GHR DEVELOPMENTS LTD

TREDEGAR JUNCTION HOTEL, PONTLLANFRAITH

PRELIMINARY ECOLOGICAL APPRAISAL

August 2025

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SUMMARY

Soltys Brewster Ecology were instructed by GHR Developments Ltd to undertake a Preliminary Ecological Appraisal of a parcel of land, located directly west of Sir Ivor's Road within the centre of the village of Pontllanfraith within Caerphilly County Borough. The site is proposed for redevelopment into residential housing comprising a single plot containing multiple residential units, including associated landscaping, drainage infrastructure, access roads, and other supporting amenities. The proposed scheme requires the demolition of an existing disused building at the site (former Tredegar Junction Hotel), as well as the removal of vegetation growing within the site boundary. A survey to establish the ecological baseline conditions and identify any ecological constraints or opportunities at the site is therefore required to inform a planning application.

Desk-based consultation confirmed that the proposed site does not hold a designation for nature conservation. 2no. statutory designations are located within 1km of the site, with the overlapping Memorial Park Meadows Pontllanfraith SSSI and LNR located approx. 443m north of the site. However, these sites will not be impacted by the proposed scheme and subsequently were not considered of ecological relevance. The desk study also identified 7no. non-statutory designated sites within 1km, the closest being the River Sirhowy SINC located approx. 124m to the east. The proposed site sits at a higher elevation to the River Sirhowy and therefore potential hydrological connectivity between the site and river cannot be ruled out although there is no risk of any direct impacts. The remaining 6no. non-statutory designations will not be impacted by the proposed scheme and were not regarded as ecologically relevant. A total of 18no. Priority Areas were also identified within 1km of the site, none of which are expected to be adversely affected by the proposed scheme. Records of protected species within 1km (extended to 2km for bats) included at least 7no. species of foraging/commuting bats, 8no. confirmed bat roosts, a range of protected/priority bird and invertebrate species, Otter, Badger, Hedgehog, and common amphibian and reptile species such as Slow-worm, Common Frog, Common Toad, and Palmate Newt. Previous ecological surveys at the site by WWE in 2021 identified the habitats at the site to be suitable for common reptiles and nesting birds.

An Extended Phase 1 Habitat survey conducted in August 2025 identified a limited range of habitats at the site. The site is predominantly composed of bare ground, hardstanding and a large disused building, with a small area of poor semi-improved grassland and scattered scrub present at the north-west of the site. No priority habitats as listed under the UK BAP/Section 7 List in Wales are located within or adjacent to the site. A majority of the site consists of bare ground and hardstanding of little (if any) ecological value. However, the semi-improved grassland and scattered scrub are considered of ecological value in the context of the site only but

are common and widespread in the surrounding landscape. Furthermore, the disused building at the site (former Tredegar Junction Hotel) was assessed as having a **Moderate Potential** to support roosting bats.

The proposed development will require the demolition of the building within the site boundary, as well as the removal of the small area of poor semi-improved grassland and scattered scrub. Further surveying of the building will be required to determine the presence or (likely) absence of roosting bats prior to its demolition. Furthermore, a number of avoidance, mitigation, and enhancement measures are recommended to minimise impacts to existing ecological features and wildlife at the site. These include (but are not limited to) (i) building demolition and vegetation removal to avoid bird season and be undertaken over the winter period (between September – February), (ii) implementation of a two-stage vegetation clearance methodology to safeguard common herpetofauna and small mammals during vegetation removal, (iii) design of site lighting to minimise artificial light spill onto retained or created boundary features to limit impacts to foraging/commuting bats and other nocturnal wildlife, (iv) environmental management plan prepared for the construction and operational phases of the proposed scheme to limit risk to the River Sirhowy SINC and other retained/adjacent habitats, (v) implementation of hedgehog access points at 15m intervals into all permanent future fencing associated with the operational phase of the proposed scheme, and (vi) inclusion of bat and bird boxes onto new buildings.

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1.0 INTRODUCTION

1.1 Soltys Brewster Ecology were instructed by GHR Developments Ltd to undertake a Preliminary Ecological Appraisal (PEA) of a parcel of land, centrally located at OS Grid Reference ST 17833 95591, located directly west of Sir Ivor's Road within the centre of the village of Pontllanfraith within Caerphilly County Borough (hereafter referred to as 'the site'). The site is proposed for redevelopment into residential housing comprising a single plot containing multiple residential units, including associated landscaping, drainage infrastructure, access roads, and other supporting amenities (Appendix I). The proposed scheme requires the demolition of an existing disused building at the site (former Tredegar Junction Hotel), as well as the removal of vegetation growing within the site boundary. A survey to establish the ecological baseline conditions and identify any ecological constraints or opportunities at the site is therefore required to inform a planning application.

1.2 The site, approx. 0.19ha in size, supports a limited range of habitat types, with the majority of the area comprising a derelict building, hardstanding, and bare ground, with little vegetation located within the site boundary. The site is bordered by roads to the west and east, residential properties to the south, and small commercial units to the north. The wider area surrounding the site is predominantly suburban in character, with further residential housing and commercial units to the south and east, a narrow parcel of woodland to the north, and the wooded corridor of the River Sirhowy to the east.

1.3 The current report presents the findings of an ecological desk study and Extended Phase 1 Habitat survey undertaken at the site in August 2025. The current report describes the existing ecological conditions as well as identifying any potential ecological constraints/opportunities associated with the proposed development at the site.

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2.0 METHODOLOGY

2.1 In order to establish the baseline ecological conditions at the site and adjacent habitats, a combination of desk-based consultation and Extended Phase 1 Habitat Survey were undertaken in July 2025.

Desk study

2.2 The desk study involved consultation with the South East Wales Biodiversity Records Centre (SEWBReC) to identify any records of rare, protected or notable flora and fauna at the site and within a radius of 1km (extended to 2km for bats as per the Bat Conservation Trust's good practice guidelines) extending from the central point of the site (Appendix II). The search criteria also included information relating to the location and citation details (where available) for any sites designated for their nature conservation interest such as Sites of Special Scientific Interest (SSSIs) or Sites of Importance for Nature Conservation (SINCs).

2.3 An evaluation of previous ecological surveys relevant to the proposed development has been undertaken as part of the desk study. This included a review of a Biodiversity Method Statement produced for the site by Wildwood Ecology (WWE) in 2021 (WWE, 2021).

Extended Phase 1 Habitat Survey

2.4 The fieldwork was undertaken on 6th August 2025 by a suitably experienced ecologist[1] and followed standard Phase 1 Habitat Survey protocol (JNCC, 2010 & Institute of Environmental Assessment, 1995). All habitats within and immediately adjacent to the site boundaries, were classified and mapped as accurately as possible. Habitats considered to have potential to support rare, protected or otherwise notable species of flora and fauna were noted, as were any direct signs of these species (e.g. Eurasian Badger *Meles meles* setts and dung-pits). Incidental observations of birds on or flying over the site were also recorded and any incidence of invasive weed species (e.g. Japanese knotweed *Fallopia japonica*) noted.

2.5 A map of habitats was produced and if required, target notes were used to identify features of ecological interest. Where possible, habitats were cross-referenced to any relevant important UK or Wales priority habitats as identified under Section 7 of the Environment Act (Wales) 2016.

[1] Associate Member of the Chartered Institute of Ecology & Environmental Management (ACIEEM) with experience in protected species and habitat surveys.

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2.6 During the field survey any trees found within or directly adjacent to the site boundaries were assessed for their potential to support roosting bats and were categorised in relation to the bat roosting features (BCT, 2023). The categories are as follows:

- **PRF-I –** Potential Roost Feature (PRF) is only suitable for individual bats or very small numbers of bats either due to their size or lack of suitable surrounding habitats**;**
- **PRF-M** - PRF is suitable for multiple bats and may therefore be used by a maternity colony;
- **Negligible** – Negligible habitat features on site likely to be used by roosting bat.

External Building Inspection

2.7 As part of the Extended Phase 1 Habitat survey, an external inspection of any existing buildings/structures present within or immediately adjacent to the site boundaries was also completed. The focus of the building inspection was to establish the likelihood that the buildings could be used by roosting bats (or nesting birds) and aimed to identify:

- If bats are, or have been, present within the building and if so, which species are present;
- The type of roost (e.g. maternity roost, day roost used by males or non-breeding females, feeding perch, night roost, mating roost, transitional roost, hibernaculum);
- How bats use the building (e.g. location of exit and entrance points to potential roosts).

2.8 The inspection of the buildings involved the use of binoculars and a hand torch to identify possible access/entry points into the structures and any evidence of use by bats such as droppings, prey remains, staining etc. The buildings were assigned to the relevant categories listed below, as per latest guidelines published by the Bat Conservation Trust (BCT, 2023). An assessment of the buildings potential to support nesting birds was also undertaken.

- **Known or confirmed roost.**
- **High** - A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roosts, e.g. maternity or classic cool/stable hibernation site.
- **Moderate** – A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the categorisation described in this list is made irrespective of species conservation status, which is established after the presence is confirmed).

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- **Low** – A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity and not a classic cool/stable hibernation site but could be used by individual hibernating bats).
- **Negligible** – No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.
- **None** – No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/suitable shelter at all ground/underground levels).

Survey Constraints

2.9 The building at the site is in poor condition and therefore internal inspection was not possible due to health and safety concerns. As such, the building was only assessed externally during the site survey. However, this was not considered to adversely affect the overall appraisal of the site.

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3.0 RESULTS

Desk Study

SEWBReC Records

3.1 Consultation with SEWBReC confirmed that the proposed site does not hold a statutory designation for nature conservation. 2no. statutory designated sites are located within a 1km radius of the site, with the overlapping Memorial Park Meadows Pontllanfraith Site of Special Scientific Interest (SSSI) and Memorial Park Meadows Local Nature Reserve (LNR) located approx. 443m to the north. However, due to the absence of physical and hydrological connectivity, these designations are not considered to fall within the zone of influence of the proposed development and are not of ecological relevance to the proposed scheme. Summary plans to illustrate the SEWBReC records are included in Appendix II.

3.2 The desk study also identified 7no. non-statutory designated sites within 1km, the closest being the River Sirhowy Site of Importance for Nature Conservation (SINC) located approx. 124m to the east. The proposed site is situated at a higher elevation to the River Sirhowy. While existing urban development provides physical separation, potential hydrological connectivity between the site and the river cannot be ruled out. Consequently, the River Sirhowy SINC may lie within the zone of influence of the proposed development and could be vulnerable to indirect effects, particularly from sediment runoff associated with the construction of the proposed scheme. The remaining 6no. non-statutory designations within the search radius lack physical and hydrological connectivity to the proposed site. Therefore, these designations are not considered to fall within the zone of influence of the proposed development and are not regarded as ecologically relevant. A summary of designated sites within 1km of the proposed site is provided in Table 1 on the following page.

3.3 During the desk study, a number of Priority Areas were returned within a 1km radius of the proposed site (see Appendix II), with 12no. parcels of Ancient Semi Natural Woodland (ASNW), 5no. parcels of Restored Ancient Woodland Sites (RAWS), and 1no. Heathland and Grassland NRW Priority Area. None of which are located adjacent to the proposed site or are expected to be adversely affected by the proposed scheme.

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Table 1 – Summary of Statutory & non-statutory designated sites in local area

Site Name	Reason for Designation	Location/Distance from Site
Memorial Park Meadows Pontllanfraith SSSI	• Traditional hay meadows which support a rich wildflower assemblage including Lady's Mantle *Alchemilla mollis*, Bistort *Bistorta officinalis*, and Greater Burnet *Sanguisorba officinalis*. • Wetland habitats and a large standing waterbody known to support a range of amphibians, Odonata, and waterfowl.	Located approx. 443m north of the site.
Memorial Park Meadows LNR	• Traditional hay meadows. • Mosaic of grasslands, hedgerows, and wetland areas.	Located approx. 443m north of the site.
River Sirhowy SINC	• Supports populations of Bullhead *Cottus gobio* and Brown Trout *Salmo trutta*. • Used as regular migratory route by Atlantic Salmon *Salmo Salar* and anadromous Brown Trout. • Supports a breeding population of Otter *Lutra lutra*.	Located approx. 124m east of the site.
Penllwyn Woodland SINC	• Semi-natural broadleaved woodland. • Species-rich marshy grassland containing at least 12 indicator species.	Located approx. 434m north-west of the site.
Coedcae Newydd, Gelligroes SINC	• Semi-natural broadleaved woodland.	Located approx. 595m south-east of the site.
Enterprise Way Grasslands,	• Semi-natural broadleaved woodland.	Located approx. 843m north-east of the site.

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Pontllanfraith SINC	• Marshy grassland containing at least 12 indicator species. • Neutral grassland containing at least 8 indicator species. • Post-industrial land containing at least 20 indicator species.	
Nant yr Odyn, East of Pontllanfraith SINC	• Semi-natural broadleaved woodland. • Flowing water (Nant yr Odyn).	Located approx. 885m south-east of the site
Heol-Ddu Woodlands, Wyllie SINC	• Semi-natural broadleaved woodland. • Marshy grassland containing at least 12 indicator species.	Located approx. 928m south-west of the site.
Glan-Brynar Woodlands, Pentwynmawr SINC	• Semi-natural broadleaved woodland. • Marshy grassland / flush containing at least 12 indicator species.	Located approx. 983m north-east of the site.

