

BAT ACTIVITY SURVEY REPORT

NOVEMBER 2024

Sandy Brow RFP

Perimeter Road

Knowsley

L33 3AN

U R B A N
G R E E N

QUALITY MANAGEMENT

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1 Executive Summary

- 1.1.1.1 Balance Power Ltd are proposing to develop land off Perimeter Road in Knowsley (hereafter referred to as 'the site'). The proposals include the development of a battery storage site, with power grid infrastructure and associated hard landscaping.
- 1.1.1.2 Urban Green has been appointed by Balance Power Ltd. to undertake bat activity surveys at the site, following the results of the Preliminary Ecological Appraisal, undertaken on the site in September 2023.
- 1.1.1.3 A suite of night-time bat walkover and automated static deployment surveys have been undertaken at the site during the survey season of 2024.
- 1.1.1.4 The site was found to support a low level of bat activity overall. The eastern reaches of the site, nearby to several confirmed off-site bat roosts, were found to support the majority of bat activity recorded on site.
- 1.1.1.5 Four bat species were recorded utilising the site extent. Bat activity was dominated by common pipistrelle, with occasional occurrences of soprano pipistrelle and rare occurrences of *Myotis* sp., and noctule.
- 1.1.1.6 The proposals for the site aim to avoid direct impacts to bats through the retention of surrounding grasslands and woodland habitats, however, impacts are anticipated along the northern and eastern reaches of the site. As such, mitigation, compensation, and enhancement measures suitable to the proposed scheme have been recommended, in the form of:
 - A sensitive lighting scheme to mitigate indirect impact
 - The provision of a small number (~2-3) of roost boxes suitable for common pipistrelle
 - Invertebrate-friendly planting scheme within the proposed site's grassland buffer



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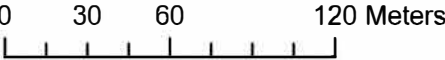
Legend: Red Line Boundary	0.85 Kilometers	N URBAN GREEN A: Ground Floor, The Tower, Deva City Office Park, Trinity Way, Manchester M3 7BF T: +44 (0) 161 312 3131 weareurbangreen.co.uk
Client: Balance Power	Issue: 01	Figure: 01
Project: Sandy Brow	Scale @ A4 1:10,000	
Title: Site Context	Approved by: BG	Checked by: OS
Drawing Ref: UG_2142_SITE_CONTEXT	Author: CL	Date: 22/07/2024



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Legend

- Red Line Boundary
- Survey Area
- Noctule bat
- Common Pipistrelle



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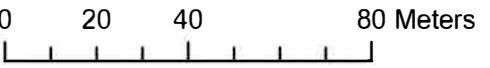
Client: Balance Power		
Project: Sandy Brow		
Title: Night-Time Bat Walkover Results		
Issue: 01	Figure: 02	
Drawn: CL	Checked: BG	Approved: BG
Project: UG2142	Scale @ A3: 1:2500	Date: 01/11/2024
Dwg No: UG_2142_ECO_NBW_01		Revision: 01



U R B A N
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Legend

- Red Line Boundary
- Survey Area
- Pre-Determined Transect Route
- Static Detector



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Client:		Balance Power	
Project:		Sandy Brow	
Title:		Night-Time Bat Walkover Pre-Determined Route	
Issue:		Figure:	
01		03	
Drawn:	Checked:	Approved:	
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Project:	Scale @ A3:	Date:	
UG2142	1:1650	12/11/2024	
Dwg No:		Revision:	
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2 Introduction

2.1 Scope

- 2.1.1.1 Urban Green has been instructed by Balance Power Ltd. to undertake Bat Activity Surveys, comprising Night-time Bat Walkovers (NBWs) and automated static deployments, upon land at Sandy Brow Lane, Knowsley and subsequently produce a technical report.
- 2.1.1.2 The main works proposals include the development of a battery storage site, with power grid infrastructure and associated hard landscaping.

