



Land at Blacksmith's Lane, Reed, Herts

Bat Survey Report



January 2026



Client	The Turney Trust
Job title	Land north of Blacksmith's Lane, Reed: Bat Report
Job number	0437
Date	22/01/2026

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Summary

Denny Ecology was commissioned on behalf of The Turney Trust to undertake a bat activity survey of an area of land to the north of Blacksmiths Lane, Reed, Hertfordshire.

The site extends to approximately 1.1043ha and comprises a grassland field, which has developed from former arable land over the last 20 years. It is bounded by woodland to the north and a mature hedgerow forming the southern boundary.

A Preliminary Ecological Appraisal of the site undertaken in June 2022, found there to be potential for the proposed development to impact foraging and commuting bats due to the severance of the southern hedgerow, the loss of the existing grassland field, and light-spill across the southern hedgerow and woodland edge to the north (although note this woodland has now been cleared, with only the boundary line of trees remaining). Overall, the PEA assessed the site and its habitats to be of some potential, low quality habitat for bats.

Bat activity surveys were recommended and undertaken during the summer and autumn survey seasons in 2022 (August-October 2022) and in the spring and autumn survey season in 2024 (May and October 2024). In 2022, this comprised two dusk transect surveys and 12 and 13 nights of monitoring by a static detector in the summer and autumn seasons respectively. In 2024, transect surveys were not undertaken, as it was considered unlikely they would gather useful data compared to static surveys. Instead, the static survey was extended to include four monitoring locations: two on the northern boundary (note, the survey took place prior to woodland clearance to the north), and two on the southern hedgerow.

The survey recorded seven species of bat: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, brown long-eared bat *Plecotus auratus*, noctule *Nyctalus noctula*, Daubenton's bat *Myotis daubentonii*, serotine *Eptesicus serotinus*, Leisler's bat *Nyctalus leisleri* and Western barbastelle *Barbastella barbastellus* (from hereon referred to as barbsstelle). All these species are widespread in the East of England region. The first four are common and widespread species in the UK, whilst the latter three are more patchily distributed, although relatively common where they occur. In addition, the barbastelle is classified by the IUCN as threatened (vulnerable) at the European scale and is specially protected under Annex II of the Habitats Directive.

Activity recorded along the southern hedgerow by the static detector was relatively low. During the transect surveys the majority of activity was along the northern woodland edge, with some use of the southern hedgerow and just a single record of a common pipistrelle from the open field habitat. The very low activity across the open field habitats, and the otherwise low activity levels are consistent with our *a-priori* prediction that the site is generally of low quality for bats.

The proposed development will involve the loss of much of the grassland, as well as short sections of the southern hedgerow, to facilitate vehicular access. Without mitigation, the predicted impacts of the development proposals on foraging and commuting bats are minor and negative, particularly as external lighting from the proposed development could result in impacts to foraging and commuting bats using the woodland edge. The two proposed breaches along the southern hedgerow (c.32m loss in total) could disrupt bat dispersal to a degree. The loss of the grassland habitat is predicted to be negligible for bats.

Recommended mitigation through sensitive external lighting design and significant wildflower grassland, hedgerow (to link the southern hedgerow with the woodland to the north) and scrub

planting, is predicted to result in an overall minor enhancement of the site for commuting and foraging bats.

We also recommend enhancing the site for bats by providing at least 21 new bat roosting features (equally 100% of the total new units proposed), installed on trees or integrated into new buildings.

1. Introduction

1.1 Aims of Study

A Preliminary Ecology Appraisal (PEA) survey of the site, undertaken in 2022 (Denny Ecology 2023), noted the presence of suitable bat foraging and commuting habitat on the site and recommended that a bat activity survey be undertaken, so that any predicted impacts of the proposed development can be effectively mitigated and/or compensated using the mitigation hierarchy.

Denny Ecology was commissioned to undertake a bat activity survey of suitable habitat within the planned development area (from hereon referred to as 'the site'). The aim of the survey was to determine the relative importance of the site for bats overall, including the number and importance of the species present, and to identify any features or habitats of importance.

This survey's aims were to assess the site for bat foraging and commuting value only. This report details the methods and results of this study and assesses the results in relation to the proposed development's potential effects on bats.

