treeline and one in Field 2 along the southern tree line. The positioning of the static bat

detectors (Grid references for the northern and southern tree lines are TQ 61640 72248 and TQ 61611 72100 respectively) is shown in *Figure 2*.

- 3.4.2 Bat survey guidelines (Collins, 2023), stipulates that bat activity data on sites with habitats of low suitability for bats should be recorded over five consecutive nights in appropriate weather conditions in spring (April to May), summer (June to August) and autumn (September to October) with at least three weeks between survey visits. The number of detector locations should provide a representative sample of all the habitats in the site that could be affected by the proposed activities. Appropriate weather conditions are considered to be sunset temperatures of 10°C or above with no heavy rain or strong winds.
- 3.4.3 In line with these guidelines, bat activity surveys were undertaken over at least five consecutive nights during surveys undertaken in May, July and September 2024. Detectors were placed in the two locations where the habitat was considered of particular value for bats, such as hedgerows and woodland edges/tree lines that provide commuting, foraging, and/or roosting opportunities. Each detector recorded bats from 30 minutes before dusk to 30 minutes after dawn.
- 3.4.4 Full spectrum Wildlife Acoustics SM4BAT static bat detectors with omnidirectional microphones were used. Each had a microphone mounted at a minimum height of 1 m to maximise the probability of recording bat calls in addition to reducing the likelihood of noise interference from insects and moving vegetation (see photographs in *Appendix A*).
- 3.4.5 Detectors were deployed when the weather forecast indicated suitable weather conditions for foraging and commuting bats (*Table 2*). A historical weather forecast for Southfleet (about 1 km from the survey area) has been created from the website www.timeanddate.com.

Table 1. Survey dates for each static detector deployment.

Month	Start Date	End Date	Nights Deployed	No. Detectors
May	16/05/2024	20/05/2024	5	2
June	19/06/2024	23/06/2024	5	2
September	04/09/2024	08/09/2024	5	2

Table 2. Weather conditions - May.

Date	Sunset and Sunrise	Temperature (°C)	Wind Speed (mph)	Humidity (%)	Overnight Rain
16/05/2024	20:46 - 05:05	9 - 17 °C	2 - 4 mph	69 - 95%	No overnight rain
17/05/2024	20:47 - 05:04	9 - 22 °C	2 - 5 mph	48 - 93%	No overnight rain
18/05/2024	20:49 - 05:02	11 - 19 °C	2 - 7 mph	67 - 90%	No overnight rain
19/05/2024	20:50 - 05:01	8 - 22 °C	4 - 13 mph	50 - 80%	No overnight rain
20/05/2024	20:52 - 05:00	10 - 21 °C	8 - 11 mph	45 - 88%	No overnight rain

Table 3. Weather conditions – June.

Date	Sunset and Sunrise	Temperature (°C)	Wind Speed (mph)	Humidity (%)	Overnight Rain
19/06/2024	21:19 - 04:41	12 - 21 °C	10 - 12 mph	43 - 88%	No overnight rain
20/06/2024	21:19 - 04:41	8 – 23 °C	2 - 5 mph	48 - 93%	No overnight rain
21/06/2024	21:19 - 04:42	10 - 24 °C	2 - 14 mph	42 - 83%	No overnight rain
22/06/2024	21:20 - 04:42	8 - 22 °C	4 - 13 mph	50 - 80%	No overnight rain
23/06/2024	21:20 - 04:42	11 - 25 °C	2 - 6 mph	53 - 84%	No overnight rain

Table 4. Weather conditions - September.

Date	Sunset and Sunrise	Temperature (°C)	Wind Speed (mph)	Humidity (%)	Overnight Rain
04/09/2024	19:39 - 06:16	10 - 19 °C	4 - 8 mph	57 - 88%	Light rain 22:20 to 23:20
05/09/2024	19:37 - 06:17	13 - 19 °C	5 - 14 mph	78 - 100%	Light rain 22:50 to 23:20 and 02:50 to 03:50
06/09/2024	19:35 - 06:18	15 - 19 °C	2 - 7 mph	88 - 100%	Light rain 19:50 to 20:20
07/09/2024	19:33 - 06:20	13 - 20 °C	2 - 3 mph	73 - 97%	No overnight rain
08/09/2024	19:28 - 06:23	13 - 22 °C	4 - 7 mph	68 - 93%	Rain from 19:50 to 20:20, and 02:20 to 03:50

3.5 Sound Analysis

3.5.1 All recordings from the static detectors were stored onto memory cards and analysed using Kaleidoscope Viewer© software. Recordings were analysed using a number of processes:

- All recordings were subject to noise processing to eliminate any noise files. The noise analysis was always split by nightly session to allow for weather variations and a minimum of 10% of the noise files identified were subject to a quality check. Quality checks were conducted by an experienced ecologist (Daniel Fellman) to identify any bat calls that may have been missed by the software. Then, if necessary, an error rate was established and a correction to the figures was made or, if the error rate was too high (i.e. bats calls were present in a high proportion of noise files), noise files were included in the full results processing.
- All calls not scrubbed as noise were subject to identification by an experienced ecologist. Call parameters such as call shape, inter-pulse interval, call length, frequency of maximum energy (peak frequency), and start and end frequency of the calls, were inspected to make an identification where possible.
- Calls were limited or split to a maximum file length of 5 seconds, which equates to a single bat registration per species present within the file, giving a measure of bat activity for the survey area.