2.2 Site Context

- 2.2.1.1 The site is located at National Grid Reference SJ 44170 98325 and comprises a total area of approximately 2.7ha (see Figure 1).
- 2.2.1.2 The red-lined site lies within a greater blue-line area leased by the client, due for later development. The red-line concerns the site detailed in this report.
- 2.2.1.3 The site is located in the rural outskirts of the greater Liverpool built-up area, ~2.2km north of Knowsley. The site is bounded west by Perimeter Road, immediately beyond which lies an extensive retail/industrial estate. Expansive rural land dominates the wider landscape to the north, east, and south of site – mostly agricultural land, and notably Knowsley Park & Safari, ~3km to the south.

2.3 Purpose of this Report

- 2.3.1.1 This report has been produced to demonstrate the results of bat activity surveys which were completed at the site. The surveys were conducted to establish the level of bat activity and the species diversity present within the site extent. As well as highlighting the most valuable habitats present on site for commuting and foraging bats. Appropriate mitigation and suitable enhancements are detailed (if required). The report has been produced in support of the proposed planning application.
- 2.3.1.2 Relevant UK legislation of the protection of all UK bats are detailed in Appendix 1.

3 Previous Surveys

3.1 Preliminary Ecological Appraisal

- 3.1.1.1 A Preliminary Ecological Appraisal (PEA) and Preliminary Roost Assessment (PRA) was completed at the site by Urban Green in September 2023 and is detailed within Report UG_2142_ECO_PEA_02 (Urban Green, 2023).
- 3.1.1.2 The site was found to comprise a mosaic of wet, marshy grasslands and bordering woodland, with scattered trees, seasonal ponds, and pockets of scrub.
- 3.1.1.3 The site's habitats were assessed to be of low suitability for foraging bats, due to the unmanaged mosaic of habitats that should draw invertebrate prey that were present. The woodland border was deemed to provide suitable foraging grounds as well as forming a linear 'edge habitat' that may provide important commuting habitat for bats.
- 3.1.1.4 Potential impacts to bats were considered closely; the nearby Acornfield Plantation Local Wildlife Site, 400m west, is in part noted as such for its bat roosts. The proposed developments on site may then have the potential to impact upon qualifying features of a local wildlife site.
- 3.1.1.5 As such, further survey work was recommended to establish the level of bat activity and species richness present within the site extent.

4 Methods

4.1 Desk Study

4.1.1.1 Sources of information used in the desk study are presented in Table 1.

Table 1. Desk Study Sources of Information

Source	Date Consulted	Information Sought
Online aerial imagery	30/10/2024	Review of satellite imagery.
Greater Manchester Local Record Centre	12/09/2023	Records of bats within 1km of the site boundary.

4.2 Bat Activity Surveys

4.2.1 Night-time Bat Walkover

- 4.2.1.1 The site was assessed as providing low commuting and foraging value to bats. However given the close vicinity of Local Wildlife Sites with noted bat roosts, Night-time Bat Walkover (NBW) surveys were undertaken in accordance with the latest Bat Conservation Trust (BCT) guidance (Collins, 2023).
- 4.2.1.2 One NBW was conducted on site during each season (spring – April/May, summer – June/July/August, and autumn – September/October).
- 4.2.1.3 Surveys commenced at sunset with surveyors stationed along potential flightlines for a minimum of the first 30 minutes of the survey, observing behaviour and recording commuting and foraging activity.
- 4.2.1.4 After the first 30 minutes of the survey, surveyors continued to wait up to another 30 minutes until a bat was recorded, after which surveyors began walking at a steady pace around the site following bat activity. A pre-determined route was followed during the survey; however, surveyors were given the freedom to react to live observations in the field and stop at areas of higher bat activity or detour from the route to observe bat behaviour.
- 4.2.1.5 The transect route incorporates all habitat types present within the site extent, gaining a representative sample of bat activity around the site.
- 4.2.1.6 Surveys were undertaken in pairs and were conducted using Echo Meter Touch 2 bat detectors, which recorded all bat activity throughout the surveys. Moreover, Echo Meter Touch software analysed bat sonograms in real time and predicted bat species based on the frequency of the calls.
- 4.2.1.7 The pre-determined survey transect route can be found in Figure 2. Table 2 summarises the survey details.