3.4 The desk study also revealed a number of protected/priority species records within the local area. This included foraging and commuting bats recorded within a 2km radius of the site, including Daubenton's Bat *Myotis daubentonii*, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Nathusius's Pipistrelle *Pipistrellus nathusii*, Noctule *Nyctalus noctule*, Brown Long-eared Bat *Plecotus auritus*, Lesser Horseshoe Bat *Rhinolophus hipposideros*, unknown Myotis *Myotis sp.,* unknown Pipistrelle *Pipistrellus sp., and* unknown bat *Chiroptera*. A total of 8no. confirmed bat roosts are located within 2km of the search radius, with the nearest record belonging to a multispecies roost of Noctule and Common Pipistrelle located approx. 300m from the site.

3.5 Other priority/protected mammal species found within the 1km search radius include 9no. records of Otter *Luta lutra* (nearest record approx. 225m from the site), 1no. record of Badger *Meles meles* (approx. 660m from the site), and 25no. records of Hedgehog *Erinaceus europaeus* (nearest record approx. 93m from the site).

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3.6 Records for a single reptile species was returned via the 1km search undertaken, with 6no. records of Slow-worm *Anguis fragilis*, although none related to the site or immediately adjacent areas. In addition, a small number of records for amphibian species were returned, with 3no. records of Common Frog *Rana* temporaria, 1no. record of Common Toad *Bufo bufo*, and 2no. records of Palmate Newt *Lissotriton helveticus* within 1km of the site boundary. No records of Great Crested Newt *Triturus cristatus* were returned within 2km of the site.

3.7 The desk study identified a small number of bird species listed under Schedule 1 of the Wildlife & Countryside Act (1981) (as amended) found within 1km of the site, including Goshawk *Accipiter gentilis*, Kingfisher *Alcedo atthis*, Cetti's Warbler *Cettia cetti*, Marsh Harrier *Circus aeruginosus*, Merlin *Falco columbarius*, Peregrine *Falco peregrinus*, Crossbill *Loxia curvirostra*, Red Kite *Milvus milvus*, Whimbrel *Numenius phaeopus*, Redwing *Turdus iliacus*, and Fieldfare *Turdus pilaris*. The data search also included a moderate list of Priority bird species listed under Section 7 of the Environmental Act (Wales) 2016 within 1km of the site, including Lesser Redpoll *Acanthis cabaret*, Tree Pipit *Anthus trivialis*, Black-headed Gull *Chroicocephalus ridibundus*, Cuckoo *Cuculus canorus*, Reed Bunting *Emberiza schoeniclus*, Kestrel *Falco tinnunculus*, Pied Flycatcher *Ficedula hypoleuca*, Herring Gull *Larus argentatus*, Linnet *Linaria cannabina*, Yellow Wagtail *Motacilla flava*, Spotted Flycatcher *Muscicapa striata*, Curlew *Numenius arquata*, House Sparrow *Passer domesticus*, Dunnock *Prunella modularis*, Bullfinch *Pyrrhula pyrrhula*, Starling *Sturnus vulgaris*, and Song Thrush *Turdus philomelos*. Although not listed as a Priority Species under Schedule 1 / Section 7, 2no. records of nesting Swift *Apus apus* were returned within 80m of the site boundary.

3.8 The desk study identified a small list of priority or protected invertebrate species within 1km of the site, comprising records for several species of butterfly and moth that are listed as Priority insect species under Section 7 of the Environmental Act (Wales) 2016. Species of butterfly is limited to Dingy Skipper *Erynnis tages* and Small Blue *Cupido minimus*, with no records of Marsh Fritillary *Euphydryas aurinia* within 1km. Species of Moth include Forester *Adscita statices*, Latticed Heath *Chiasmia clathrate*, Ghost Moth *Hepialus humuli*, Shoulder-striped Wainscot *Leucania comma*, White Ermine *Spilosoma lubricipeda*, and Cinnabar *Tyria jacobaeae*. Furthermore, a single record for White-clawed Crayfish *Austropotamobius pallipes* was returned approx. 560m to the north-east of the site and associated with the River Sirhowy.

3.9 A number of invasive species listed under Schedule 9 of the Wildlife and Countryside Act (1981) (as amended) have been recorded within 1km of the site, including Canada Goose *Branta canadensis*, Cotoneaster *Cotoneaster sp.*, Himalayan Cotoneaster *Cotoneaster simonsii*, Montbretia *Crocosmia*

aurea x pottsii = C. x crocosmiiflora, Himalayan Balsam *Impatiens glandulifera*, Curly Waterweed *Lagarosiphon major*, Variegated Yellow Archangel *Lamiastrum galeobdolon subsp. Argentatum*, Signal Crayfish *Pacifastacus leniusculus*, Ring-necked Parakeet *Psittacula krameria*, Japanese Rose *Rosa rugosa*, and Grey Squirrel *Sciurus carolinensis*. No records were associated with the site or immediately adjacent areas.

Previous Surveys (2021)

3.10 A Biodiversity Method Statement produced for the site by WWE in 2021 (WWE, 2021) to discharge planning conditions 10 (reptile mitigation), 11 (bat roost provision), and 12 (bird nest provision) relating to a different planning consent (16/0607/FULL). A walkover survey was conducted at the site by WWE on 13/10/2021 and identified that the site predominantly consisted of grassland, scrub, and a disused building (former Tredegar Junction Hotel). Although no survey to determine the presence or likely absence of reptiles at the site was completed, the habitats at the site (grassland and scrub) were assessed as suitable for common reptiles at the time of the survey. Furthermore, the scrub and disused building at the site were assessed as suitable for nesting birds, with a large number of House Sparrow (30+) noted perched on the building and within bramble scrub at the time of the survey.

Extended Phase 1 Habitat Survey

3.11 The distribution and extent of habitats recorded at the proposed site in August 2025 are illustrated on the Extended Phase 1 Habitat Plan included within Appendix III. The Extended Phase 1 Habitat survey revealed that the site supports a limited range of habitats as described below. The habitats at the site have undergone substantial alteration since the 2021 walkover survey by WWE, with the majority of grassland and scrub habitat previously present at the site appearing to have been cleared. The low prevalence of early successional plant species within cleared areas indicates removal may have occurred relatively recently.

Poor Semi-improved Grassland

3.12 A narrow strip of poor semi-improved grassland is located at the north of the site. The grassland appears to be unmanaged and possess a maximum sward height of approx. 90cm. Species composition includes Perennial Ryegrass *Lolium perenne*, Red Fescue *Festuca rubra*, Creeping *Buttercup Ranunculus repens*, Broadleaved Dock *Rumex obtusifolius*, Dandelion *Taraxacum officinale agg.*, Fringed Willowherb *Epilobium ciliatum*, Herb Robert *Geranium robertianum*, Common Ivy *Hedera helix*, Common Nettle *Urtica dioica*, Common Nipplewort *Lapsana communis*, Goat's-beard *Tragopogon pratensis*, Ribwort Plantain *Plantago lanceolata*, Hemp Agrimony *Eupatorium cannabinum*, Common

Hogweed *Heracleum sphondylium*, Bramble *Rubus fruticosus*, Sycamore *Acer pseudoplatanus* (saplings), and Silver Moss *Bryum argenteum*.

Scattered Scrub

3.13 Small patches of scattered scrub are located within the strip of poor semi-improved grassland at the north of the site. The scrub appears to be unmanaged, naturally regenerated, and is dominated by Bramble and Sycamore (saplings), with Hemp Agrimony, Fringed Willowherb, Herb Robert, and Red Fescue present to a lesser extent.

Plate 1 – Strip of poor semi-improved grassland and scattered scrub at the north of the site.

Bare Ground

3.14 The vast majority of the site consists of two adjacent areas of bare ground. The bare ground appears to have been recently formed through the clearance of grassland and scrub habitat formerly present at the site. Occasional small remanent patches of vegetation and a low prevalence of early successional species are present, including Perennial Ryegrass, Red Fescue, Common Rush *Juncus effusus*, Cock's-foot *Dactylis glomerata*, Drooping Sedge *Carex pendula*, Creeping Buttercup, Broadleaf Plantain *Plantago major*, Ribwort Plantain, Bramble, Broadleaved Dock, Common Ivy, Dandelion, Herb Robert, Red Valerian *Valeriana rubra*, Common Hogweed, Fringed Willowherb, Goat's-beard, White Clover *Trifolium repens*, and Silver Moss.

Plate 2 – Bare ground with remnant vegetation at the site.

Buildings

3.15 A large disused building (TN 1 in Appendix III) is located at the south-west of the site and has been described in the building inspection section on the following page.

Fence

3.16 Fencing consisting of concrete posts and wire mesh, approx. 1.5m in height, is located along part of the northern and western site boundaries. Common Ivy and Bramble were noted growing occasionally on fences along the northern site boundary.

Walls

3.17 Stone walls, approx. 1.5m in height, are located along site boundaries and separate the two areas of bare ground at the site. Common Ivy, Bramble, and Silver Moss were noted growing occasionally on walls throughout the site.

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Hardstanding

3.18 Areas of hardstanding are located along the eastern and western boundaries of the site. Common plant species can be found growing occasionally from gaps/cracks within hardstanding surfaces, particularly at the west of the site, including Butterfly Bush *Buddleja davidii*, Goat's-beard, Dandelion, Wood Avens *Geum urbanum*, Common Nettle, Bramble, Hemp Agrimony, Lesser Burdock *Arctium minus*, Red Valerian, Sycamore (saplings), and Silver Moss.

Invasive Species

3.19 There were no species listed as invasive weeds under Schedule 9, Section 14 of the Wildlife and Countryside Act 1981 (as amended) identified within or immediately adjacent to the site boundary at the time of the survey.

Building Inspection

3.20 An external inspection was carried out on the building located at the site. The findings are summarised in the following sections, with additional information available in Appendix III.

Main Building

3.21 A large three-storey building (former Tredegar Junction Hotel) is located at the south-west of the site (TN 1 in Appendix III). The structure is primarily constructed of stone and brick, with a main pitched roof of slate tiles and 3no. smaller roofs associated with attached single-storey elements on the northern and western elevations. The building is in poor condition and appears to have been disused for several years, with most windows missing and a substantial section of the main roof absent. Smaller roofs at the single-storey elements are largely intact, although occasional missing slates may allow wildlife access to internal voids. Narrow linear gaps are present under the soffits on most elevations, with additional gaps in the fascia on the southern elevation. Damaged soffits along the western elevation provide access to an enclosed void within the soffits and fascia, and narrow gaps are present beneath a sign on the same elevation. Dense ivy growth along the northern and eastern elevations may conceal additional features. Various common plant species were observed growing from cracks and gaps in walls, particularly along the western elevation, including Butterfly Bush and Alder *Alnus glutinosa*.

3.22 A small group (5+) of Jackdaw *Corvus monedula* were observed using the large central gap in the main roof to access the roof void, potentially indicating active nesting within the building. However, no

evidence indicative of roosting bats was identified during the survey.

3.23 Overall, the building is assessed as having a **Moderate Potential** to support roosting bats. Furthermore, the building is likely to be used by nesting birds, particularly Jackdaw.

Plate 3 – Building located at the south-west of the site.

Fauna

3.24 During the course of the survey, a search of field signs for protected or notable species was undertaken and the potential of the habitats to support these species considered. In the context of this report, these species meet any of the following criteria:

- Species protected by British or international law;
- Priority species included on Section 7 (Environment Act, Wales);
- Nationally rare or nationally scarce species;
- Species of Conservation Concern (e.g. JNCC Red List, RSPB/BTO Red or Amber Lists);

Amphibians

3.25 There are no ponds or any other breeding habitats considered suitable for Great Crested Newt (GCN) within the site boundaries or within the immediately adjacent habitats. Furthermore, no records of GCN were returned within 2km of the site during the desk study. Therefore, the likelihood of GCN being present onsite is considered to be negligible and the presence of this species is not considered

further in this report.

3.26 The narrow strip of poor semi-improved grassland and scattered scrub at the north-west of the site is considered suitable for amphibians during their terrestrial phase, offering potential foraging and commuting opportunities for common species such as the Common Toad. However, the site is generally isolated from additional areas of suitable habitat by urban development and roads, and no standing waterbodies or watercourses suitable for amphibian breeding are located within or immediately adjacent to the site boundary. Furthermore, the bare ground and hardstanding that comprise a majority of the site area are considered unsuitable to support amphibian species due to a lack of appropriate cover habitat. Therefore, anything other than the presence of individual common amphibians around site margins is considered unlikely.