- Echolocation calls were identified down to species wherever possible; however, depending on the type of bat encountered and call recorded, it is not always possible to reliably identify all bats beyond their genus. In particular, it is often not possible to reliably identify species belonging to the *Myotis*¹, *Plecotus*² and *Nyctalus*³ genera). For this reason, registrations from bats in the *Myotis* genus have not been separated to species level.

- 3.5.2 Note that it can also be difficult to separate some calls of *Plecotus* (long-eared) bats as well as separating some *Plecotus* calls from *Myotis* bats - although only one species of *Plecotus* (*P. auritus*, the brown long-eared bat) is known to be present in Kent. It can also be difficult to distinguish between the two bats in the *Nyctalus* genus (noctule, *N. noctula* and Leisler's bat, *N. leisleri*), with those of serotine (*Eptesicus serotinus*). Some calls of common pipistrelle (*Pipistrellus pipistrellus*) also overlap with either Nathusius' pipistrelle (*P. nathusii*) or soprano pipistrelle (*P. pygmaeus*). Analysis of cryptic calls is more difficult with faint or poor-quality recordings.
- 3.5.3 There are a number of variables that affect the 'detectability' of a bat call, ranging from their biology and ecology, to the environmental conditions and condition of the equipment, and so there are limitations in drawing certain conclusions about bat activity on a site from the use of bat detectors / sound analysis alone. Given the different detectability between different species of bats i.e. from a few metres (for the quietest species such as brown long-eared bats) up to 200 m (for noctule), the percentage distributions of units of activity (recordings containing a particular species' calls) detected should not be extrapolated to estimate abundance or compare levels of relative activity between species groups.
- 3.5.4 The timings of all bat calls were compared with sunset and expected emergence times for the different species (light tolerant/averse species), to assess the likelihood of bat roosts being present near each static detector location.

3.6 Assumptions and limitations

- 3.6.1 Static detectors cannot distinguish between large numbers of bats, and small numbers of bats making repeated registrations. Therefore, high levels of bat activity can be generated by a large number of commuting bats, a small number of foraging bats flying past the detector on multiple occasions, or individual bats flying close to a detector. This constraint was factored into the interpretation of the survey results.
- 3.6.2 It was not considered that nighttime bat walkover (NBW; Collins, 2023) survey would be required for this project, primarily because of the small scale of the proposed development. In addition, all trees suitable for roosting bats are to be retained and the habitats to be affected are only of low to moderate suitability for bats. However, the

¹ Species from the *Myotis* genus include Natterer's (*M. nattereri*), Daubenton's (*M. daubentonii*), whiskered (*M. mystacinus*), Bechstein's (*M. bechsteini*), Brandt's (*M. brandtii*) and Alcahloe (*M. alcathoe*) bats.

² Species from the *Plecotus* genus include brown long-eared (*P. auritus*) and grey long-eared (*P. austriacus*) bats.

³ Species from the *Nyctalus* genus include noctule (*N. noctula*) and Leisler's bat (*N. leisleri*). These calls may overlap with those of serotine, and so these three larger species are sometimes grouped as 'big bats'.

survey area was visited during the hours of darkness to explore the nighttime lighting environment, especially lightspill from the nearby garden centre.

- 3.6.3 It should be noted that ecological features are transient, and that the distributions of habitats and species may be subject to change. As such, in line with Chartered Institute of Ecology and Environmental Management (CIEEM) guidance, the ecological survey data presented in this report are considered valid for two years (CIEEM, 2019), after which if baseline conditions have changed significantly, it may be necessary for further field surveys to be undertaken.

4.0 RESULTS

4.1 Background Data Search

- 4.1.1 The background data search (BDS) for the proposed solar farm and the cable route (where the proposed solar farm location was 2.2 km to the south and the cable route immediately south of the survey area) from 2023, returned records of 9 bat species within 1 km of the survey area.
- 4.1.2 These were: serotine, Daubenton's bat, Natterer's bat, Leisler's bat, noctule, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and brown long eared bat.
- 4.1.3 The MAGIC map search found that four European Protected Species (EPS) licences have been granted within a 4 km radius of the survey area during the years between 2009 and 2021. The licences covered five common/relatively common bat species: common pipistrelle, soprano pipistrelle, brown long-eared bat, Natterer's bat and whiskered/Brandt's bat. All the licences concerned day roosts.

Table 5. Relevant specially protected bat species recorded within 1km of the survey area

Common name	Scientific name	Number of records	Date of most recent record
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	108	11/10/2021
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	38	11/10/2021
Brown long-eared bat	<i>Plecotus auritus</i>	59	11/10/2021
Noctule	<i>Nyctalus noctula</i>	26	15/09/2021
Daubenton's bat	<i>Myotis daubentonii</i>	70	22/02/2020
Leisler's bat	<i>Nyctalus leisleri</i>	14	22/08/2019
Serotine	<i>Eptesicus serotinus</i>	13	01/08/2019
Natterer's bat	<i>Myotis nattereri</i>	38	09/02/2019
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	3	07/11/2015

4.2 Bat activity and species diversity

Bat activity levels

- 4.2.1 A total of 5,489 bat registrations was recorded across both locations and all three seasons (equivalent to 183 registrations per night per static unit, averaged over all recording periods).
- 4.2.2 At least nine species of bat were recorded on the survey area during the three static detector deployments. These were, barbastelle, serotine, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle, noctule, Leisler's bat, brown long-eared bat, and *Myotis* species (potentially comprising both Daubenton's and Natterer's bats).