Table 2. Night-time bat walkover survey details

Date	Sunset time	Survey time	Surveyors	Weather conditions at sunset
14/05/2024	21:05	20:50 – 22:50	S1 – Barnaby Gardner S2 – Jo Reeves	Temp: 17°C Cloud cover: 1/8 oktas Wind: 1 Beaufort Precipitation (Ppt): None
31/07/2024	21:08	21:08-22:38	S1 – Barnaby Gardner S2 – Jo Reeves	Temp: 22°C Cloud cover: 2/8 oktas Wind: 2 Beaufort Precipitation (Ppt): None
23/09/2024	19:07	19:49-21:27	S1 – Barnaby Gardner S2 – Emma Cromby	Temp: 13°C Cloud cover: 8/8 oktas Wind: 2 Beaufort Precipitation (Ppt): Heavy rain prior to survey, occasional light drizzle during survey

4.2.2 Automated Static Deployment

- 4.2.2.1 As detailed in BCT good practice guidance (Collins, 2023), the NBWs were facilitated by the deployment of static bat detectors each season (Spring, Summer, Autumn.)
- 4.2.2.2 Two static detectors were deemed suitable for the size and complexity of the site. The detectors used were Anabat Chorus static detectors. Static detectors were deployed for a period of five consecutive nights and were placed in particular habitats of interest, associated with the north and south of the site.
- 4.2.2.3 Table 3 summarises the details of each deployment.

Table 3. Automated static deployment survey details

Deployment Period	Dates	Static Number	Grid reference	Nighttime weather conditions
Deployment 1 - May	15/05/2024	Static 1	SJ 44291 98377	Relatively dry and clear, with brief, light rain.
	19/05/2024	Static 2	SJ 44279 98252	Highs of 18.5°C and lows of 11.5°C.
Deployment 2 - July	01/08/2024	Static 1	SJ 44291 98377	Warm, dry, and clear, with one brief spell of rain.
	05/08/2024	Static 2	SJ 44279 98252	Highs of 21°C and lows of 12.5°C.
Deployment 3 - September	24/09/2024 – 28/09/2024	Static 1	SJ 44291 98377	Cool and clear. No rain. Highs of 12°C and lows of 5.5°C.
		Static 2	SJ 44279 98252	
		Static 2	SJ 44291 98377	

4.2.3 Data Analysis

- 4.2.3.1 All bat calls recorded during the various surveys were subsequently analysed using two software packages.
- 4.2.3.2 The Echo Meter Touch 2 bat detectors conduct auto identification analysis in real time during the surveys which is used to determine species identification during the NBWs. The data collected was analysed and checked again via Kaleidoscope Pro, to extract the meta data and in turn create the associated figures.
- 4.2.3.3 Calls recorded on the Anabat Chorus detectors during the automated static deployment surveys were analysed and checked via Anabat Insight.
- 4.2.3.4 All calls were passed through an auto identification tool at 80% confidence interval; ~30% of all Auto-ID'd calls were then checked by a suitably experienced ecologist. Where inconsistencies were noted, a greater manual effort was focused.

4.3 Constraints to the Survey

- 4.3.1.1 *Myotis Alcahoe* (*Myotis alcahoe*), brandt's (*Myotis brandtii*), Daubenton's bat (*Myotis daubentonii*) and whiskered (*Myotis mystacinus*) bat are often difficult to distinguish between by handheld detectors and sound analysis. For the purpose of this report and the proposed scheme any recordings of *Myotis* sp. are not identified to species level and are referred to as *Myotis* throughout the report.
- 4.3.1.2 During the survey season of 2024, the UK experienced unstable weather patterns, with periods of heavy rainfall common. As such, it was not possible to deploy static detectors during optimal weather conditions during each month. This is not anticipated to be a major constraint, as bat activity was recorded on site during each deployment period and the results were largely consistent throughout.