Badger

3.27 No evidence of Badger activity (including setts, latrines, or foraging signs) was recorded on site or within adjacent habitats during the survey. Furthermore, only a single record for Badger was returned within 1km of the site during the desk study (approx. 660m from the site). Although there is a variety of suitable habitat for Badger in the surrounding area, with various parcels of woodland and the wooded corridor of the River Sirhowy within 500m, the habitats on site are generally considered unsuitable for Badger. Furthermore, the site is isolated from larger, continuous areas of habitat required to support a Badger sett by urban development and roads. Therefore, the likelihood of Badger using the site is considered very low / negligible and no specific measures will be required regarding this species.

Bats

3.28 Although the majority of habitats on site are considered unsuitable to support foraging and commuting bats, the narrow strip of poor semi-improved grassland and scattered scrub at the north-west of the site may provide limited foraging opportunity for bat species and may contribute to habitat connectivity for bats in the local area, particularly between the woodland corridor to the north-west of the site and the wooded corridor of the River Sirhowy to the east.

3.29 There are no trees located within or immediately adjacent to the site boundary that are considered to be suitable to support roosting bats.

3.30 The disused building at the site (TN 1 in Appendix III) was assessed as having a **Moderate Potential** to support roosting bats due to the presence of a variety of Potential Roosting Features (PRFs). Further

surveying of this building to determine the presence or (likely) absence of roosting bats will be required as discussed in Section 5 of this report.

3.31 The desk study identified at least 7no. different bat species previously recorded within a 1km radius of the site. Although the site contains minimal foraging and commuting habitat features considered suitable for bat species, the site lacks significant exposure to artificial lighting and is situated between various woodland parcels and corridors located in the immediate surrounding area. Therefore, bat species may utilise the site as a dark corridor to commute between more suitable habitats (i.e. woodland parcels/corridors) in the surrounding area.

Birds

3.32 During the survey, a small group of Jackdaw (5+) were observed entering and exiting the building located at the south-west of the site (TN 1 in Appendix III), making use of a substantial gap in the central section of the main roof. Although this activity may be indicative of active nesting within the building, nesting could not be confirmed due to a lack of internal access into the building. The species present at the time of current survey would not be considered representative of the full range of species that the proposed site could potentially support (i.e., during the breeding season or over-wintering).

3.33 Due to a lack of suitable vegetation within the site boundary, the habitats at the site are considered unsuitable for arboreal (tree and shrub) nesting bird species. However, the building at the site is considered to provide suitable nesting opportunities for a variety of urban nesting bird species, including Swift, which have been recorded nesting within approx. 80m of the site boundary.

Hazel Dormouse

3.34 No evidence of Hazel Dormouse (e.g. Hazel nuts with characteristic signs of being gnawed by Dormouse) was identified at the time of the survey and there are no records within 1km of the site. Furthermore, there are no habitats within the site boundary that are considered suitable to support Dormouse and the site is isolated from more suitable habitats, such as larger areas of structurally diverse woodland, due to surrounding roads and residential development. Therefore, this species is not considered of relevance to the proposed works and is not considered further within this report.

Otter & Water Vole

3.35 The desk study returned 9no. records of Otter within 1km of the site, with the nearest record located approx. 225m from the site and associated with the River Sirhowy (located 124m to the east of the site

at its nearest point). Although the poor semi-improved grassland and scattered scrub at the site is considered to have some suitability for foraging and commuting otter, the site is generally isolated from major waterbodies and watercourses (i.e. River Sirhowy and its tributaries) by residential development and roads. Furthermore, the geographical positioning of the site makes it unlikely to be used for commuting between watercourses or as part of a foraging range. Therefore, Otter are not considered a constraint of the proposed development and no specific measures will be required regarding this species.

3.36 No records for Water Vole were returned within 1km of the site during the desk study and there are no aquatic or terrestrial habitats located within or immediately adjacent to the site boundaries considered suitable for Water Vole. Furthermore, the site is generally isolated from suitable habitats in the wider area (e.g. Sirhowy River and its tributaries) by residential development and roads. Therefore, the likelihood of Water Vole being present at the site is considered to be negligible and this species is not considered of ecological relevance to the proposed scheme.

Reptiles

3.37 The desk study revealed that only a small number of common reptiles have previously been recorded in the local area, with no records associated with the site or immediately adjacent habitats. A walkover survey conducted by WWE in 2021 (WWE, 2021) recorded a mosaic of scrub and semi-improved grassland at the site which was considered suitable for use by individual or small numbers of common reptiles. However, the current survey found the majority of semi-improved grassland and scrub area has been cleared and now consists of bare ground with little suitability to support reptile species, with only a small strip of suitable habitat (grassland and scattered scrub) present at the north-west of the site. Therefore, the habitats at the site in their current form (i.e. bare ground and hardstanding) are considered unsuitable for reptiles. However, individual common reptiles may still be present around site margins and within the small area of semi-improved grassland and scattered scrub at the north-west of the site.

Terrestrial Invertebrates

3.38 Although the hardstanding, buildings, and bare ground at the site are considered to be unsuitable to support a wide range of invertebrate species, the area of poor semi-improved grassland and scattered scrub at the site is considered likely to support a greater diversity of invertebrates in the context of the site, containing foodplants for common butterfly and moth species.

Other Species

3.39 The desk study revealed 25no. records of Hedgehog within the vicinity of the site, with the nearest record located approx. 93m from the site. Although the majority of the site comprises habitats unsuitable for Hedgehog (i.e. bare ground, hardstanding, and buildings), the small area of semi-improved grassland and scattered scrub in the north-west of the site is considered suitable for use by Hedgehog. In addition, the site is boarded by small residential gardens to the north and south, and woodland parcels are located within 100m of the site in most directions. Therefore, Hedgehog may be present within semi-improved grassland, scrub habitats, and around site margins at least on an occasional basis.

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4.0 POLICIES AND PLANS

4.1 The following local and national planning policy relating to nature conservation and biodiversity are considered of relevance to the site.

Planning Policy Wales (2024)

4.2 This document set out the land use planning policies of the Welsh Government with Chapter 6 dealing with Distinctive and Natural Places which covers Biodiversity and Ecological Networks. The advice contained within PPW is supplemented for some subjects by Technical Advice Notes (TAN's), with TAN 5 addressing Nature Conservation & Planning.

4.3 TAN 5 identifies a number of key principles, which the town and country planning system in Wales should consider. Those relevant are detailed below:

- *Work to achieve nature conservation objectives through a partnership between local planning authorities, Natural Resources Wales (NRW), voluntary organisations, developers, landowners and other key stakeholders;*
- *Integrate nature conservation into all planning decisions looking for development to deliver social, economic and environmental objectives together over time;*
- *Ensure that the UK's international obligations for site, species and habitat protection are fully met in all planning decisions;*
- *Look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally;*
- *Promoting approaches to development which create new opportunities to enhance biodiversity, prevent biodiversity losses, or compensate for losses where damage is unavoidable. Minimising or reversing the fragmentation of habitats and improving habitat connectivity through the promotion of wildlife corridors;*
- *Local planning authorities should seek to protect trees, groups of trees and areas of woodland where they have natural heritage value or contribute to the character or amenity of a particular locality;*
- *The presence of a species protected under European or UK legislation is a material consideration when a local planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat.*

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Updates to PPW Chapter 6: Distinctive and Natural Places (October 2023)

4.4 An updated version of PPW: Chapter 6 was published with immediate effect on 11th October 2023 in a published letter to Local Authorities from Julie James AS/MS – Minister for Climate Change[2]. These changes have now been incorporated as part of the latest edition (February 2024) of PPW. The new guidance provides an update on Net Benefit for Biodiversity and the Step-wise Approach, with extracts considered of relevance to the development site provided below:

Maintaining and Enhancing Biodiversity

4.5 Planning authorities must follow a step- wise approach to maintain and enhance biodiversity, build resilient ecological networks and deliver net benefits for biodiversity by ensuring that any adverse environmental effects are firstly avoided, then minimized, mitigated, and as a last resort compensated for. Enhancement must be secured by delivering a biodiversity benefit primarily on site or immediately adjacent to the site, over and above that required to mitigate or compensate for any negative impact.

4.6 All development must deliver a net benefit for biodiversity and ecosystem resilience from the baseline state (proportionate to the scale and nature of the development proposed). Even if the biodiversity value has been maintained, there must still be a pro-active process to look for and secure enhancement through the design and implementation of the development.

Environment (Wales) Act, 2016

4.7 Part 1 of the Environment Act Wales came into force in May 2016 and sets out the approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act.

Section 6 - Biodiversity and resilience of ecosystems duty

4.8 Section 6 of the Act places a duty on public authorities to 'seek to maintain and enhance biodiversity' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to 'promote the resilience of ecosystems'.

Section 7 - Biodiversity lists and duty to take steps to maintain and enhance biodiversity

4.9 This section lists living organisms and types of habitat in Wales which are considered of key significance to maintaining and enhancing biodiversity in relation to Wales. The Welsh Ministers are required to

[2] Published letter from Julie James AS/MS (Minister for Climate Change) to Local Authorities – Heads of Planning. Reference: MA/JJ/2512/23. Dated 11th October 2023.

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take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.

Local Planning Policy

Caerphilly County Borough Loal Development Plan up to 2021

4.10 The Caerphilly County Borough Local Development Plan (LDP) up to 2021 provides the local planning policy framework for Caerphilly County Borough and was adopted by the Council in November. The Plan sets out the vision, objectives, strategy and policies for managing development in Newport and contains a number of local planning policies and makes provision for the use of land for the purposes of housing, employment, retailing, recreation, transport, tourism, minerals, waste, and community uses. Preparation has commenced for a new 2nd Replacement LDP (2020-2035). Policies within the current LDP relating to biodiversity, and considered of relevance to the site proposals, are listed below.

Policy SP10 – Conservation of Natural Heritage

The Council will protect, conserve, enhance and manage the natural heritage of the County Borough in the consideration of all development proposals within both the rural and built environment

Policy CW4 – Natural Heritage Protection

Development proposals that affect locally designated natural heritage features, will only be permitted:

a) Where they conserve and where appropriate enhance the distinctive or characteristic features of the Special Landscape Area (SLA) or Visually Important Local Landscape (VILL).

b) Within, or in close proximity to sites designated as Sites of Importance for Nature Conservation (SINC), Local Nature Reserves (LNR), Regionally Important Geological Sites (RIGS), Green Corridors, or Local Priority Habitats and Species, where proposals either:

i) Conserve and where appropriate enhance the ecological or geological importance of the designation, or

ii) Are such that the need for the development outweighs the ecological importance of the site, and where harm is minimised by mitigation measures and offset as far as practicable by compensation measures designed to ensure that there is no reduction in the overall value of the area or feature

Policy CW5 – Protection of the Water Environment

Development proposals will only be permitted where:

a) They do not have an unacceptable adverse impact upon the water environment, and

b) Where they would not pose an unacceptable risk to the quality of controlled waters (including

groundwater and surface water)

POLICY CW6 – Trees, Woodland, and Hedgerow Protection

Development proposals on sites containing trees, woodlands and hedgerows, or which are bordered by one of more such trees or hedgerows, will only be permitted provided that:

a) Where arboricultural surveys are required, they are submitted and approved, including any mitigation, compensation or management requirements, as part of the planning application.

b) Root systems will be retained and adequately protected for the duration of all development activity on site.

c) Development proposals have made all reasonable efforts to retain, protect and integrate trees, woodlands or hedgerows within the development site.

d) Where trees, woodlands or hedgerows are removed, suitable replacements are provided where appropriate.

POLICY NH3 – Sites of Importance for Natural Conservation (SINC)

Sites of Importance for Nature Conservation are identified and will be protected at the following locations:

NH3.1 River Rhymney, NH3.2 Pen March and Traed y Milwyr, Llechryd NH3.3 Bute Town, Llechryd and Rhymney Grasslands, Rhymney NH3.4 Nant Bargoed Rhymni, Darran Valley NH3.5 Tair Carreg Moor, North West of Fochriw NH3.6 Cwm-Llydrew Wood, South of Fochriw NH3.7 Nant Bargod Flush, Deri NH3.8 Cefn y Brithdir, South of Pontlottyn NH3.9 Mile End Pond, Abertysswg NH3.10 Y Graig Mire, South of Abertysswg NH3.11 River Sirhowy NH3.12 River Ebbw NH3.13 Cwmsyfiog Woodland, North of New Tredegar NH3.14 Coed Cefn-Rhychdir, North of New Tredegar NH3.15 Troed-Rhiw'r-Fuwch, North West of New Tredegar NH3.16 Parc Cwm Darran Larch Plantation, Deri NH3.17 Cefn Gelligaer, West of Deri NH3.18 Craig Ysgwydd-Gwyn, Deri NH3.19 Ysgwydd-Gwyn-Isaf Wood, South of Deri NH3.20 Coed Deri-Newydd, Deri NH3.21 Pont Caradog and Nant Llan Woodlands, East of Deri NH3.22 Tir-y-Ferch-Gryno, Brithdir NH3.23 Coed-y-Moeth and Cwmsyfiog Hillside, Cwmsyfiog NH3.24 Mynydd Manmoel, North of Manmoel NH3.25 Twyn y Bleiddiaid, South East of Manmoel NH3.26 Coed Waun-Bleiddian, North of Hollybush NH3.27 Hollybush Spring, Hollybush NH3.28 Llwyn-Bach Woodland, South of Hollybush NH3.29 Nant-y-Felin Wood, North East of Markham NH3.30 Markham Tips, North of Markham NH3.31 Pen-yr-Heol Meadows, Markham NH3.32 Markham Railway Line, Markham NH3.33 Pen- Rhiw'r-Eglwys, East of Markham NH3.34 Hafodrisclawdd, East of Markham NH3.35 Pen-y-Waun, South of Markham, NH3.36 Markham Colliery, North of Markham, NH3.37 Coed Argoed, East of Bedwellty, NH3.38 Bedwellty Churchyard, Bedwellty, NH3.39 Land opposite St Sannan's Church, Bedwellty, NH3.40 Nant Cwm-Crach, Bedwellty, NH3.41 Nant-Gau and Darran Woodlands, North of

Oakdale, NH3.42 Caeau Cwm-Corrwg, North of Oakdale.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 The combination of desk study and Extended Phase 1 Habitat survey undertaken at the site in August 2025 identified a limited range of habitats at the site. The site does not contain any priority habitats listed under Section 7 of the Environment (Wales) Act 2016. A majority of the site consists of bare ground and hardstanding considered to be of little (if any) ecological value. Additional common habitat types are also present onsite, which are considered of some ecological value within the context of the site only, with a small strip of poor semi-improved grassland and scattered scrub located at the north-west of the site capable of support a range of protected/priority species, such as individual common reptiles, hedgehog, foraging/commuting bats, and other small mammals. Furthermore, the building at the south-west of the site (TN 1 in Appendix III) is considered suitable to support roosting bats (**Moderate Potential**) and urban nesting bird species, with evidence of active nesting by Jackdaw at the time of the survey.