1.2 Site Location & Description

The site is located on the northwest edge of the village of Reed in Hertfordshire, approximately 4km south of the town centre of Royston (at OS grid ref TL357363; w3w: deeper.remission.doormat). It is situated immediately east of the A10 trunk road (London Road) and north of Blacksmith's Lane. The site location is shown in the accompanying Preliminary Ecological Appraisal (PEA) report (Denny Ecology 2023).

It extends to approximately 1.08ha in area and comprises a rectangular grass field bounded by woodland along the northern boundary, the A10 road to the west, a mature hedgerow and Blacksmith's Lane to the south, and a row of houses with gardens to the east. There are no buildings on the site. The site sits within a semi-rural landscape, with scattered housing forming the village to the east and south, associated with intervening pasture fields. The farmland beyond is predominantly arable with scattered hedgerows and small woodlands.

1.4 Proposed Works

The proposal is to build new residential housing. Current draft layout plans are for 21 new residential housing units, with four new vehicle entrances feeding off Blacksmith's Lane to the south, serving different sections of the new development. The development layout plan is shown in the accompanying Preliminary Ecological Appraisal (PEA) report.

1.5 Legislative and Planning Background

All bat species in England and their places of shelter and protection (their roost sites) are protected from disturbance, killing or injuring, damage or destruction under the Wildlife & Countryside Act 1981 (as amended) and the Habitats Directive 2019. There are also associated planning policies that afford some protection (e.g. those assuming against bat habitat development impacts). In

addition, four species of bat in the UK, including one recorded during this survey (barbastelle), are specially protected under Annex II of the Habitats Regulations. This confers greater protection to important areas used by these species when associated with nearby European Protected Sites designated for them.

2. Methods

The PEA report (Denny Ecology 2023) assessed the site as having potential for foraging and commuting bats. However, the proximity of the adjacent A10 trunk road severs the site from land to the west, and there is general discontinuity with suitable habitat surrounding the site. Additionally, the site was under arable cultivation until 2002, such that the current grassland has a relatively low plant diversity and is likely of limited value for foraging bats. Following standard recommendations (Collins 2016), prior to survey, the site was assigned overall low suitability for foraging and commuting bats, with value assigned mainly because of the presence of the mature southern boundary hedgerow and the adjacent woodland to the north,

The author, who is a licensed bat surveyor (Natural England class 2 licence registration number: 2015-14774-CLS) and has been carrying out bat surveys since 2003, coordinated all bat surveys.

Surveys in 2022 were undertaken by ecologists Rebecca Cattell and Stefan Taylor, who are experienced bat surveyors. Surveys in 2024 were undertaken by ecologists Hayley Farnell and Ian Booker, who are experienced bat surveyors, with Hayley holding a Natural England bat survey licence. All surveys followed standard methodology guidelines (Collins 2016 & 2023), with a modification that transect/nighttime walkover surveys were not undertaken in 2024, as it was felt extending the static survey would be more beneficial. In particular, barbastelle bats are best detected using static detectors, as they can be fast fliers, commuting long distances, and are often missed on snapshot transect surveys. As barbastelle bats were recorded in 2022, we wanted to ensure a greater static survey coverage, both temporally and spatially.