4.4 Lifespan of Reports

- 4.4.1.1 In accordance with the BCT guidance (Collins, 2023), the details of this report will remain valid for a minimum period of **12 months** from the date of this report (i.e. until October 2025). After this date, this assessment should be reviewed to determine whether any update surveys are required.

5 Results

5.1 Desk Study

5.1.1 Site Context

- 5.1.1.1 The site comprises a mosaic of disturbed, wet grassland, of variable sward height, that has received limited management. The land is characteristically wet and noted by the Merseyside Biobank as a part of the Knowsley and St Helens Mosslands Nature Improvement Area. Small parcels of gorse scrub and scattered trees are present throughout. The trees present within the site extent comprise a mixture of mature and early/semi-mature specimens.
- 5.1.1.2 A large industrial-commercial estate is situated closely west of the site, though expansive rural-arable land, with a network of linear woodlands, ditches, and hedgerows, surrounds the site to all other aspects. Two Local Wildlife Sites are in close vicinity of the site, west, including the Acornfield Plantation, that has confirmed bat roosts within (See section 5.1.2)

5.1.2 Biological Records

- 5.1.2.1 As part of the PEA (Urban Green, 2023), local data records within 1km of the site extent were requested.
- 5.1.2.2 Forty-six records of bats were returned during the data search, including multiple records of unidentified bat species (*Chiroptera* spp). Species included mostly common pipistrelle (*Pipistrellus pipistrellus*), as well as *myotis* species, noctule (*Nyctalus noctula*), and soprano pipistrelle (*Pipistrellus pygmaeus*) bats.
- 5.1.2.3 Records included those of confirmed roosts, within the Acornfield Plantation LWS, 400m west of the site, with fourteen further counts of roosting potential in trees, largely at the former Petrolite site in Knowsley Industrial Park, west of the site. No roosts nor potential roosts were confirmed to the species level.
- 5.1.2.4 The closest record was that of a common pipistrelle present approximately 100m west of the site in 2009.
- 5.1.2.5 There were no granted EPSL within 1km of the site, per consultation with MAGIC.
- 5.1.2.6 See Appendix 2 for a map of the associated local data records.

5.2 Nocturnal Surveys

5.2.1 Night-time Bat Walkover

Spring NBW – 14/05/2024

- 5.2.1.1 Bat activity during the survey was relatively scarce. Forty-five passes were recorded, associated to just seven ‘bursts’ of activity, of which five were attributed to common pipistrelle (38 passes), and the remainder to noctule bats (7 passes).
- 5.2.1.2 The first observation, of noctule flying north, was made at 21:34, ~29 minutes after sunset. There was silence thereafter for over 30 minutes before a common pipistrelle was observed foraging along the length of the southern woodland border.
- 5.2.1.3 Bat activity was similarly sporadic for the duration of the survey, with observations of single bats made at ~10-minute intervals throughout the remainder of the survey.

Summer NBW – 11/07/2024

- 5.2.1.4 Bat activity was extremely low, with only eleven bat passes recorded during the survey.
- 5.2.1.5 Noctule were first recorded, with few passes made at 21:09 in the southeastern corner of the site, by the woodland border, as the survey began.
- 5.2.1.6 An individual soprano pipistrelle was recorded foraging at 21:40 over the open field in the west of the site.

Autumn NBW – 11/09/2024

- 5.2.1.7 Bat activity was again extremely low. Only one single pass of soprano pipistrelle, was recorded at 21:15, over 2 hours after sunset.
- 5.2.1.8 The bat was recorded within vicinity of the woodland in the south-east corner of the site.

Summary

- 5.2.1.9 Bat activity was consistently extremely low during the night-time bat walkovers, with a maximum of 45 passes recorded during the first survey undertaken in May.
- 5.2.1.10 Passes were so few that a ‘dominant species’ could not be determined, though the most commonly recorded were noctule and soprano pipistrelle, as individual bats.
- 5.2.1.11 What bat activity was recorded during the night-time bat walkovers was most commonly associated with the southern and eastern woodland boundaries of the site, and other linear features around the periphery of the site extent. Bat activity was rarely observed within the centre grassland parcels of the site.