5.2 The site is proposed for redevelopment into residential housing comprising a single plot containing multiple residential units, including associated landscaping, drainage infrastructure, access roads, and other supporting amenities (Appendix I). The proposed development will require the removal of the strip of poor semi-improved grassland at the north-west of the site, as well as the demolition of the building located within the site boundary assessed as having **Moderate Potential** to support roosting bats and is likely to support nesting birds (TN 1 in Appendix III). Further surveying of the building located onsite is required to confirm the presence or (likely) absence of roosting bats within the building prior to its demolition. In addition, mitigation and enhancement measures are recommended to ensure compliance with the Section 6 Duty of the Environment Act (Wales) 2016. The following avoidance, mitigation, and enhancement measures are considered appropriate to the construction and operational phases of the future development at the site:

Hedgehog and Small Mammals

5.3 Although the likelihood of Hedgehog using the site is considered low due to a lack of connectivity with larger areas of suitable habitat, it is recommended that during the construction phase of any future development, any excavations with steep/near vertical sides are covered overnight, or a means of escape provided (e.g. rough sawn timber board of 300mm width placed at an angle of $\leq 45^{\circ}$) to minimise the risk to Hedgehog and any other small mammals that may become trapped. Construction materials should also be stored properly when not in use to prevent Hedgehog (or other small mammal) access. Any boundary security fencing (if required) should include an appropriate access gap

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at the bottom to allow the continued free movement of Hedgehog (and other mammals) throughout the site.

Bats

5.4 The building at the site (TN 1 in Appendix III) is assessed as having **Moderate Potential** to support roosting bats. All bats and their roosts are fully protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended). As such, the Bat Conservation Trust (BCT, 2023) guidelines indicate that buildings with **Moderate Potential** require at least 2no. survey visits (dusk emergence) between May and August in order to confirm the presence or (likely) absence of roosting bats prior to the commencement of any works that may disturb/destroy a potential roost within the building (i.e. demolition). If surveys confirm the presence of a roost within the building, a license application to Natural Resources Wales (NRW) will be required prior to its demolition. Mitigation/enhancements for roosting bats could be provided via bat boxes on or integrated into new buildings.

5.5 The linear habitat features at the site, including the strip of semi-improved grassland and scattered scrub at the north-west of the site, as well as artificial features such as fence lines, may support a limited range of foraging and commuting bat species. A majority of linear habitat features at the site are subject to proposed plans for removal and therefore the addition of native scrub and tree planting within any future soft landscaping plans will be required to provide compensatory foraging and commuting opportunities for local bat populations.

5.6 It is recommended a Sensitive Lighting Scheme is implemented during both the construction and operational phases of the development. This should ensure that retained or created linear habitat features along site boundaries are maintained as dark corridors (e.g. lux level increases minimised to at or below 1.0 lux compared to existing) to support continued use by bats and other nocturnal wildlife. See lighting guidance note produced by BCT & ILP (2023) for advice on how to mitigate for impacts of artificial lighting on bats (Appendix IV).

Birds

5.7 A small group of Jackdaw (5+) were noted entering and exiting the building at the site at the time of the survey, utilising a large gap within the main roof (TN 1 in Appendix III). This activity may be indicative of active nesting by Jackdaw within the building. In addition, the building is assessed as suitable to support a range of urban nesting species (e.g. Swift and House Sparrow). Furthermore, in the absence of management, the areas of bare ground at the site will likely reestablish to grassland

and scrub habitats (as recorded during the 2021 survey by WWE) which may support arboreal nesting bird species. All birds, their nests and young are protected from damage and destruction under the Wildlife and Countryside Act 1981 (as amended). Due to the high likelihood of nesting birds being present within suitable habitats, works that would affect the existing building (i.e. proposed demolition) and (existing/future) scrub vegetation at the site will be subject to seasonal constraints and should be undertaken outside of the nesting bird season (undertaken between September – February). If this is not possible, an ecologist should be present to inspect habitats for the presence of nesting birds prior to removal and to supervise vegetation clearance. Mitigation/enhancements for both arboreal (tree and shrub) and urban nesting species could be provided via nest boxes on new buildings. It is recommended bird boxes should be selected to provide nesting opportunity for Jackdaw, House Sparrow, and Swift.

Common Herpetofauna (Reptiles and Amphibians)

5.8 The poor semi-improved grassland and scattered scrub at the site is considered to have the potential to support individual common reptiles and terrestrial phase amphibians. The following two-stage clearance methodology for vegetation removal should be adopted to safeguard herpetofauna and other wildlife (e.g., small mammals) during the initial groundworks associated with the proposed scheme:

- Vegetation will be cut to approx. 300mm above ground using handheld tools (e.g., chainsaws, brush cutters).
- A suitably qualified ecologist or experienced landscape contractor will then conduct a fingertip search of the remaining vegetation for the presence of wildlife, including under loose refuge features (e.g., logs and stones).
- Any wildlife found will be immediately transferred to an appropriate predetermined receptor site.
- The vegetation can then be cut to ground level.

Designated Sites

5.9 The desk study identified that the River Sirhowy SINC is located approx. 124m to the east of the proposed site. While the designated features of the River Sirhowy SINC are located outside the scope of the proposed scheme and are not expected to be subject to direct impacts, hydrological connectivity may be present between the designated site and proposed development area. Therefore, there is potential for indirect impacts on designated features to occur as a result of the proposed works. Indirect impacts, such as surface water run off during the construction or operation of the proposed scheme, could be controlled by an environmental management plan. This could set out measures to

avoid the risk of pollutants entering the watercourse and information on the drainage design for the completed scheme.

Other Considerations and Enhancements

5.10 Any future internal and boundary fencing within the site should incorporate provisions for Hedgehog access. Access points measuring at least 13cm x 13cm should be installed at approx. 15-metre intervals to facilitate the free movement of Hedgehogs across the site and prevent habitat fragmentation.

5.11 The positive management of retained and newly created habitats in order to encourage botanical diversity would further contribute to providing localised enhancement for biodiversity.

Avoidance, Mitigation and Enhancements

5.12 The avoidance, mitigation and enhancements described in the sections above are summarised below:

Avoidance

- Building demolition and vegetation removal (existing/future scrub) to avoid nesting bird season and be undertaken over the winter period (between September – February).

Mitigation

- Two-stage vegetation clearance methodology to safeguard common herpetofauna and small mammals during vegetation removal;
- Design of site lighting to minimise artificial light spill onto retained or created boundary features to limit impacts to foraging/commuting bats and other nocturnal wildlife. Any increase in lux level to be less than or equal to 1.0 lux compared to existing levels;
- Environmental management plan prepared for the construction and operational phases of the proposed scheme to limit risk to the River Sirhowy SINC and other retained/adjacent habitats;
- Covering of any excavations overnight or means of escape provided during construction phase to minimise risks to Hedgehog and any other small mammals that may become trapped;
- Implementation of 13cm x 13cm hedgehog access points at 15m intervals into all permanent future fencing associated with the operational phase of the proposed scheme.

Enhancement

- Inclusion of bat and bird boxes onto new buildings. Bird boxes should be selected to provide nesting opportunity for Jackdaw, House Sparrow, and Swift;

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- Use of native species or those with a known biodiversity benefit within any future soft landscape plan;
- Implement Management Plan for retained and proposed planting to maintain and enhance value to Biodiversity.

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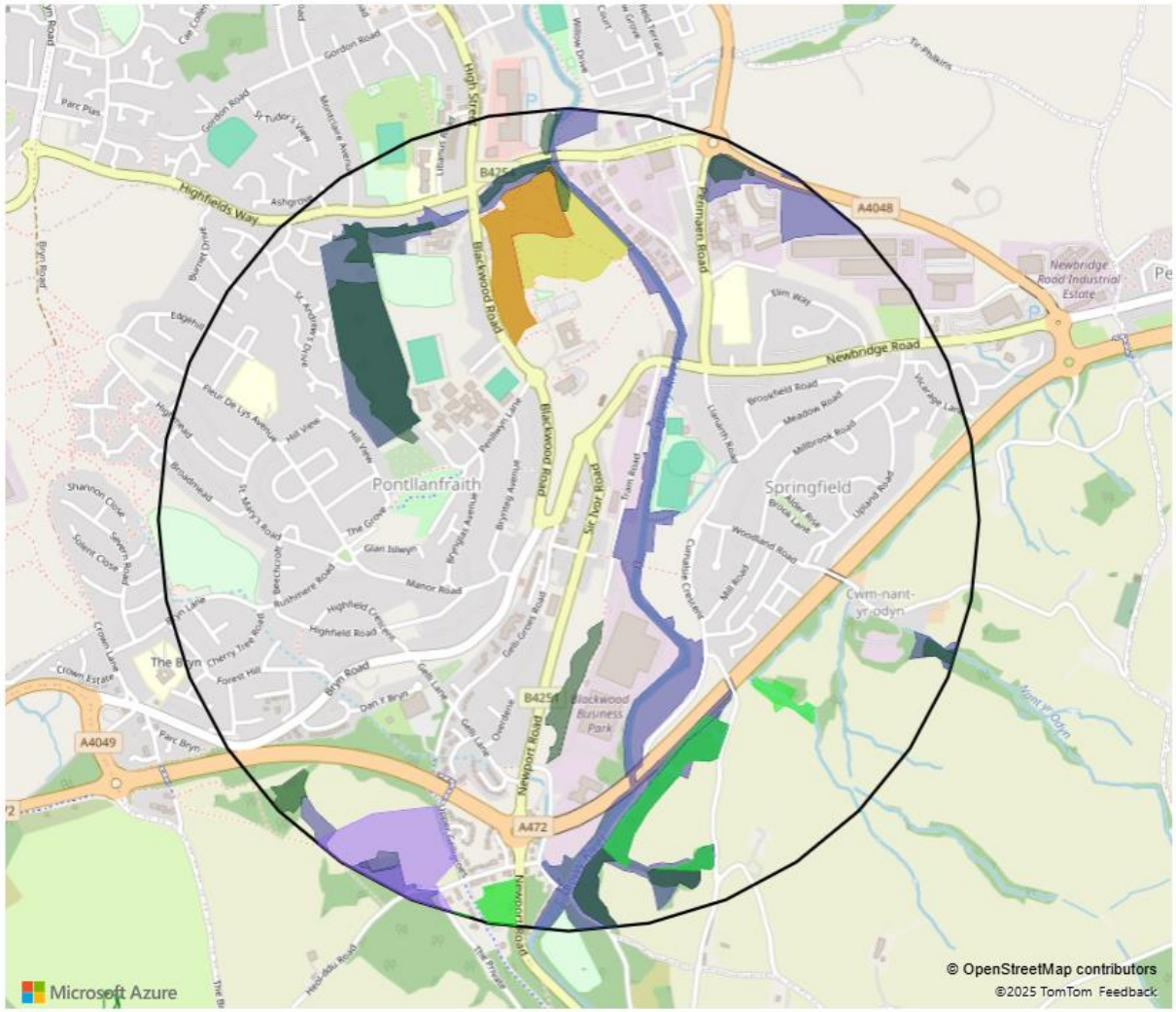
APPENDIX I PROPOSED SITE PLAN