2.1 Transect surveys

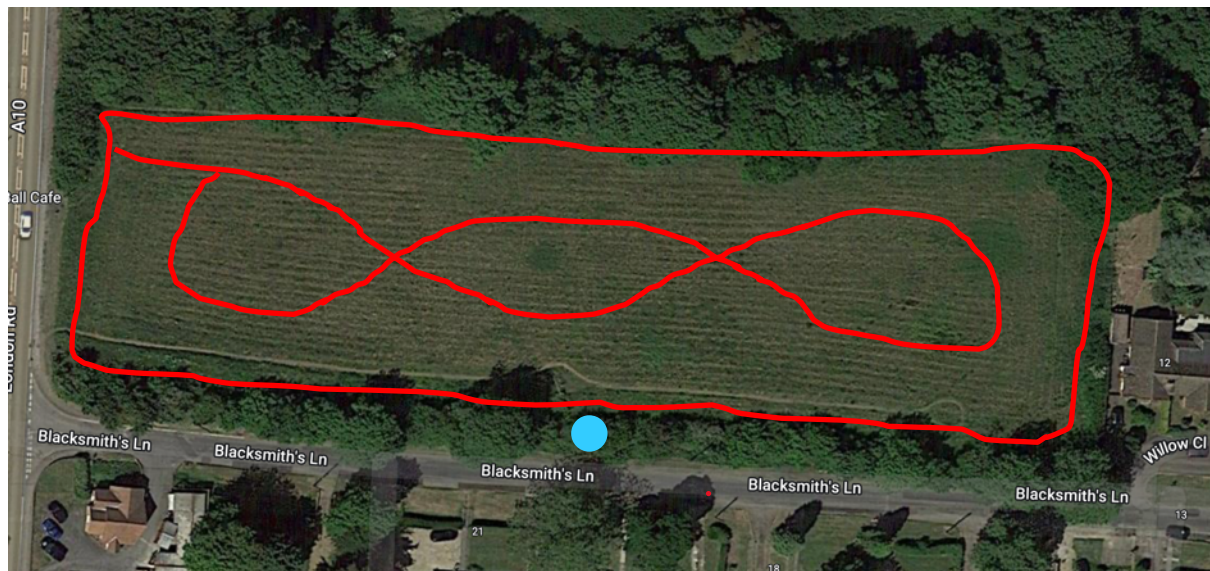
In the 2022 surveys, a transect was walked around the whole site, repeating the route twice on each of two evenings: one in the summer and autumn seasons (August & October 2022) respectively. The transect route followed the site boundaries and an inner route weaving across the field to cover more open field habitats, as approximately shown in Figure 1. The start and end points of the transect were at the main southwest corner of the site, forming the junction between Blacksmiths Lane and the A10 road junction. As two surveyors were present on each survey visit, each walked the transect route separately, in opposite directions to eliminate spatio-temporal sampling bias relative to sunset time, whilst still being in constant radio contact for health and safety purposes.

Visit dates, times and weather conditions are presented in Table 1. Surveys were started at or within 15 minutes before sunset on each visit and continued for between 1.5 and 2 hours after sunset. Bat detectors used were two Wildlife Acoustics EMT2 Pro. Bat call analysis was performed post-hoc, using the software package Kaleidoscope (Wildlife Acoustics).

Table 1. Dates, times and survey weather conditions of transect survey visits

Season	Date	Sunset	Start	Finish	Weather
Summer	22/08/22	20:08	20:08	22:08	Cloud 0/8, 17°C, dry, wind: BS force 2
Autumn	13/10/22	18:10	17:55	19:40	Cloud 6/8, 14°C, dry, wind: calm

Figure 1. Location of static bat detector (blue circle) and approximate inner and outer transect routes (red line)



2.2 Static surveys

Collins (2016) recommended undertaking static surveys of a single location in the three active bat seasons (spring, summer and autumn), recording for at least five nights in each season. We followed this protocol for the summer and autumn seasons, but the spring season was not temporally available to us.

An autonomous-recording static bat detector (Wildlife Acoustics SM2 BAT+) was deployed midway along the southern boundary hedgerow, as marked in Figure 1. This location was chosen both as it provided suitable bat foraging and commuting habitat, and because the proposed development will breach the hedgerow in two places, thereby having potential to impact any bat usage. Deployment dates were: 17-28 August (12 nights) and 20 September - 2 October (13 nights) 2022.

Weather conditions were generally good during these monitoring periods, with light winds and low rainfall. Temperatures were consistently at, or above the long-term average (11°C) in the summer (average 13.8°C). Whereas, in the autumn they varied widely (between $3\text{--}13^{\circ}\text{C}$) between nights, with an average (7.8°C) marginally below the long-term average (9°C).

The updated guidelines (Collins 2023) recommend a similar static detector methodology to the 2016 version, but as outlined above, we wanted to sample a greater area. We therefore deployed four detectors, two on each of the north and south boundaries, in both the spring and autumn periods in 2024. Full spectrum static recorders were used across five nights at the end of May, and seven nights in mid October. The locations of each detector are shown in Figure 1a.

Static detectors were programmed to record each night, starting 30 minutes before sunset and ending at sunrise, as is standard practice. This resulted in an average overnight monitoring period of 20:26-05:20 hour in the spring, 19:40-06:25 hours in summer, 18:17-07:24 hours in September and 17:34-07:56 hours in October.