Table 6. Relative bat activity – Northern Treeline

'Relative bat activity' is a measure of activity for each species; these counts (of registrations not bats) are 'normalised' to registrations per night in the second column for each month. This is standard practice to allow comparisons with other sites (if required).

Northern treeline	May		June		September		Combined seasons	
RPN = registrations/night	Count	RPN	Count	RPN	Count	RPN	Count	RPN
Common pipistrelle	632	126	147	29	1052	210	1831	122
Soprano pipistrelle	31	6	17	3	49	10	97	6
Nathusius' pipistrelle	3	1	0	0	7	1	10	1
Brown long-eared bat	23	5	3	1	50	10	76	5
Noctule	23	5	20	4	7	1	50	3
Leisler's bat	0	0	11	2	12	2	23	2
Myotis species	20	4	11	2	232	46	263	18
Serotine	2	0	29	6	1	0	32	2
Barbastelle	0	0	0	0	0	0	0	0
TOTALS	734	147	238	48	1410	282	2382	159

Table 7. Relative bat activity – Southern Treeline

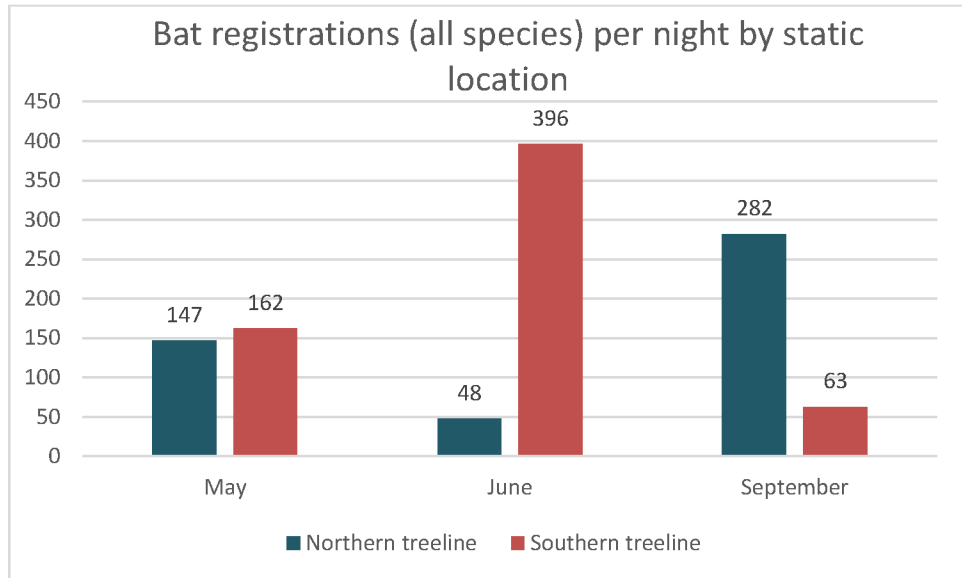
'Relative bat activity' is a measure of activity for each species; these counts (of registrations not bats) are 'normalised' to registrations per night in the second column for each month. This is standard practice to allow comparisons with other sites (if required).

Southern treeline	May		June		September		Combined seasons	
RPN = registrations/night	Count	RPN	Count	RPN	Count	RPN	Count	RPN
Common pipistrelle	748	150	1,449	290	178	36	2375	158
Soprano pipistrelle	15	3	25	5	26	5	66	4
Nathusius' pipistrelle	0	0	2	0	15	3	17	1
Brown long-eared bat	18	4	8	2	41	8	67	4
Noctule	8	2	222	44	12	2	242	16
Leisler's bat	2	0	156	31	8	2	166	11
Myotis species	20	4	14	3	28	6	62	4
Serotine	0	0	105	21	4	1	109	7
Barbastelle	1	0	0	0	2	0	3	0
TOTALS	812	162	1981	396	314	63	3107	207

- 4.2.3 The southern treeline recorded a higher percentage of the total registrations (53%) than the northern treeline (47%) across all seasons combined. The distribution of calls is shown on Graph 1. Common pipistrelle accounted for 77% of the total bat registrations from the two static locations (again all locations and seasons) and this was by far the