APPENDIX II DESK STUDY INFORMATION RECEIVED FROM SEWBReC

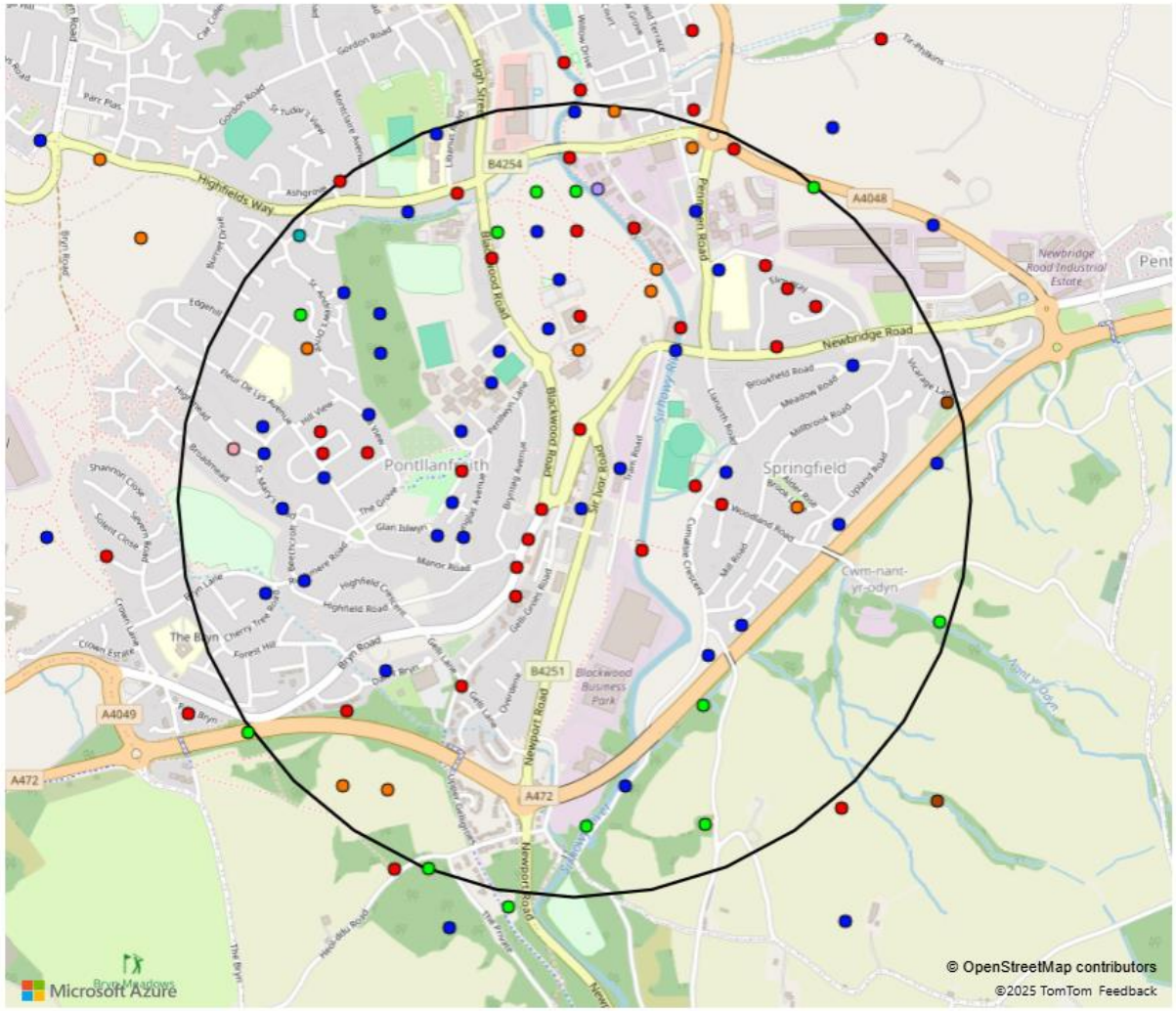
Designated Sites Map



Col.	Name
	Site of Special Scientific Interest (38,313m^2)
	Local Nature Reserve (73,439m^2)
	Wildlife Site / SINC (Adopted) (276,605m^2)
	Ancient Semi Natural Woodland (104,916m^2)
	Restored Ancient Woodland Site (40,979m^2)
	NRW Priority Area (Heathland and Grassland) (50,054m^2)

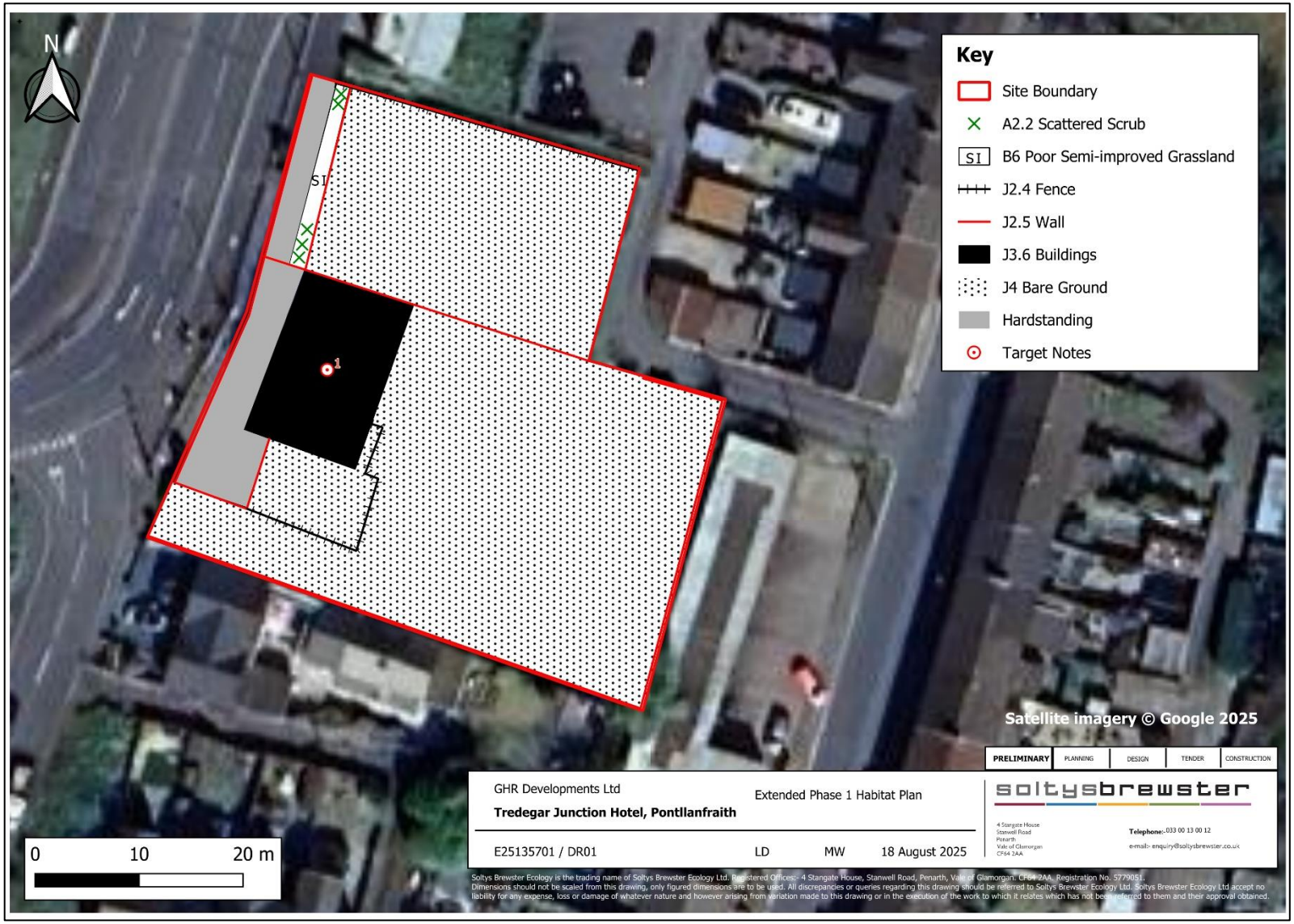
Species Map

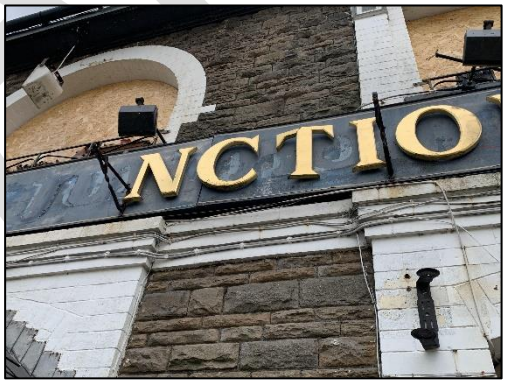
Species records are mapped below. Records are mapped as centred points (centre of grid reference polygon).



Icon	Name
	Birds
	Bryophytes
	Fish
	Fungi and Slime Moulds
	Invertebrates (insect)
	Invertebrates (other, marine or freshwater)
	Mammals (terrestrial)
	Reptiles and Amphibians
	Vascular Plants

APPENDIX III EXTENDED PHASE 1 HABITAT PLAN



Target note	Description/comment
Birds seen/heard: Jackdaw **Other sightings:** none.	
1	Three-storey disused building. Assessed to have a **Moderate Potential** to support roosting bats. In poor condition, with Ivy, Butterfly Bush, and Alder found growing from gaps/cracks. Large gap in main roof which may facilitate internal access for wildlife. A small group of Jackdaw (+5 individuals) seen flying in and out of roof (potentially nesting). Smaller roofs present at single-storey elements located on western and northern elevations. These are mainly intact but a small number of missing slates provide potential access for wildlife into roof void.   Gaps present in damaged soffits and under sign at western elevation. Gaps at soffits lead to enclosed void within soffits and facias.   Narrow linear gaps present under soffits at most elevations. Furthermore, most windows and doors are missing (some boarded up, particularly at ground level) which may facilitate internal access for wildlife.  

APPENDIX V BATS AND ARTIFICIAL LIGHTING IN THE UK GUIDANCE NOTE

The following is an extract from the Bat Conservation Trust and Institution of Lighting Professionals (2023) guidance note on Bats, Lighting and the Mitigation Hierarchy. Section 4 contains advice on how to mitigate for the impacts of artificial lighting on bats. Full citation:

Bat Conservation Trust & Institution of Lighting Professionals (2023) ***Bats and Artificial lighting at Night Guidelines*****.** ***Guidance Note 08/23*****. Bat Conservation Trust, London.**

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4. Bats, lighting and the mitigation hierarchy

Introduction

4.1 This chapter provides a process for considering the impact on bats as part of a proposed lighting scheme or new development incorporating night-time lighting. It contains a toolkit of techniques which can be used on any site, whether a small domestic project or larger mixed-use, commercial or infrastructure development. It also provides best practice advice for the design of a lighting scheme, for both lighting professionals and other users who may be less familiar with the terminology and theory.

4.2 Under the Agent of Change principle within national planning policy, those seeking to introduce a new plan or project are also responsible for the management of its impact. Therefore, it is crucial that the impacts of obtrusive lighting are mitigated or avoided altogether. While this chapter focuses on how potential lighting impacts on bats can be identified, avoided and mitigated, opportunities for ecological betterment beyond maintaining the status quo should be pursued wherever possible. Doing so would not only fulfil our responsibilities under this principle but contribute to Biodiversity Net Gain in line with legislation. [xlix] Further information on Biodiversity Net Gain can be found here: https://cieem.net/i-am/current-projects/biodiversity-net-gain/

4.3 Effective avoidance and mitigation of lighting impacts on bats relies on close collaboration from the outset between multiple disciplines. Depending on the specific challenges this will almost certainly involve ecologists working alongside architects and/or engineers; however, lighting professionals and landscape architects should be approached when recommended by your ecologist. This should be done at as early a stage as possible, in order to ensure the proposed lighting strategy is acceptable to all disciplines, mitigation is effective and is not in breach of legislation. In this way, delays to approval/adoption and unforeseen costs or liability can be avoided.

4.4 The stepwise process and key follow-up actions are outlined in the flowchart overleaf see figure 3 and followed throughout the Chapter. The questions in the flowchart should be asked in good time to allow any necessary bat survey information to be gathered in advance of lighting design, or fixing a scheme design.

4.5 It should be noted that the measures discussed in this document relate only to the specific impacts of lighting upon retained or newly created bat habitat features, on or adjacent to the site. If loss or damage to roosting, foraging or commuting habitat is likely to be caused by other aspects of the development, separate ecological advice will likely be necessary in order to avoid, mitigate or compensate for this legally and/or in line with ecological planning policies.