Figure 1a. Locations of static bat detectors deployed in spring and autumn 2024



2.3 Call sonogram analysis

Call data were recorded in full spectrum and were viewed and analysed visually using Kaleidoscope software (Wildlife Acoustics 2019). Sound recordings are split into files a maximum length of 15 or 30 seconds. A vast majority of these files are much less than 15 seconds, so in effect each sound file can be equated to a bat pass at the detector location, the number of which can be used as a proxy measure of bat activity intensity.

In some circumstances recorded passes constitute a single individual commuting or foraging for a very short time at the location. A relatively continuous sequence of files can be generated either from individual bats repeatedly passing the location back and forth, whilst foraging, or from a stream of different individuals passing the detector and moving on. The analysis does not automatically distinguish between these types of passes as individual bats of the same species cannot be identified.

For the transect surveys, the density of recorded bat calls/passes was used as a proxy for habitat use across the site. However, bat call analysis does not allow individual bats to be identified, so unless more than one individual can be elucidated from the sequence of calls within a single sound file, the level of activity cannot be related to individual bat density, but rather to a relative index of use.

3. Results

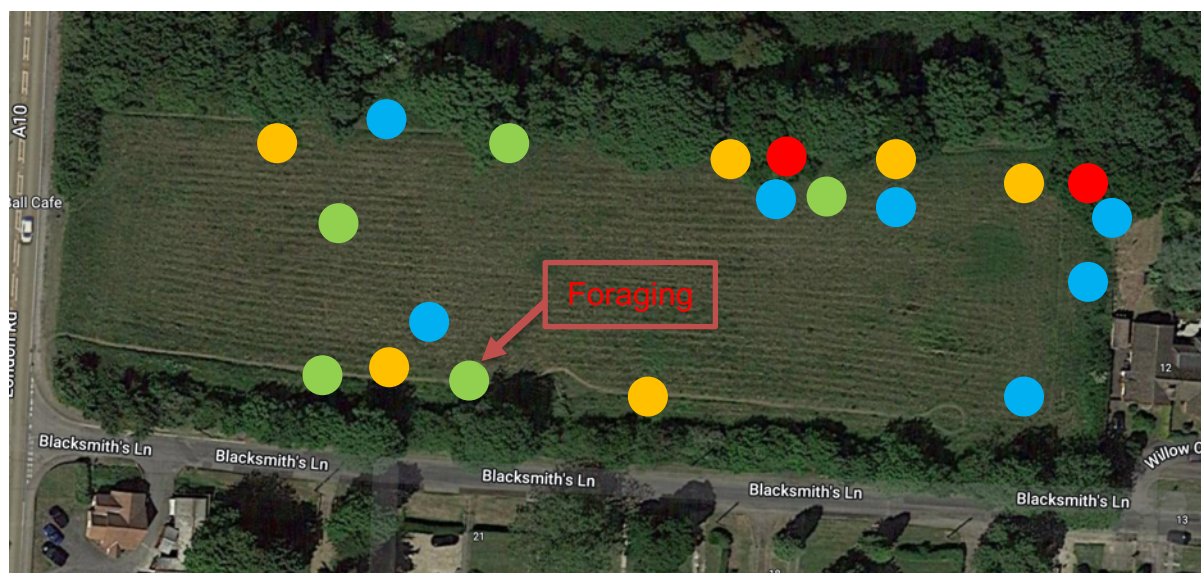
A total of eight bat species were recorded during the surveys: common pipistrelle, soprano pipistrelle, noctule, Daubenton's bat, brown long-eared, Leisler's, serotine and barbastelle, with three of these recorded during the transect surveys, and four during the static surveys in 2022, and all eight recorded in 2024.

3.1 Transect surveys

During the summer transect survey two species of bat were recorded, five passes of common pipistrelle and seven passes of noctule. Figure 2 shows the location of these recorded passes. Most of the noctules were recorded towards the start of the survey, and probably relate to high flying individuals moving between roosts and feeding grounds. One of the common pipistrelle records related to a foraging individual (feeding call heard) using the southern boundary hedgerow as shown in Figure 2.

During the autumn transect survey two species of bat were recorded, with six passes of common pipistrelle (two along the southern hedgerow, and four along the northern woodland edge) and two passes of barbastelle along the woodland edge near the northeast corner. Figure 2 shows the location of these recorded passes.