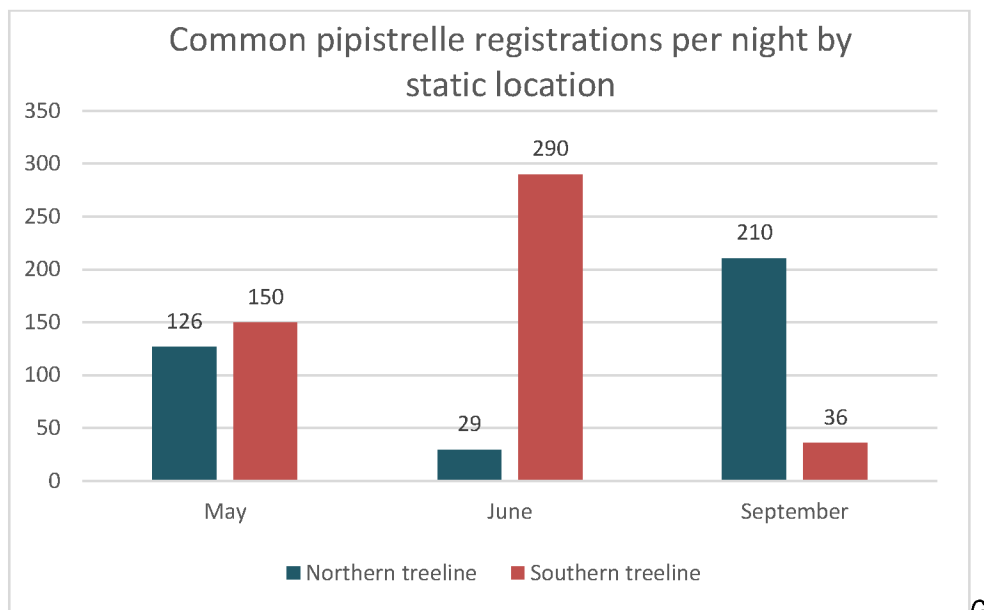
most frequently recorded species. The slightly higher levels of activity recorded at the southern boundary is consistent for other species (i.e. even if common pipistrelles are excluded).

Graph 1. Summary of All Seasonal Bat Activity



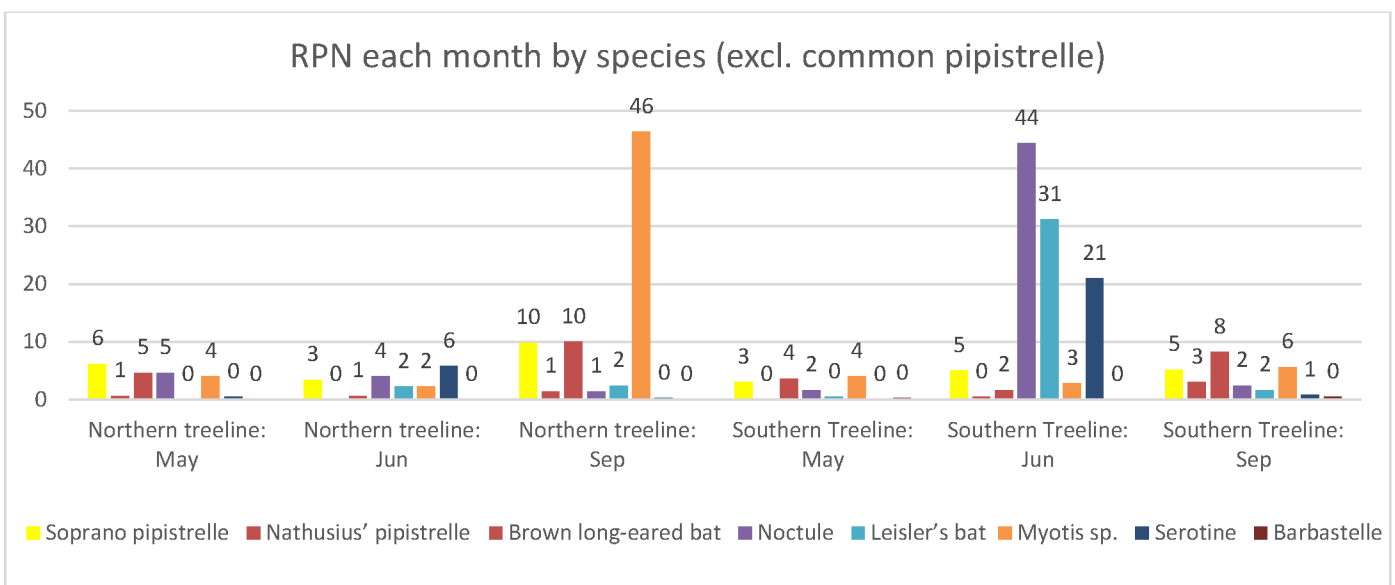
4.2.4 Graph 1 shows how the total seasonal bat activity (represented as bat registrations per night) is highest along the southern treeline in June, during the breeding season); conversely, the lowest activity of all seasons was in the same month along the northern treeline. This pattern is driven by the preponderance of common pipistrelle registrations.

Graph 2. Common pipistrelle registrations per night by static location.



- 4.2.5 Graph 2. Common pipistrelle registrations per night by static location. Graph 2 shows that common pipistrelle activity along the northern treeline was the lowest in June (during the summer breeding season) and the highest in September (the autumn mating/transitional season). However, the reverse was true along the southern treeline, where the common pipistrelle activity was highest in June and lowest in September. This result indicated a potential common pipistrelle maternity roost in the vicinity of the southern treeline.
- 4.2.6 The activity (RPN) for all other species is shown by month (season) and location in Graph 3. Common pipistrelle data is excluded to better show patterns of species with lower activity.