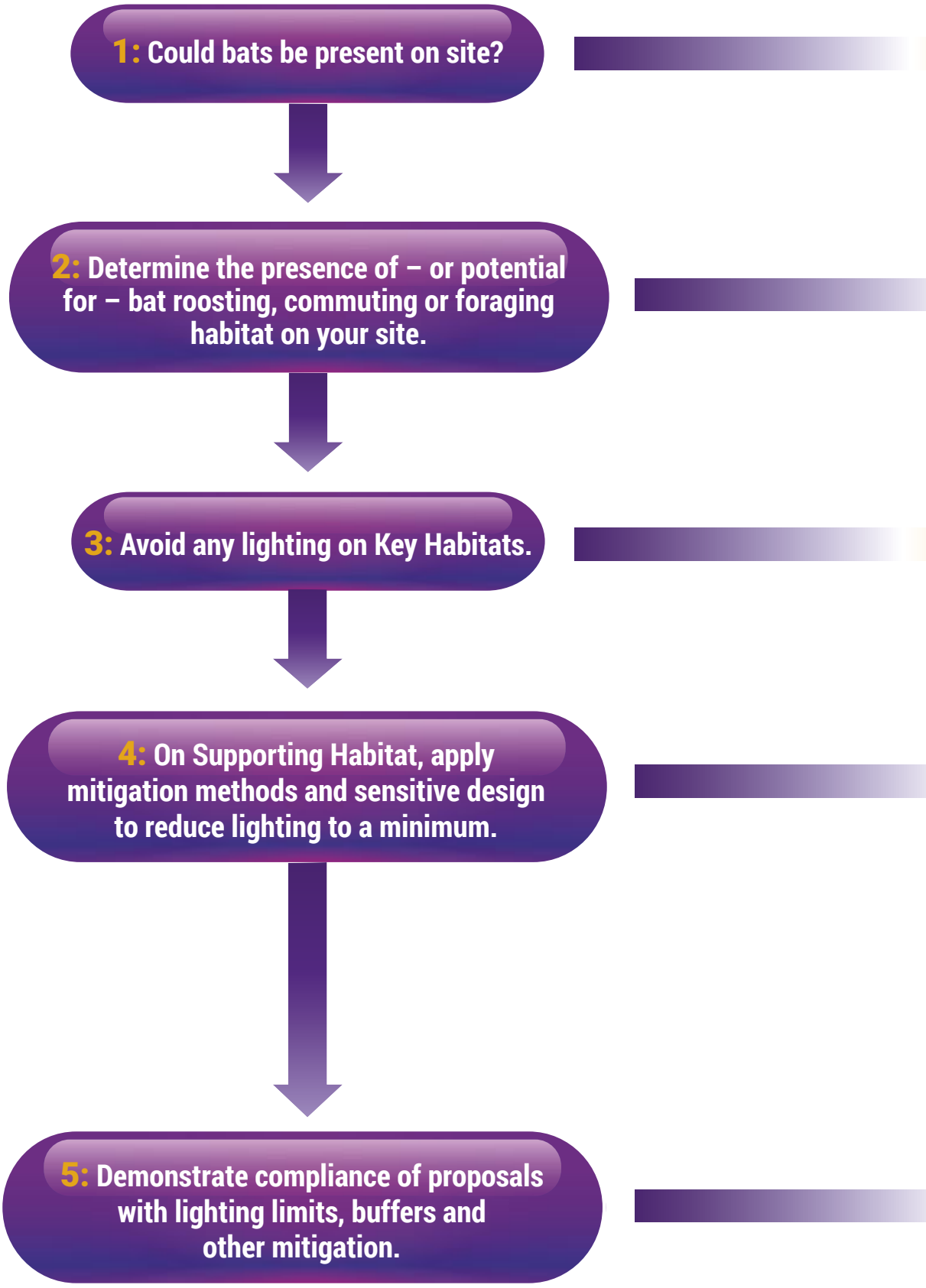
1: Could bats be present on site?
2: Determine the presence of – or potential for – bat roosting, commuting or foraging habitat on your site.
3: Avoid any lighting on Key Habitats.
4: On Supporting Habitat, apply mitigation methods and sensitive design to reduce lighting to a minimum.
5: Demonstrate compliance of proposals with lighting limits, buffers and other mitigation.

Figure 3. Ecology process for lighting.

Step 1: Could bats be present on site?

4.6 If there is no ecological data for your site, an ecologist should be contacted at the earliest opportunity to advise on an initial survey and any potential follow-on surveys. This information should be collected as early as possible in the design process, and certainly before lighting is being specified, so as to avoid the need for costly revisions.

4.7 If any of the following habitats occur on site, and are adjacent to or connected with any of these habitats on or off site, it is possible that proposed lighting may impact local bat populations (please note this list is indicative and advice should be sought from an ecological consultant):

- Woodland, individual mature trees or lines of trees
- Hedgerows and scrub
- Ponds, lakes and other wetland
- Ditches, streams, canals and rivers
- Infrequently managed grassland, or parks, gardens and Public Open Space
- Buildings - Especially, **but not limited to**, those in disrepair or built pre 1970s
- Gravel pits, quarries, cliff faces, caves and rock outcrops
- Any building or habitat known to support protected species
- Any additional scenarios as advised by your Local Planning Authority (LPA)

4.8 If you are unsure about whether bats may be impacted by your project, and an ecologist has not yet been consulted, sources of information on the presence of bats within the vicinity of your site include the following.

- Local Environmental Records Centres (LERC) - Will provide third-party records of protected and notable species for a fee. Search http://www.alerc.org.uk/ for more information
- The Wildlife Assessment Check is a free online tool designed by the Partnership for Biodiversity in Planning to support small-to-medium scale developments by helping identify whether ecological advice should be sought prior to submitting a planning application. The WAC is available online at www.biodiversityinplanning.org/wildlife-assessment-check/
- National Biodiversity Network Atlas - Provides a resource of third-party ecological records searchable online at https://nbnatlas.org - typically this is less complete than LERC data. Please note: Some datasets are only accessible on a non-commercial basis, while most can be used for any purpose, provided the original source is credited
- Local Authority Planning Portal - Most local planning authorities have a searchable online facility detailing recent planning applications. These may have been accompanied by ecological survey reports containing information on bat roosts and habitats

- Defra's MAGIC map - Provides an online searchable GIS database including details of recent European Protected Species licences, and details of any protected sites designated for bat conservation

4.9 The professional directory at the website of the Chartered Institute of Ecology and Environmental Management (www.cieem.net) provides details of ecologists in your area with the relevant skills/experience. The early involvement of a professional ecologist can minimise the likelihood of delays at the planning stage (if applicable) and ensure your project is compliant with conservation and planning legislation and policy.

Step 2: Determine the presence of/potential for bat roosts or habitat and evaluate their importance

4.10 Once a potential risk to bats has been identified, the ecologist will visit the site in order to record the habitats and features present, and evaluate their potential importance to bats. Additionally, they should consider the likelihood that bats could be affected by lighting both on and immediately off site. This survey may also include daytime building and tree inspections, and the deployment of automated bat detectors. On the basis of these inspections, further evening surveys may be recommended, either to determine the presence or likely absence of bats within buildings and/or trees, or to assess the use of the habitats by bats by means of a walked survey. Such surveys may be undertaken at different times during the active season (May - September) and should also involve the use of automated bat detectors left on site for a period of several days. The surveys should be carried out observing the recommendations within the Bat Conservation Trust's Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), and the Interim Guidance Note: Use of Night Vision Aids for Bat Emergence Surveys (BCT, May 2022), or as superseded.

4.11 The resulting report will detail the relative conservation importance of each habitat feature to bats, including the roost-supporting potential of any built structures or trees. The ecologist's evaluation of the individual features will depend on the specific combination of contributing factors about the site, including:

- The conservation status of species likely to be present
- Geographic location
- Type of bat activity likely (breeding, hibernating, night roosting, foraging etc.)
- Habitat quality
- Habitat connectivity off-site
- The presence of nearby bat populations or protected sites for bats (usually identified in a desk study)

4.12 The evaluation will enable the ecologist to determine the presence of any Key Habitats or Supporting Habitats for bats. The whereabouts of these habitats should be set out on a plan of the site or as an Ecological Constraints and Opportunities Plan (ECOP), see Case Study 3. The bat habitat plan/ECOP and report can then be used to help guide the design of the lighting strategy (see next steps) as well as the wider project.

4.13 Key Habitats are those which are considered essential for the function and stability of local bat populations, while Supporting Habitats may be of lesser significance or usage. Habitats falling within neither category are considered to be of negligible or very low importance to bats.

4.14 Examples of Key Habitats include:

- Roosting and swarming sites for all species and their associated flightpaths and commuting habitat
- Foraging or commuting habitat for highly light-averse species (greater and lesser horseshoe bats, some Myotis bats, barbastelle bats and all long-eared bats) or nationally/locally rare species
- Foraging or commuting habitat supporting relatively large numbers of bats or high activity rates as assessed through survey
- Any habitat otherwise assessed by the ecologist as being of elevated importance in maintaining the 'favourable conservation status' of the bat population using it

Step 3: Avoid lighting on any Key Habitats

4.15 An adverse impact from illumination onto a Key Habitat feature is likely to have a significant effect on the bats using it. Therefore, an absence of artificial illumination and glare acting upon both the feature and an appropriately sized buffer zone is most often the only acceptable solution. An ecologist will be best placed to set the size of such a buffer zone according to the species present and the level of usage, and these can be tens of metres if unattenuated light spill or glare from local sources is predicted. The input of a lighting professional should be sought when determining the distances of light spill from new sources and likelihood of glare. It is recommended that proposals are communicated by them to the Principal Designer and the Highways Designer, (if applicable) as in some circumstances these decisions may influence highway function (e.g. visibility departures). Further information on demonstrating an absence of illumination within proposals via lux/illuminance contour plans is provided in Step 5.

4.16 As detailed in Section 2.1, there is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24hr operation, or in high-risk security situations. Nevertheless, these are not exempt from

the statutory protection afforded to bats, their roosts and commuting routes directly associated with roosts, and good design principles recommended under industrial documents such as the Institution of Lighting Professionals' GN01: The Reduction of Obtrusive Light remain best practice. However, in the public realm, while lighting can increase the perception of safety and security, measurable, objective benefits on safety and security are less well established. Consequently, lighting design should be holistic, taking into consideration the relevant British Standards or local policies concerning lighting but, through a risk assessment-style process, be able to fully take into account the presence of protected species and the likely adoption of mitigation approaches through proper engagement with local communities (see Case Study 4).

4.17 Completely avoiding any lighting conflicts in the first place is advantageous, because proposals would be automatically compliant with the relevant wildlife legislation and planning policy, and costly, time-consuming additional surveys, mitigation and post-development monitoring would be avoided. Furthermore, LPAs are likely to favour applications where steps have been taken to avoid such conflicts.

4.18 Sources of lighting which can have the potential to disturb bats are not limited to roadside, footpath or security lighting, but can also include light spill via windows, permanent but sporadically operated lighting such as sports floodlighting, and in some cases car headlights. It is important to note that these situations often comprise many complex variables, and light emission is often difficult to predict or model accurately.

4.19 A competent lighting professional should be involved in the design of proposals as soon as potential impacts (including from glare) are identified by the ecologist, in order to avoid planning difficulties, or late-stage design revision. The lighting professional will be able to make recommendations about placement of luminaires tailored to the project.

Glare

4.20 Glare (extremely high contrast between a source of light and the surrounding darkness - linked to the 'intensity' of a luminaire) may additionally affect bats over a greater distance than the area directly lit by a luminaire. Glare impacts on bats and other wildlife should be considered on the site alongside best practice advice on reducing obtrusive light (see ILP GN01).

Highways

4.21 Where highways lighting schemes are to be designed by the LPA, the ecology officer (or planning officer) should be consulted on the presence of important bat constraints, determined in Step 2, which may impact the design of the lighting scheme in order to ensure compliance with wildlife legislation.

LPA-specific guidance

4.22 Some LPAs have Supplementary Planning Documents (SPD) or other guidance concerning the management of potential development impacts on particular species of bats, or in relation to certain protected sites, such as Special Areas of Conservation (SACs). These should be consulted for particular advice concerning lighting. For example, the North Somerset and Mendip Bats SAC Guidance on Development SPD provides a methodology for calculating the specification of compensatory habitat required to off-set certain development impacts on the bat population of the SAC. In it, retained or created habitats that are subject to lighting above certain lux levels, are considered to be lost to development, with implications for compensation requirements [1].

Environmental Impact Assessment (EIA)

4.23 For plans and projects subject to the Environmental Impact Assessment (EIA) Regulations screening process, it is important for LPAs to understand the nature of mitigation measures at this relatively early stage. Under current EIA Regulations, schemes planning to avoid likely significant effects on the environment through either embedded design measures, such as sensitive site configuration or strategic land/building usage etc., or by other robust mitigation, may be exempt from EIA and therefore less costly. However, the over-reliance on conditions to effect environmental mitigation may be open to legal challenge.

Step 4: On Supporting Habitat, apply mitigation methods and sensitive design to reduce lighting to a minimum

4.24 Supporting Habitats may be less frequently used by bats compared to Key Habitats, or support fewer, or more light-opportunistic species. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved.

4.25 It is important to reiterate the legal protection from disturbance that bats receive under the Wildlife and Countryside Act 1981, as amended. Where the risk of offences originating from lighting is sufficiently high, it may be best to apply the avoidance approach in Step 3. (see Case Study 5).

4.26 Advice from an ecologist and lighting professional will be essential in finding the right approach for the site according to their evaluation. The following are techniques which have been successfully used on projects to limit lighting impacts on bats, and are often used in combination for best results.