Figure 2. Locations of bat passes recorded during the transect survey. Red = barbastelle (recorded in autumn only); yellow = common pipistrelle recorded in the autumn; green = pipistrelle recorded in the summer; blue = noctules (recorded in summer only).



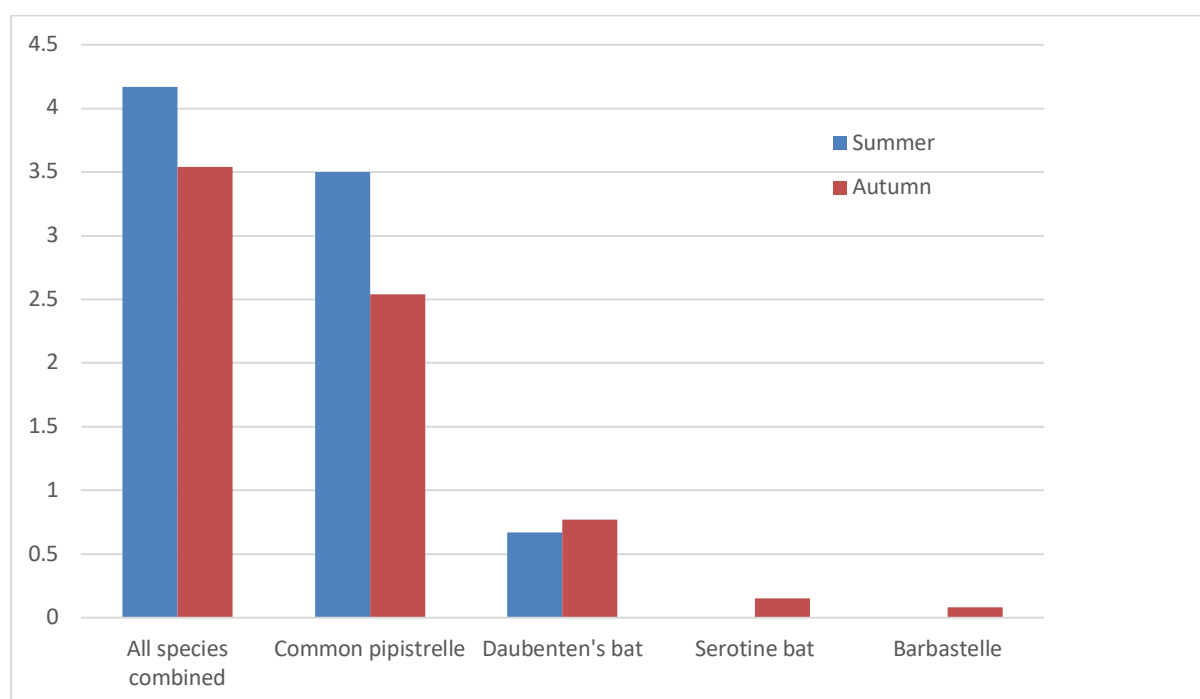
3.2 Static surveys

Figure 3 plots the number of passes per night of monitoring during the static survey in 2022, during the summer and autumn seasons, for each species separately and all species combined.

During the summer, two species of bat were recorded along the southern hedgerow during the static surveys: common pipistrelle and Daubenton's bat, with the former being recorded five times more frequently than the latter.

During autumn 2022, four species of bat were recorded during the static surveys: common pipistrelle, Daubenton's bat, barbastelle and serotine. Common pipistrelle bats were recorded slightly less frequently than in the summer, whilst Daubenton's bats were recorded slightly more frequently, but numbers were comparatively similar between seasons. A single barbastelle bat was recorded, whilst serotine bat was recorded twice on the same night, but spread apart by four hours, so it is difficult to determine whether this was the same or a different individual.

Figure 3. Number of bat passes recorded per night during the static surveys, split by species and season



During the 2024 surveys, common pipistrelle was still the most common species by far, with all other species recorded only occasionally. Barbastelle was recorded by static C (north-west boundary) in spring with single passes on 4 of the 5 monitoring nights, and static D (south-east boundary) in autumn with single passes on 4 of the 7 monitoring nights.