Graph 3. RPN at each location in each season for all species except common pipistrelle



- 4.2.7 Graph 3 shows the activity levels of all other bat species (i.e. except for common pipistrelle). As a group, the highest levels of relative activity (481 registrations; 8.7%) were from the *Nyctalus* genus (noctule and Leisler's bat followed by the *Myotis* genus (325 registrations; 5.9%) across all locations/seasons
- 4.2.8 Both *Nyctalus* species showed their highest levels of activity in June along the southern treeline (44 and 31 RPN; see Graph 3), along with a smaller peak of serotine activity in the same month; otherwise 'big bat calls' were far less frequent. Conversely, whilst *Myotis* species also had one peak in a single month/location (46 RPN; see Graph 3), i.e. September (Autumn) along the northern treeline (232 registrations; 71% of all *Myotis* calls), levels of relative activity were otherwise low (6 or fewer RPN).
- 4.2.9 Also of note are the following:
- Low peaks of activity from brown long-eared bats, a quiet and often under-recorded species, along both treelines, also in September.
 - Low relative activity for soprano pipistrelle, despite it being one of the UK's most common species, and all other species.

- Barbastelle activity was only identified along the southern treeline, with only three registrations recorded.
- 4.2.10 The presence of serotine, noctule and Leisler's bat (collectively known as 'the big bats', which can be difficult to separate on the basis of their echolocation calls alone) all showing raised activity in June on the southern treeline, which was considered unusual. Therefore, these recordings were explored further and the results from the southern treeline of the BESS site (in the survey area) were also compared to the results recorded 2.2 km to the south during bat activity surveys undertaken at a proposed solar site in 2023 (RSK Biocensus 2023b). For both locations, the results of the BTO Acoustic Pipeline and manual call analysis were compared. The comparison⁴ indicated that all three big bat species were indeed present (this was also reflected in the desk study records). A maternity roost of serotine in the vicinity of the proposed solar site was predicted due to the high number of registrations adjacent to this site and the serotines recorded at the BESS site (in the survey area) may be linked to such a roost. Also, breeding roosts of noctule and/or Leisler's bat cannot be discounted. Early registrations (i.e. close to typical emergence times indicating roosts) were recorded for almost all species other than barbastelle and Nathusius' pipistrelle.
- 4.2.11 It is important to reiterate that the percentage of bat registrations cannot be directly translated into a species presence percentage, as the total number of bat registrations recorded is not equivalent to the total number of bats present (para. 3.6.1), and it is also inappropriate to interpret percentages of registrations as percentages of species prevalence (para. 3.5.3).
- 4.2.12 The night time lighting assessment showed that the eastern area of the survey area was affected by lightspill that extended along the boundary between the two fields, but the northern and southern treelines were unaffected (see Figure 3 and photographs in Appendix B).

⁴ A comparison was made between the manual assessment undertaken by an experienced sound analyst, and the 'high confidence' species assigned by the BTO Acoustic Pipeline, an auto-identification software.

5.0 EVALUATION AND RECOMMENDATIONS

5.1 Species Assemblage

- 5.1.1 At least nine different species of bat were recorded using the treelines on the boundaries of the survey area. The species assemblage comprised three widespread species, likely three widespread but less abundant species, three species with rarer or restricted distribution and one rarest/Annex II species. The species identified were:
- common, soprano and brown long-eared bats (widespread);
 - *Myotis* species (potentially Daubenton's and likely Natterer's bats) and noctule (widespread but less abundant);
 - Nathusius' pipistrelles, serotine and Leisler's bat (rarer or restricted distribution);
 - Barbastelle (rarest/Annex II),
- 5.1.2 Barbastelle bat is a species of high conservation importance and as such is designated under Annex II of the EC Habitats Directive (Schedule 2 of the Habitats Regulations, 2017 (as amended)).
- 5.1.3 The survey area species list is based on echolocation alone, and has not been confirmed by trapping surveys or DNA analyses. *Myotis* species in particular are difficult to distinguish on this basis, as there is much overlap between their calls. The same applies, to a slightly lesser extent, to the three 'big bat' species.

5.2 Ecological Value of the Survey area

- 5.2.1 The method for valuing the species present in the recently published UK Bat Mitigation Guidelines (Reason & Wray, 2023) indicates that the assemblage could, in theory, meet the threshold for National level importance⁵. However, whilst there is a good diversity in recorded species, the number of registrations for most species was generally low, with barbastelle only registered on three occasions and Nathusius' pipistrelle with 27 registrations (never exceeding 3 RPN). The very low contribution from several species, and the very high predominance of common pipistrelle, as well as the survey area's small size, would indicate that the survey area would be more appropriately designated as being of (at best) County importance. The apparent value of this small area was raised by its proximity to the adjoining railway line to the south and its wider connectivity in the landscape, which may merit 'Regional' importance because of its connectivity within the wider landscape. However, the railway line will be unaffected by the proposed development.
- 5.2.2 The two treelines included in the survey were considered to be important for bats for commuting and foraging, while the small open grassland areas are likely to be used for

⁵ This level of importance is assigned using a methodology from Table 3.2 of the Bat Mitigation Guidelines Reason & Wray, 2023. The assigning of a value to an assemblage is to provide contextual information for a site.

foraging only, with the better foraging habitat likely to lie along the southern field boundary. Field 1 comprised species-poor pasture, cut for hay and sheep-grazed while Field 2 comprised neutral grassland managed by occasional mowing and is thus more species-rich, which may benefit bat invertebrate prey. Part of the survey area is affected by lightspill from adjacent land uses.