5.2.2 Automated Static Deployment

Deployment 1 – May

- 5.2.2.1 Bat activity over the May static deployment period was consistently low. Just 101 calls were recorded in total between the two statics, over five nights. These were dominantly recorded at Static 1, located within scrub in the north of the site, which recorded 86 calls. Static 2, situated along the southern woodland border of the site, recorded just 15 calls.
- 5.2.2.2 Four species were recorded during the five-night period. Pipistrelle species were dominant, with 52 records of common pipistrelle (51% of calls), and 30 soprano pipistrelle (30%).

Deployment 2 – August

- 5.2.2.3 Static detectors recorded exceptional bat activity in the August deployment period. In contrast to the May period, this activity was overwhelmingly attributed to the southern woodland border at Static 2, which recorded 2649 of a total 2724 calls (97%).
- 5.2.2.4 This activity was dominantly common pipistrelle, which accounted for 2636 calls (97%). Over half of these (1794) were recorded at Static 2 on a single night, 5th August. The exceptional common pipistrelle activity of this night accounted for 61% of all calls recorded over the entire survey season. In curiously stark contrast, Static 1 recorded no common pipistrelle at all during the night, only three noctule calls.
- 5.2.2.5 Other species recorded throughout August were soprano pipistrelle (71), noctule (12), and myotis bats (4).

Deployment 3 – September

- 5.2.2.6 Bat activity was again very low during the September deployment, recording the lowest number of calls over the survey season. Just 91 calls were recorded total, between both statics over the five-night survey period.

- 5.2.2.7 Static 2 again recorded the most dominant activity, with 88% of calls during the period. Species distribution was relatively more even than other months, though still dominated by common pipistrelle at 76%, with soprano pipistrelle accounting for 23%. Just one myotis call was recorded, and there were no noctule calls.
- 5.2.2.8 Static 1 recorded no bats at all for two successive nights, and on the nights between recorded only 2-3 calls total. Static 2 recorded bats every night, though only a single call, of common pipistrelle, was recorded on 26th September.

Summary

- 5.2.2.9 Bat activity at the site was extremely low, aside from one anomalous night of exceptionally high common pipistrelle presence at the site's southern woodland border.
- 5.2.2.10 The majority of activity was recorded at Static 2, situated within the site's southern woodland border, and which accounted for 94% of all bat calls. Static 1, in comparison, was located within a parcel of gorse and hawthorn scrub within vicinity of one of the site's seasonal ponds.
- 5.2.2.11 Four bat species were recorded. Common pipistrelle accounted for 95% of all calls recorded, with soprano pipistrelle, noctule, and myotis bats also recorded relatively rarely.
- 5.2.2.12 Bat activity was exceptionally busy at Static 2 on 4th, and particularly 5th August. That night recorded the highest nighttime temperatures of the survey season, peaking at 21°C, and also recording the warmest temperature low of the season, at 16.5°C. In comparison, the May nights frequently recorded lows of ~11.5 °C and September saw lows of 5.5 °C. however, several successive nights in May saw highs of 18.5°C, and lows of 12°C –temperatures comparable to those nights preceding the August surge, yet bat activity remained exceptionally low. The September nights recorded a peak temperature of only 12°C and a low of 5.5°C, and whilst bat activity was lowest for September, the total count of 91 was not far removed from May's 101, which was recorded during weather conditions similar to those of the August surge.
- 5.2.2.13 The August surge was also strictly confined; only three bats total were recorded at Static 1 during the period. Furthermore, the peak of 1759 bat recordings that night, whilst an exceptional anomaly for the site, would not be considered a significantly notable count for habitats of any greater suitability for foraging bats.
- 5.2.2.14 The August surge is assessed to be an outlier event, of common pipistrelle swarming, at a time of year when peak bat activity should be expected. Even considering this swarm, the site still recorded low bat activity year-round.