3.3 Summary of combined results

The transect survey results help elucidate the spatial pattern of bat use across the site in 2022. Only a single bat record, of a common pipistrelle, was recorded away from the field boundaries over the grassland habitat, and this is likely to relate to a commuting rather than foraging individual (brief, non-feeding call). The majority of records during the transect survey came from the northern boundary woodland edge, including two records of barbastelle. These were concentrated towards the northeast site corner. Interestingly, in 2024, barbastelle records came from the north-west corner (spring) and south-east corner (autumn), involving a single pass on between 80-57% of the sampled nights, respectively.

4. Assessment and Conclusions

4.1 Survey limitations

No significant limitations to the surveys were noted, with all seasons monitored when spread across both years.

4.2 Duration of validity

Changes in site habitats and the ability of the site to support bats may alter over time. Our professional judgement and knowledge of the site and bat species can be used to determine the period for which the undertaken surveys and this appraisal remain valid. The recent loss of the woodland to the north of the Site may have reduced the suitability of the Site for bats. However, it will not increase the suitability of the Site, so applying the precautionary principle, the existing surveys are considered appropriate for use as a baseline for the planning application. Following standard protocol (CIEEM guidelines), this bat survey report and associated surveys are valid for two years, i.e. until summer 2026.

4.3 Evaluation – bat activity levels

Bat activity levels

To assess the importance of the site for bat use, we compared our static survey results from 2022, specifically the number of bat passes per night, to the largest set of bat activity data collected in the UK, by the Norfolk Bat Survey (<https://www.batsurvey.org>). Like this site, Norfolk is in the East of England region, and the Norfolk survey deployed the same type of detector (SM2BAT+) in locations along hedgerows, tree lines and water features, where bats are considered more likely to concentrate, similar to our placement along the southern hedgerow. We restricted our comparison with the year of highest recording effort in the Norfolk Survey (2015), when 1,737 nights were sampled across 1,413 sites. Note that 2022 data were not available from the Norfolk Survey. Unfortunately, the Norfolk Survey data were no longer available for comparison in 2024, so comparisons for the other three bat species are not possible.

In August and September 2015, an average of 191.5 and 145.4 common pipistrelle passes were recorded per night in Norfolk respectively, compared to 3.5 and 2.5 per night on this site – between one and two orders of magnitude higher. As described above, our transect survey results indicate that the northern boundary woodland is used a little more by common pipistrelles than the southern hedgerow, but still at a much lower intensity than the average for the Norfolk Survey.

Fewer Daubenton's bats were recorded in the Norfolk Survey, with 6.7 and 7.8 passes per night in August and September respectively. But this is still an order of magnitude higher than for this site (0.7 and 0.8 respectively). Serotine bats were recorded at a rate of 4.2 passes per night in Norfolk, again over ten times greater than the 0.2 per night on this site. Barbastelle was recorded in Norfolk at approximately 10 times the intensity (average 3.9 passes per night) compared to this site (0.4 passes).

This comparison shows that the southern hedgerow, whilst used by seven bat species, is used at a far lower intensity than would be expected for a mature rural hedgerow in the East of England.

As mentioned earlier in this report, this may be due to the proximity of the busy A10 trunk road, which probably has the combined effect of creating noise and light disturbance and truncating the linear features leading to and from the site, thereby disrupting bat commuting/dispersal routes.

Barbastelle use the northeast, northwest and southeast corners of the site during different surveys/seasons, but at a much lower intensity than the Norfolk Survey.

We therefore assign Parish value to the Site as a whole for its bat use, but for barbastelle specifically we consider it is on the cusp of Parish and District value, given the national rarity and additional protection afforded this species.

Given the lack of evidence of use of the grassland in-field habitat by bats during the transect surveys, we consider the grassland to have negligible value for bats. The loss of this habitat is considered unlikely to have a significant impact on bats.

4.4 Impact Assessment without mitigation

Without mitigation, the proposed development has the potential to impact bat habitats in the following two ways:

1. Lighting disturbance, from external lights during the development and operational phases, of the southern hedgerow and the northern woodland edge, which could both reduce the insect prey available and directly discourage use by light-intolerant bat species. Given the presence of barbastelle bats, it is considered this has potential for moderate, negative and long-term impacts on bat activity across the site without mitigation.
2. Severance of the southern hedgerow in total 32m wide, in two locations (east 13.5m, west 18.5m), to facilitate vehicle access, is likely to interrupt bat commuting flight lines. Note that barbastelle was only recorded to the east of these breaches. Given the presence of low numbers of four-five bat species using this hedgerow, to the west of the easternmost breach, it is considered this has potential for minor, negative and long-term impacts on bat activity on the site without mitigation.