- 5.2.3 Along the northern treeline bordering Field 1, common pipistrelle activity showed a drop in bat registrations in the maternity season, suggesting it is primarily a foraging resource for this species (though of small size), and not close to breeding roosts (which tend to be in buildings). There was an increase in bat registrations across most of the species present in September on this treeline, outside of the maternity season, again suggesting the survey area is used as a foraging resource, as bats feed up in preparation for hibernation and travel further from their roosts.
- 5.2.4 Surveys previously undertaken by RSK Biocensus 2.2 km to the south of the survey area had recorded a high level of bat activity along the railway, to the west of the assessed site, which is functionally linked to the southern treeline bordering Field 2 of the survey area (RSK 2023b). This was reflected in the results for the current surveys, showing the railway line as a strong commuting/foraging corridor. The increase in 'big bat' and common pipistrelle activity in June may indicate a maternity roost, but roosts on the survey area itself or in close proximity are less likely. Tree-roosting bats move roosts regularly, so trees with suitable features anywhere on the survey area and site should be treated as potential roosts.
- 5.2.5 The boundary features provide valuable connectivity to the wider landscape, which is likely to be more important than the foraging value of such a small area.

5.3 Potential impacts and mitigation measures

Impacts to foraging/commuting habitat

- 5.3.1 The site will be laid to gravel in the immediate vicinity of the battery units, inverters and transformers and within the substation, resulting in a small loss of foraging habitat for bats. Outside these areas, the retained trees and hedgerows will be safeguarded during the construction phase of the proposed development, including a buffer zone protecting tree roots and the grassy margins around the site boundaries. Following construction, reinstated areas will be subject to habitat enhancements in accordance with the site's Landscape Strategy, including the reinstatement of grassland areas and the creation of new hedgerows and areas of scrub (Liz Lake Associates 2024).
- 5.3.2 Four access tracks will be created through the hedges on Station Road, each requiring the removal of approximately 10 metres of hedgerow. The railway line to the south of the survey area and the woodland strip on the northern survey area boundary would be unaffected and the hedgerows to be lost are to be compensated through the proposed Landscape Strategy.
- 5.3.3 Overall the habitat changes on this small site post-development are unlikely to be significant to bats.

Impacts to (potential) roosts

- 5.3.4 No buildings will be affected by the proposed works, and trees will be retained with an appropriate root protection zone.
- 5.3.5 No trees are currently to be removed to accommodate the Proposed Development, although a tree may require removal or pruning to accommodate one of the new access points. Any tree removal proposed would be subject to further assessment for bat roosts.
- 5.3.6 The cable connection to the grid supply point will be installed via HDD. The drilling areas (launch and receive pits) will be microsituated to avoid tree loss, damage and disturbance through vibration.

Disturbance

- 5.3.7 Construction will require the presence of workers, the operation of plant, and vegetation and topsoil clearance. These will result in an increase in noise, some of which may be in the audible range of bats, potentially causing minor disturbance to active bats in proximity to the survey area. However, the construction period will be relatively short, and the disturbance is unlikely to affect bats commuting or foraging, given they will be able to continue doing so along the railway cutting to the south of the survey area.
- 5.3.8 Lighting may be needed during the construction period (including the months of October to March); however, bats are less active at this time of the year.

Operational impacts

- 5.3.9 The proposed BESS site will be fully fenced for security purposes and will have occasional activity by personnel during operation, so disturbance impacts would be minimal. The site will be largely unlit, with, for example infrared movement-triggered lighting in working areas by the building as well as emergency provision. The battery units may emit high frequency noise, but this is unlikely travel far given high-frequency sounds attenuate over short distances and will dissipate through the palisade fencing around operational areas of the site. The operational impact is therefore assumed to be relatively low.

Compensation and enhancements

- 5.3.10 On completion, at least a 10% net gain for biodiversity will be achieved through on- and off-site grassland, hedgerow and scrub habitat creation and enhancement, which will be implemented through a Habitat Mitigation and Management Plan (HMMP). These habitats, once established, will provide replacement suitable foraging and commuting habitats for bats.

Recommendations

- 5.3.11 Construction lighting should be avoidable during the months of April – September but, if required, should be directed downwards and away from the railway line to the south of the site.

- 5.3.12 Construction impacts should be managed through a Construction Environmental Management Plan.
- 5.3.13 Should any trees need to be removed or otherwise directly affected, further assessments of those trees for bats would be required.

REFERENCES

Chartered Institute of Ecology and Environmental Management (CIEEM) (2019), *Advice Note on the Lifespan of Ecological Reports & Surveys*. CIEEM, Winchester, Hampshire. [Available at: [Advice-Note.pdf \(cieem.net\)](#) – accessed 23/07/2024].

Collins, J. (ed) (2023), *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn)*. The Bat Conservation Trust, London.