Table 4: Total species counts from static deployments

	Species				
Month	Myotis	Noctule	Common Pipistrelle	Soprano Pipistrelle	Grand Total
May	3	10	52	36	101
Aug	4	12	2637	71	2724
Sep	1		69	21	91
Grand Total	8	22	2758	128	2916

Table 5: Bat activity counts by survey night and temperature

Date	Temperature (°C)																										
	5.5	7	8	8.5	9	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16	17	17.5	18	18.5	19	21	21.5	Grand Total	
15-May															4	6											10
16-May										1	6		10		2	1											20
17-May												9	18										3				30
18-May										2										3			3				8
19-May										1					2	27				2			1				33
01-Aug																		3	4	10				4			21
02-Aug												8	30	11	8	3		4	1	5	4						74
03-Aug															1	49	13	5	17								85
04-Aug												70	96	110	52	10			1	27	227	123					716
05-Aug																			91	1005	375	56	26	9	197	1759	
24-Sep							2	21			2																25
25-Sep					15	10	7	1																			33
26-Sep							1																				1
27-Sep			1	7																							8
28-Sep	11	5					5			3																	24
Grand Total	11	5	1	7	15	10	15	22	3	1	11	8	119	125	126	90	59	20	102	1069	606	180	36	9	197	2847	

6 Assessment and Mitigation Recommendations

6.1 Project Proposals

- 6.1.1.1 The proposals include the development of a battery storage site, with power grid infrastructure and associated hard landscaping.
- 6.1.1.2 Based on the most recent landscape proposals (Drawing number: PR871_SANDYBROW LANE_PROPOSED PLAN_REV A), the majority of open grassland habitat is to be lost in order to facilitate the development. The southern and eastern woodland borders are outside of the development footprint and are to be retained, though may be disturbed during the construction and operational phases of the site.

6.2 Impact Assessment

- 6.2.1.1 Taking into account the location, size, and context of the site and given the results of the survey effort, the site is assessed as supporting an exceptionally low (overall) level of bat activity. Bat activity was low for all survey occasions, though one major surge in bat activity was encountered, suggesting the site is used opportunistically for swarming activity, when there is an influx in potential foraging opportunities and when conditions are particularly favourable.

Habitats of Value

- 6.2.1.2 The central, open grassland area of the site was found not to be important/frequently used habitat by bats. Very few bats were recorded during the transects, and Static 1, situated in a more open environment, recorded significantly less activity throughout the season.
- 6.2.1.3 Areas of particular interest included the south and eastern woodland borders. These areas are to be retained, though bats may be disturbed by construction works and operational lighting.

Species Likely Impacted

- 6.2.1.4 Common pipistrelle were the dominant species utilising the site, suggesting that the site provides suitable foraging and commuting conditions for the species. Thus, this species would likely be most impacted by the proposed scheme and loss of suitable habitat.
- 6.2.1.5 Common pipistrelle are however, a species known to be more resilient to urban lighting than other species of bat.
- 6.2.1.6 Soprano pipistrelle, noctule, and *Myotis* sp bats were also recorded utilising the site though on rarer occasions, suggesting that they have preferred foraging and commuting habitats within the wider landscape and would therefore be less impacted by the proposed works.
- 6.2.1.7 The BCT detail that: *'common pipistrelle show a preference for deciduous woodland, but are known to be a generalist, using a wide variety of habitats. However, shaded wooded areas can extend the time bats spend foraging by approximately 30 minutes at both dawn and dusk.'* (BTC, 2023). This should be considered within the project proposals.
- 6.2.1.8 It is therefore anticipated that the overall impact on bats that use the site for foraging and commuting purposes will be low. Notwithstanding this, further mitigation recommendations and enhancements are proposed below.

6.3 Mitigation

6.3.1 Avoidance

- 6.3.1.1 The proposals for the development include the retention of large areas of woodland to the south and east of the site which equates to avoidance of direct impacts to these areas of preferred habitat.
- 6.3.1.2 It has been established that common pipistrelle are the dominant species utilising the site, which prefer to forage within deciduous woodland habitat, as such the retention of these habitats will retain suitable foraging and commuting grounds for the species.
- 6.3.1.3 Impacts are anticipated to be indirect associations with lighting and noise; as such, suitable mitigation have, instead, been recommended in Section 6.3.2.