[1] https://n-somerset.gov.uk/sites/default/files/2020-03/North%20Somerset%20and%20Mendip%20Bats%20SAC%20guidance%20supplementary%20planning%20document.pdf

Dark buffers and concentric zonation

4.27 A buffer zone subdivided to into smaller zones of increasing illuminance limit further away from the Supporting Habitat would ensure light levels (illuminance - measured in lux) do not exceed certain defined limits. This has the effect of a gradual decrease in lighting from the developed zone, rather than a distinct cut-off, which may provide useable area for the project which also limits lighting impacts on less sensitive species, or less well-used habitat.

4.28 The ecologist (in collaboration with a lighting professional) can help determine the most appropriate buffer widths and illuminance limits according to the value of that habitat to bats. Figure 4 gives an example of a multi-zoned approach which includes Key Habitat (Zone A) which would receive no ALAN, and Supporting Habitat (Zones B and C) which would act as a 'light attenuation zone', but remain within the public realm, and so receive reduced light levels.

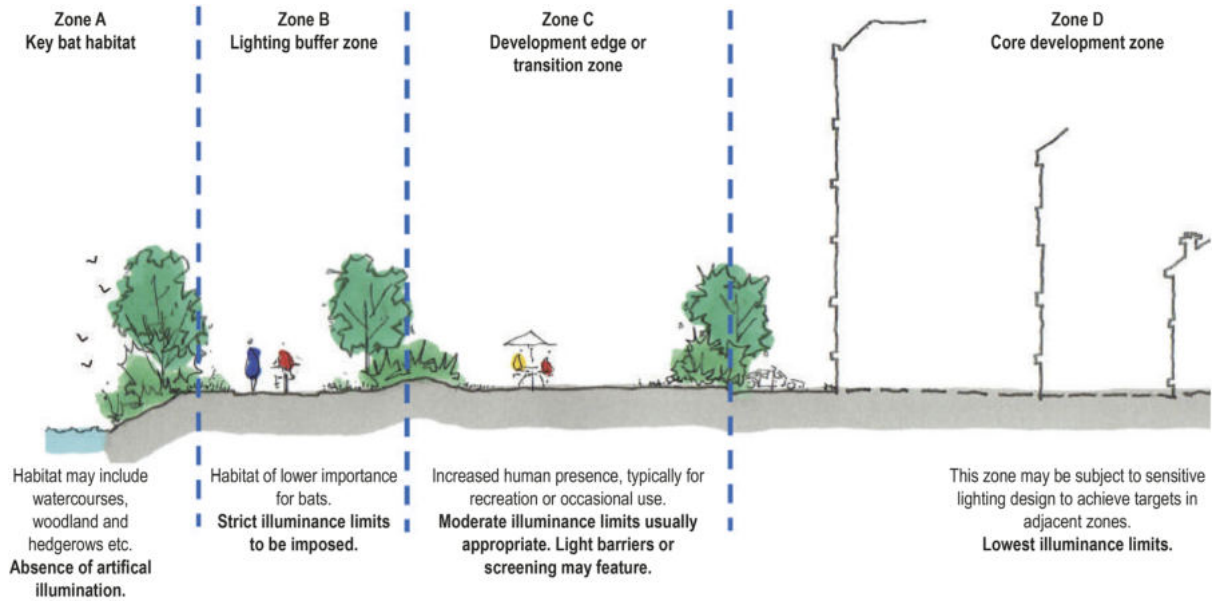

Figure 4. Example of illuminance limit zonation.

Appropriate luminaire specifications

4.29 Light sources, lamps, LEDs and their fittings come in a myriad of different specifications which a lighting professional can help to select. However, the following should be considered when choosing luminaires and their potential impact on Key Habitats and features:

- 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 (2700Kelvin 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 (Stone, 2012)
- Internal luminaires can be recessed (as opposed to using a pendant fitting - See Figure 5) where installed in proximity to windows to reduce glare and light spill
- Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges (see Case Study 1)
- 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 - See ILP GN01
- 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
- Use of a Central Management System (CMS) with additional web-enabled devices to light on demand
- Use of motion sensors for local authority street lighting may not be feasible unless the authority has the potential for smart metering through a CMS
- The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues. See Case Study 6
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely

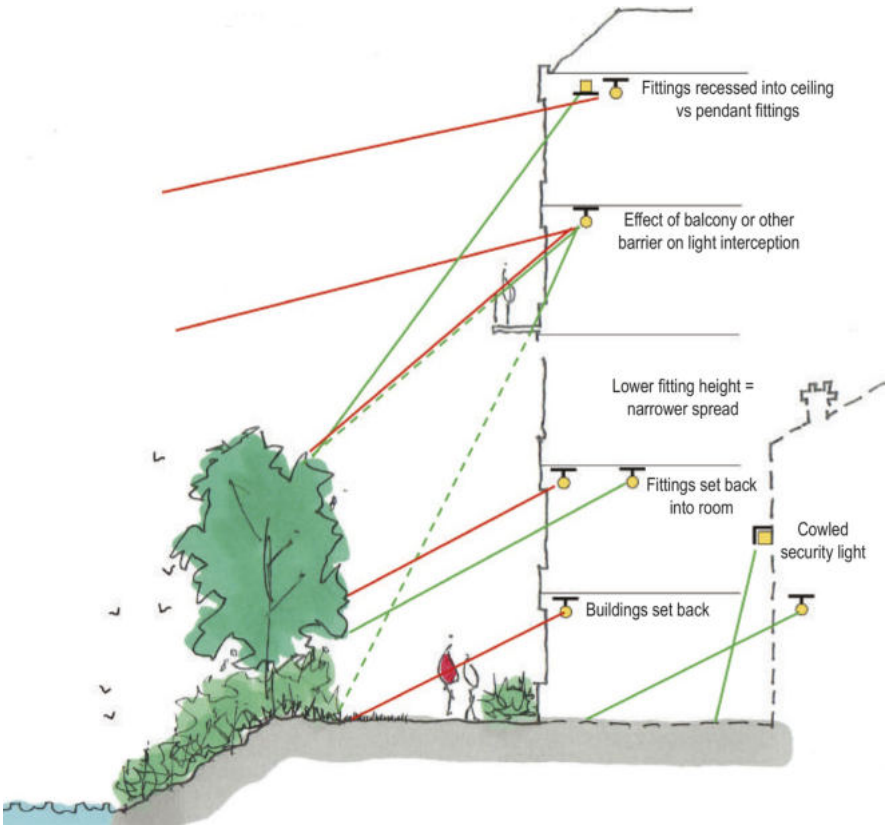

Figure 5. Internal lighting mitigation options.

Sensitive site configuration

4.30 The location, orientation and height of newly built structures, and hard standing, relative to each other can have a considerable impact on light spill. Small changes in terms of the placement of footpaths, open space and windows can all help to achieve a better outcome in terms of minimising light spill onto Key Habitats and features.

- Key or Supporting Habitat is often located alongside, or to the rear of buildings, on new developments. In this case, the removal or reduction of windows can be the most effective way to permanently limit light spill, potentially alongside the internal reconfiguration of the building, to ensure high-use spaces are not as impacted by loss of natural light
- It may be possible to include Key or Supporting Habitat into unlit public open space such as parks. However, avoid including into residential gardens, as uncontrolled and inappropriate lighting may be introduced by residents following occupation
- It is often considered better for a residential scheme to specify good quality downward-directional external light fittings for security, and/or at the front entrance, on short PIR timers, rather than risk the imposition of poor quality and poorly controlled lighting at a later date
- Buildings, walls and hard landscaping may be sited and designed so as to block light spill from reaching habitats and features

- Paved surfaces should not be located within Key Habitat or buffer zones, unless they form part of unlit public open space
- Taller buildings may be best located toward the centre of the site, or sufficiently set back from Key Habitats, to minimise the effect of their light spill
- Column mounted luminaires can be located so that the rear shields are adjacent to habitats, or narrow optics selected that direct light into the task area where needed

Physical screening

4.31 Light spill can be successfully screened through landscaping and the installation of walls and fences, or even banks and bunds (See Figure 6). In order to ensure that fencing makes a long-term contribution, it is recommended that it is supported on concrete or metal posts. Fencing can also be over planted with hedgerow species or climbing plants to soften its appearance and provide a vegetated feature which bats can use for navigation or foraging.

4.32 The planting of substantial landscape features integrated to the wider network of green corridors such as hedgerows, woodland and scrub would make a long-term positive contribution to the overall connectivity of bat habitat and light attenuation. It would also contribute to any local Nature Recovery and Green Infrastructure policies and help achieve obligatory Biodiversity Net Gain targets. A landscape architect can be appointed to collaborate with the ecologist on maximising these natural light screening opportunities.

4.33 It should be noted that newly planted vegetation (trees, shrubs and scrub) is unlikely to adequately contribute to light attenuation upon Key Habitats for a number of years, until it is well established. Sufficient maintenance to achieve this is also likely to be required. Consequently, this approach is best suited to the planting of dense, mature or translocated vegetation. In some cases, it is appropriate to install temporary fencing, or other barrier, to provide the desired physical screening effects until the vegetation is determined to be sufficiently established.

4.34 Given the fact that planting may be removed, die back or inadequately replaced over time, it should never be relied on as the sole means of attenuating light spill.

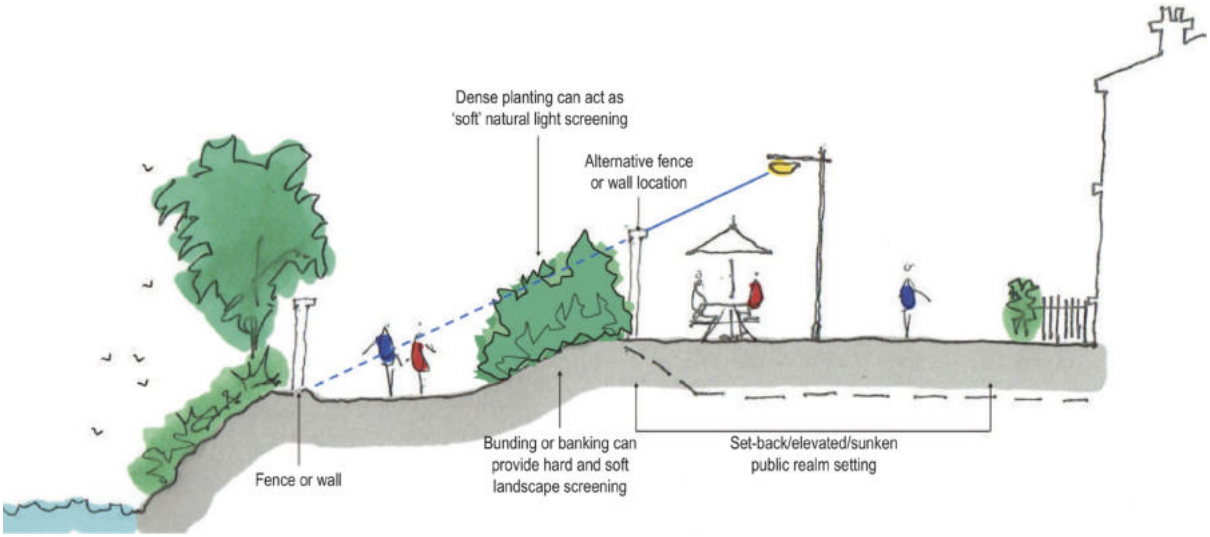

Figure 6. Examples of physical light screening options.

Dimming and part-night lighting

4.35 Depending on the pattern of bat activity across the Supporting Habitat identified by the ecologist, it may be appropriate for an element of on-site lighting to be controlled by dimming or switching either diurnally, seasonally, or according to human activity (light on demand). This is known as Part-Night Lighting (PNL). It is important to state that PNL is not likely to be appropriate where Key Habitats are at risk, especially as PNL often results in lighting when bats are most active.

4.36 A Central Management System (CMS) can be specified by the lighting engineer to dim or turn off individual or groups of luminaires when not in use or during less busy times. Dimming can be precisely controlled, with dimming states often being as low as 10 or 20%. However, due to the electrical difficulties of maintaining a dimming state of under 10%, luminaires should be set to off below this point.

4.37 Lighting could be set to a low output state by default, to turn up to a pre-determined output in response to a trigger, and be combined with a timeclock or photocell to further add an element of seasonal or diurnal control. For example, Passive Infrared (PIR), Artificial Intelligence enabled cameras, on demand controls, or pressure sensors may be used to trigger lights to come on or dim in response to movements, either by vehicles (for example at car parks or industrial loading bays) or by pedestrians (for example a footpath leading from residential development through an area of Supporting Habitat). The timeclock or photocell could ensure that this response only occurs during a set window of hours after sunset and before sunrise, or during certain months.

4.38 Where some trigger is used to temporarily modify lighting states, it will be necessary to specify the timed trigger window during which the response is maintained beyond the last triggering activity. For most typical residential purposes, 1-2 minutes is likely to be sufficient, however risk assessments must

be performed in line with BS5489-1. The proposed system of lighting control will be determined by the outcome of the risk assessment. Where used in locations which receive distinct busy periods, such as cycle paths used by commuters, care will be needed to ensure lighting responds adequately to permit safe usage, but avoids both over-illumination and potentially disruptive dimming states of lighting groups.