The Conservation of Habitats and Species Regulations 2017 (as amended). London: HMSO.

Kent Biodiversity Nature Partnership (2020) *The Kent Biodiversity Nature Partnership - Biodiversity Strategy 2020-2045*. Available at [Our Strategy | Kent Nature](#)

Liz Lake Associates (2024) Landscape Strategy drawing number 2831-LLA-ZZ-00-DR-0001-P01 Landscape Strategy DRAFT 311024

National Planning Policy Framework. (2023) London: HMSO. [Available at: [National Planning Policy Framework - GOV.UK \(www.gov.uk\)](#) – accessed 23/07/2024].

Natural Environment and Rural Communities Act (2006). [Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents> – accessed 23/07/2024].

Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Chartered Institute of Ecology and Environmental Management, Ampfield.

RSK (2023a) 2486105 North Kent BESS (now known as Dartford Energy Hub) Preliminary Ecological Appraisal – August 2023, RSK Biocensus.

RSK (2023b) 2484841 Dartford Solar bat activity report, RSK Biocensus.

Wildlife and Countryside Act 1981 (as amended). London: HMSO.

FIGURES

Figure 1. Site layout plan (drawing number CST010 DF4.0rev10, provided by Clearstone Energy)

Figure 2. Site location and static location plan

Figure 3. Nighttime walkover survey results plan



This drawing is the copyright of CLEARSTONE ENERGY Limited and must not be reproduced in whole or in part or used in any manner without their written permission.
Scaled dimensions must not be taken from this drawing. All dimensions are to be confirmed on site prior to commencement of work.

Revisions:

Revision	Date	Revision Notes	Drawn	Inspected
01	07.11.23	First Issue	JM	DW
02	18.12.23	Revised	JM	DW
03	19.01.24	Revised	JM	DW
04	08.07.24	Amendments to Site Technology and Layout	JM	ST
05	30.08.24	Amendments to Layout, Substation relocated	JM	ST
06	10.09.24	Technology and Duration revised	JM	ST
07	28.10.24	Overhead HV Lines Added	GM	ST
08	28.11.24	Amended as per Comments	OB	ST
09	29.11.24	Amended as per Comments	OB	ST
10	06.12.24	Amended as per Comments	OB	ST

LEGEND:

	PLANNING APPLICATION BOUNDARY
	SITE ACCESS
	INTERNAL SITE ROADS
	EMERGENCY/FIRE ACCESS
	DNO ACCESS
	BESS SECURITY FENCE
	EXISTING UNDERGROUND POWER LINES
	EXISTING OVERHEAD POWER LINES
	EXISTING THOROUGHFARE
	FOOT ACCESS
	EXISTING VEGETATION

SITE INFRASTRUCTURE

	SECURITY GATE		BATTERY UNIT
	PEDESTRIAN GATE		PCSK INVERTER
	CUSTOMER SUBSTATION		MV SKID
	FIRE HYDRANT		AC/DC PANEL
	120,000L WATER TANK		FIRST RESPONDER PANEL
	FIRST RESPONDER REPEATER PANEL		CCTV COLUMN

Project:

Dartford Energy Hub

Developer:



CLEARSTONE ENERGY Limited
8 Devonshire Square, London
United Kingdom, EC2M 4PL
www.clearstoneenergy.com/

Drawn by:



Status:

FOR PLANNING

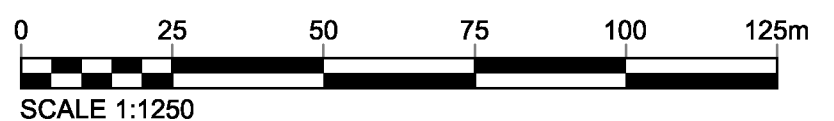
Drawing Title:

Dartford Energy Hub
Proposed Site Layout Plan

Drawn: JM	Checked: DW	First Issued: 07.11.2023
Project Code: CST010- DF4.0	Drawing Number:	
Sheet Size: A1	Scale: 1:1250	Revision: 10

DARTFORD ENERGY HUB PROPOSED SITE LAYOUT PLAN

Scale: 1:1250@A1





Legend:

- Survey area boundary
- Bat Static Location
- Number of Species Recorded
- 9
- Number of Barbastelle Records
- 3

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Rev	Date	Description	Drn	Chk	App