6.3.2 Mitigation

Noise Mitigation

- 6.3.2.1 BESS sites can produce significant noise pollution. Recording at ~90dB 1m from the units, and as much as 70dB 30m away. Typical urban noise levels are limited to ~45dB.
- 6.3.2.2 The proposals may then significantly impact foraging and commuting bats by increased noise pollution in the absence of appropriate mitigation.
- 6.3.2.3 The site proposals include fencing around the plant during the operational phase. The interior fencing could be lined with noise-suppression panels, particularly the southern fence, in vicinity of the southern woodland border. This will reduce the impact of noise on bats foraging the habitat.

Lighting Mitigation

- 6.3.2.4 All bats have some degree of sensitivity to artificial, night-time lighting and the proposed development will result in an increase of artificial light within the site extent and in the vicinity of suitable woodland habitat for commuting and foraging bats.
- 6.3.2.5 Therefore, it is recommended that a sensitive lighting scheme for the site is produced that considers the presence of commuting and foraging bats.
- 6.3.2.6 This scheme should implement the principles detailed within the Guidance Note on Bats and Artificial Lighting at Night (Institution of Lighting Professionals, 2023) and include the following:
 - Keeping site lighting to minimum levels.
 - Implementation of dark habitat buffers around retained areas of woodland at the south and east of the site.
 - All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
 - A warm white light source (2 700Kelvin or lower) should be adopted to reduce blue light component.
 - Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
 - Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges.

- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered.
- Luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt.
- Where appropriate, external security lighting should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1- or 2-minute timer is likely to be appropriate.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged.
- Part Night Lighting (PNL) may be appropriate, where street lighting close to the previously identified habitats that are of value to bats are controlled to turn on at specific times during different seasons.

6.3.3 Compensation & Enhancements

Roosting Opportunities

- 6.3.3.1 The southern woodland was not assessed to host potential roosts during the PEA survey, though roosting potential could be improved to increase the potential use of the site evidenced during the August surge.
- 6.3.3.2 It is recommended that the proposals for the site include the introduction of artificial bat boxes that provide various types of roosting opportunities. Given the findings of the surveys ~2-3 boxes providing day roosts and maternity roosts targeting common pipistrelles would be suitable.
- 6.3.3.3 A plan detailing the number, specification, and location of such features should be produced by a suitably qualified ecologist.

Planting Scheme

- 6.3.3.4 The proposals for the site currently include the enhancement of a grassland buffer surrounding the site. This should include the introduction of a variety of plant species that will attract invertebrate prey, such as:
- Oxeye daisy (*Leucanthemum vulgare*),
 - Michaelmas daisy (*Symphyotrichum novi-belgii*),
 - Wild angelica (*Angelica sylvestris*),
 - Common honeysuckle (*Lonicera periclymenum*),
 - Scotch thistle (*Onopordum acanthium*),
 - Lavender (*Lavandula x intermedia*),
 - Hemp agrimony (*Eupatorium cannabinum*),
 - Purple loosestrife (*Lythrum salicaria*),
 - Rowan (*Sorbus aucuparia*), and
 - Bramble (*Rubus fruticosus*)

7 References

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Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1. Chartered Institute of Ecology and Environmental Management, Ampfield.

Urban Green (2024a). Preliminary Ecological Appraisal. Ref: UG_2142_ECO_PEA_o2.

Appendix 1 – Relevant Legislation

Legislation relating to European Protected Species (e.g. bats)

European Protected Species and their resting places (e.g. bat roosts) are protected under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way (CROW) Act 2000, and the Conservation of Habitats and Species Regulations 2017.

The Conservation of Habitats and Species Regulations 2017 transpose the European Union's 'Habitats Directive' (Council Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (EC Habitats Directive) into UK law. The Regulations provide for the designation and protection of 'European Sites', the protection of 'European Protected Species' (EPS), and the adaptation of planning and other controls for the protection of European Sites. EPS are listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017.