4.5 Recommended mitigation and enhancements

Breaching of the southern hedgerow

To facilitate vehicular access to the proposed development, two access roads are proposed off Blacksmiths Lane to the south. These breaches avoid trees. Their combined width is 32m (13.5m and 18.5m), wide enough to disrupt bat movement and impact the existing function of the hedgerow as a bat dispersal and feeding corridor. However, this impact is predicted to be minor, as these survey results show the hedgerow to be of low value for commuting and foraging bats, probably because the hedgerow ends adjacent to the A10 at its western end, so does not provide continuity for bat dispersal through the landscape. With the proposed planting of new species-rich native hedgerows elsewhere around the developed site, hedgerow length will not only increase with the development, but dispersal corridors will be improved across the Site, resulting in an overall positive impact in the longer term to offset the predicted residual short-term negative impacts.

Mitigating light disturbance impacts

As bats are sensitive to artificial lighting, we recommend external lighting be minimised: low level LED and down-pointing lighting should be used sparingly, and on timers/movement sensors where practical. More detailed recommended lighting parameters are presented in Appendix 1.

Creation of wildflower grassland, traditional orchard, flood attenuation basin and tree/hedgerow planting

An area of greenspace is proposed to the north and the south of the developed area, much of which will be enhanced, including enhancement of wildflower grassland and planting of traditional orchard and trees.

These measures will result in the likelihood of no residual impacts of the development on foraging or commuting bats.

In line with section 41 of the NERC Act (2006), and the National Planning Policy Framework (NPPF) (2024), it is also recommended that the site be enhanced for bats. This can be done by providing extra roosting opportunities for bats, post-development. We recommend that at least 21 (100% of the total of new housing units) bat roost features are installed on the site, both on the mature trees and as integrated features within the new buildings. These should be located close to existing/proposed green corridors, and away from artificial light-spill to improve their chances of being used.

Formal planting beds

Formal garden/landscaping planting can play an important role in attracting pollinating and other invertebrates, which in turn attract birds, bats, and other insectivorous species. The soft landscaping scheme, in the more formal landscaped areas, has focussed on plant varieties attractive to pollinators and bats in turn.

This provision should increase the numbers of bats able to use the retained and new habitats, including new gardens. We predict this will result in an increased use of the site by bats over baseline conditions, and result in a small overall net gain in bat value.

Assuming all recommended mitigation is implemented, the proposed development should result in a neutral impact on bats. Should all recommended enhancement measures be implemented, it will result in an overall minor positive enhancement for bats, in compliance with the NPPF.

5. References

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6. Appendix 1. Generic bat-sensitive external lighting guidance

Excessive lighting can disturb foraging, commuting and roosting bats (Stone 2009). To minimise such disturbance, it is recommended that external lighting be kept to a minimum and designed sympathetically. Lights should be placed to avoid direct illumination of the existing trees and hedgerows, and security lighting should be operated on short timers. Lighting during the operational phase should also be kept to a minimum as summarised below. These follow mitigation strategies recommended in the Bat Conservation Trust and other referenced sources:

The following design principles draw on advice presented in the Institute for Lighting Professionals (ILP 2023) guidance note GN08/23, and Landscape and Urban Design for Bats and Biodiversity (Gunnell *et al.* 2012):

- Space lights as widely as possible (Fure 2006);
- Keep height of lighting columns as low as possible – low level bollard lights are best;
- Keep light spread below the horizontal, using cowls or other shielding devices as well as directional beams;
- All luminaires should lack UV elements when manufactured. Metal halide, 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.
- White light from LEDs is usually produced by emitting a combination of different wavelength colours - if possible, use narrow spectrum lamps emitting a peak wavelength higher than 550nm to avoid the component of light most disturbing to bats (Stone 2009);
- Keep brightness as low as possible and below 3 lux (1 lux preferable) at ground level;
- Keep lights from illuminating identified potential bat features, namely trees and other boundary vegetation, and proposed hedgerows and bat roost features;
- Reduce illumination time by using lights with movement sensor or time switches.