North Kent BESS Further Surveys



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EXPERTS IN ECOLOGY

TITLE: Figure 2:
Site Location and Static Detector Results

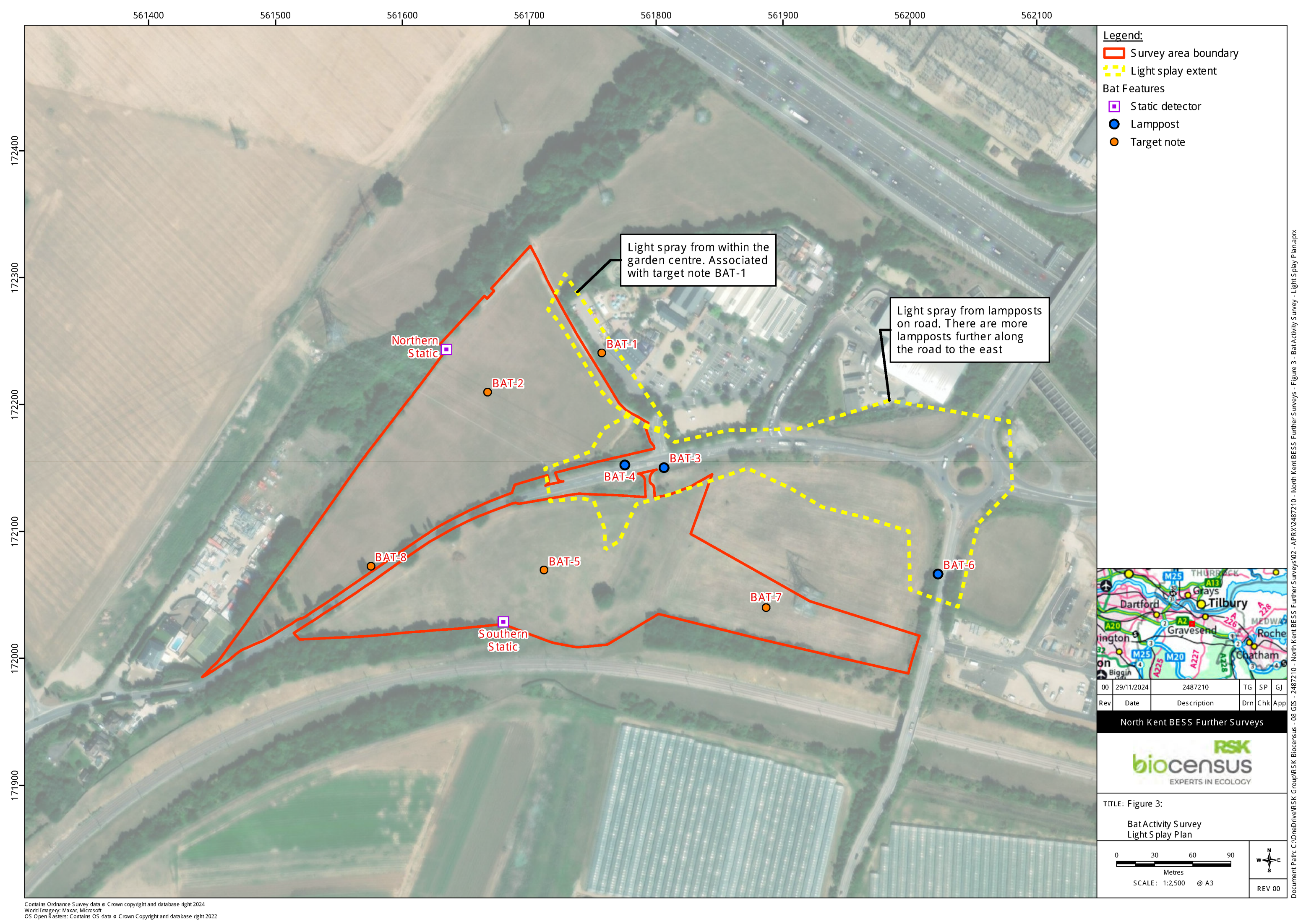


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APPENDIX A: SURVEY AREA PHOTOGRAPHS

Plate 1: Location of static in northern treeline

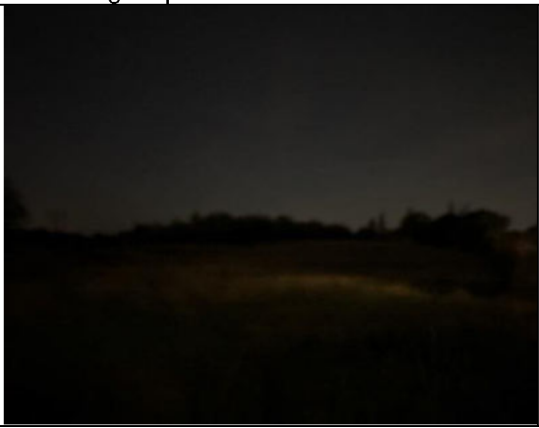


Plate 2: Location of static in northern treeline



APPENDIX B – NIGHTTIME PHOTOGRAPHS

Target Note No.	Target Note
BAT-1	Hedge bordering the eastern end of the northern field, separating the field and the garden centre. Hedge blocks the light from the garden centre very well with limited spill into the field. Hedge itself is lit up by the lights within the garden centre. 
BAT-2	Field and northern boundary of field with line of trees dark with little to no light spill. Did not enter field fully to avoid disturbing livestock. 
BAT-3	Lamppost - causing some light spill into southern field 

Target Note No.	Target Note	
BAT-4	Lamppost causing light spill into southern and northern field	
		
BAT-5		
	Southern field dark apart from light spill from BAT-4 and lamp-post along the road going east (not close to the red line boundary). Centre of the field and southern boundary dark with no light spill.	
		

Target Note No.	Target Note	
BAT-6	Lamp-post causing minimal light spill into southern field	
		
BAT-7	The northern part of the northern field to the western end is lit from the lamppost associated with the road; the southern boundary (with a block of woodland) is dark with limited light spill	
		
		
BAT-8	Tree line along road dark after last lamppost (at BAT-4); see Figure 3.	



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