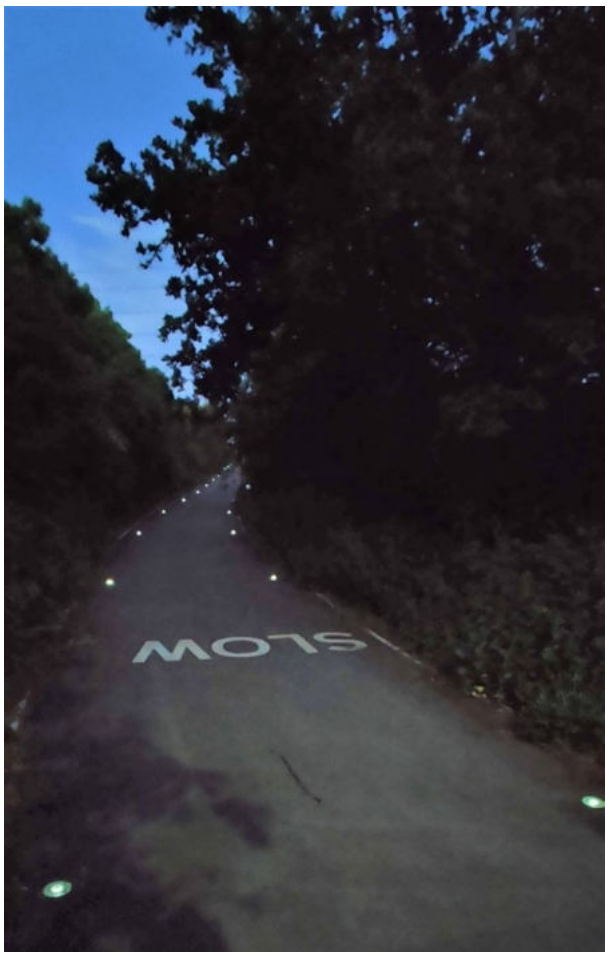

Photo 4: Waymarkers installed on a multi-user path in Worcester. Image credit: Cody Levine.

4.39 Alternative lighting designed for subtle waymarking, rather than illumination, may be more appropriate, such as very low-wattage, ground-level luminaires (photo 4). This lighting option can have a number of additional benefits such as a reduced risk of vandalism, lower carbon footprint during manufacture and fitting and no requirement for cabling. However, it should be noted that these systems depend on regular maintenance and a long-term commitment for them to be successful, as well as a clear view of the sky for solar-powered options. Due to this, proposals and potential planning conditions should be considered in liaison with maintenance teams, to ensure success (and any handover of assets) post install. See Case Study 1 for further information.

4.40 Part-Night Lighting should be designed with input from an ecologist as it may still produce unacceptably high light levels when active or dimmed. Part-Night Lighting is not usually appropriate where lights are undimmed during key bat activity times, as derived from bat survey data or within riparian habitats (see research chapter 1.27). Research has indicated that impacts upon commuting bats are still prevalent where lighting is dimmed during the middle of the night at a time when illumination for humans' use is less necessary (Azam et. al., 2015) thus this approach should not always be seen as a solution, unless backed up by robust ecological survey and assessment of nightly bat activity. In this case, designing areas to be lit to avoid retained Key Habitat, or the provision of sufficient alternative dark corridors, may be the only solution.

Glazing treatments on buildings

4.41 As mentioned, glazing should be restricted and reduced wherever the ecologist and lighting professional determine there to be a likely significant effect upon bats' Key Habitat and associated features.

4.42 Where Supporting Habitat is present, glazing treatments such as tinted, frosted or low transmission glazing treatments are not generally considered suitable ways of fully mitigating light spill. In the case of frosted or 'frit' glazing, windows typically remain luminous surfaces in their own right, defeating the objective of reducing lighting impacts. Although promisingly named, low-transmission glazing (glazing with a lower visible light transmittance) often makes only a very small difference to light spill in practice - a window's fundamental objective is to transmit light!

4.43 Automatic blinds should be discouraged as their longevity depends on regular maintenance and successful routine operation by the occupant. Such blinds are generally only suited to commercial situations where maintenance can be incorporated into the long-term regime routine for the building.

4.44 Depending on the height of the building and windows, and therefore predicted light spill, glazing treatments or window design restrictions may not be required on all storeys. This effect can be more accurately determined by a lighting professional.

Creation of alternative valuable bat habitat on site

4.45 The provision of new, additional or alternative bat flightpaths, commuting or foraging habitat is encouraged and could result in appropriate compensation for any such habitat being lost to the development. The ecologist will be able to suggest and design such alternative habitats, although particular consideration should be given as to its connectivity to other features, the species to be used, the lag time required for a habitat to sufficiently establish and the provision for its ongoing protection and maintenance.

4.46 As almost all new development will be required to result in at least 10% Biodiversity Net Gain (BNG), opportunities to improve habitat connectivity for bats should always be considered. Further to the 10 principles at the core of BNG, the implementation of sensitively sited habitat features for bats would be a clear contribution to 'additionality'. Particularly when considering achieving BNG off-site, assessment should be made of the impacts of altering the type and proportion of bat-suitable habitats, both within and beyond the site, upon the potential Core Sustenance Zone of any maternity roosts which use them.[2]

[2] https://cdn.bats.org.uk/uploads/pdf/Bat-Species-Core-Sustenance-Zones-and-Habitats-for-Biodiversity-Net-Gain.pdf

Step 5: Demonstrate compliance with illuminance (lux) limits and buffers within proposals and, where appropriate, the operational scheme

4.47 Once it has been determined through the above process how Key and Supporting Habitats will be protected, or impacts on them mitigated or compensated for, it will be necessary to demonstrate how this will be achieved. For a planning application, this information is increasingly required prior to determination in order for the LPA to make an informed decision and discharge statutory duties towards protected species legislation and policies. This is most likely to be the case for 'Full' planning applications. For 'Outline', phased or complex applications, this information is, at times, deemed a 'Reserved Matter', for which detail will normally follow at a later date before final consent is granted, or in the discharging of reserved matters. Incidences include EIAs and should be made prior to determination. It is appropriate for a pre-commencement planning condition to be imposed on a consented application which would require that an ecologically sensitive lighting plan is prepared, or is achievable.

4.48 In all cases where impacts from lighting on bats are possible, the LPA will require some form of documentation to be produced by the lighting engineer, either in collaboration with the ecologist, or working to the constraints set out within the bat habitat plan/ECOP (see Step 2), in order to demonstrate compliance. Usually, this will take the form of a 'Lighting Strategy', 'Lighting Design' or 'Lighting Impact Assessment', depending on the level of detail in the application. A Lighting Strategy may simply set out the agreed lighting parameters, objectives and likely mitigation requirements (e.g. unlit zones and any other bat mitigation), together with a plan. A Lighting Design/Impact Assessment would provide finalised details, consisting of a plan to show modelled illuminance from all proposed (and existing, where necessary) light sources, taking into account all site configuration, physical screening and glazing measures adopted. It would usually be accompanied by an explanatory document detailing the specification of each luminaire, as well as all assessment assumptions made and any other rationale for lighting mitigation, such as recessed light fittings or part-night lighting.

4.49 In the case of Outline or phased applications, the precise detail of architectural materials, glazing, landscaping etc. might not be known at the time of submission, therefore a Lighting Strategy may be the most appropriate document to provide. As described above, the bat mitigation objectives derived from the ecologist's bat habitat plan/ECOP should be referenced. It is worth being aware of the potential for matters such as highways (incorporating highways-specific lighting needs) to be fixed at Outline consent stage, which can make the resolution of bat mitigation requirements at a later stage challenging. This highlights the importance of inter-discipline collaboration and early communication of ecological constraints.

4.50 In the case of small or simple planning applications, where significant impacts upon bats from lighting are of a low likelihood, the production of a full Lighting Design package may be disproportionately costly and time-consuming. It may therefore be appropriate to provide a simplified document produced between

the ecologist and lighting engineer, setting out design decisions undertaken and the likely achievability of the recommendations within the ECOP according to the lighting engineer's professional judgment.

Lighting contour plans

4.51 A horizontal illuminance contour plan can be prepared by a suitably experienced and competent lighting professional (Member of the Institution of Lighting Professionals (ILP), Chartered Institution of Building Services Engineers (CIBSE), Society of Light and Lighting (SLL) or similar to ensure competency) using an appropriate software package to model 'Day 1', extent of light spill from the proposed, retained and, possibly, existing luminaires. The various buffer zone widths and illuminance limits which may have been agreed can then be overlaid to determine if any further mitigation is necessary. In some circumstances, a vertical illuminance contour plot may be necessary to demonstrate the light in sensitive areas, such as entrances to roosts or the Key Habitat associated with it (see Appendix).

4.52 Such calculations and documentation would enable the LPA ecologist to fully assess impacts and compliance.

4.53 Because illuminance contour plots and plans may need to be understood and examined by non-lighting professionals, such as architects and local planning authority ecologists, the following should be observed when producing or assessing illuminance contour plans, to ensure the correct information is displayed.

- A calculation showing output of luminaires to be expected at 'Day 1' of operation should be included, where the luminaire and/or scheme Maintenance Factor is set to 1. Schemes using Constant Light Output (CLO) luminaires should also be calculated using 'Day 1' output
- Where deemed necessary by a lighting professional, models should be issued so that all luminaires (i.e. internal and external, or between different phases/plots) can be assessed and each should be set to the maximum output anticipated to be used in normal operation on site (i.e. no dimming where dimming is not anticipated during normal operation)
- Where dimming, PIR, or variable illuminance states are to be used, an individual set of calculation results should accompany each of these states
- A horizontal calculation plane representing levels of illuminance at ground level should always be used
- Vertical calculation planes should be used wherever appropriate, for example along the site-facing aspects of a hedgerow or façade of buildings containing roosts, to show the illumination directly upon the vertical faces of the feature. Vertical planes can also show a cross-sectional view within open space (however, they will only face one direction.) Vertical planes will enable a visualisation of the effects of illumination at the various heights at which different bat species fly. An ecologist can

advise on the most appropriate dimensions to use according to the likely locations of bat flight around the site's habitats

- The contours (and/or coloured numbers) for 0.2, 0.5, 1, 5, and 10 lux must be clearly shown, as well as appropriate contours for values above these
- Each illuminance/lux contour plan should be accompanied by a table showing their minimum and maximum illuminance/lux values
- Where buildings are proposed in proximity to key features or habitats, plots should also model the contribution of light spill through nearby windows, making assumptions as to internal luminaire specification, internal lighting levels, and visible light transmittance of windows. It should be assumed that blinds or curtains are absent or fully open. Assumptions will need to be made as to the internal luminaire specification and levels of illuminance likely to occur on 'Day 1' of operation. These assumptions should be clearly stated and guided by the building/room type and discussions between architect, client and lighting professional. Consideration may also need to given to the site topography, and differences in ground levels between key features and lit areas or buildings. It is acknowledged that in many circumstances, only a 'best effort' can be made in terms of accuracy of these calculations as it is often not possible to account for all 'real world' conditions and variables which influence light. Note that evidence-based professional judgement is needed to assess whether light from windows should undergo a full assessment, dependent on factors such as the distance between light source and critical habitats
- Modelled plots should not include any light attenuation factor from new or existing planting, due to the lag time between planting and establishment and the risk of damage, removal or failure of vegetation. This may result in difficulties in the long-term achievement of the screening effect and hamper any post-construction compliance surveys
- The illuminance contour plots should be accompanied by an explanatory note from the lighting professional to list where, in their opinion, sources of glare acting upon the key habitats and features may occur, and what has been done/can be done to reduce their impacts

4.54 **N.B.** It is acknowledged that, especially for vertical calculation planes, very low levels of light (<0.5 lux) may occur even at considerable distances from the source if there is little intervening attenuation. It is therefore very difficult to demonstrate 'complete darkness' or a 'complete absence of illumination' on vertical planes where some form of lighting is proposed on site, despite efforts to reduce them as far as possible and where horizontal plane illuminance levels are zero. Consequently, where 'complete darkness' on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is at or below 0.2 lux on the horizontal plane, and at or below 0.4 lux on the vertical plane. These figures are still lower than what may be expected on a moonlit night and are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its light averse behaviour. [xvi]

Baseline and post-completion light monitoring surveys

4.55 Baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on Key and Supporting Habitats and features, and so may prevent the agreed or modelled illuminance limits being achieved. This data can then be used to help isolate which luminaires might need to be removed, or where screening should be implemented, or establish a new illuminance limit reduced below existing levels. For example, where baseline surveys establish that on or off-site lighting illuminates potential Key Habitat, improvements could be made by installing a tall perimeter fence adjacent to the habitat, and alterations to the siting and specification of new lighting, to avoid further illumination.

4.56 Baseline lighting surveys must be carried out by a suitably qualified competent person with the correct equipment. As a minimum, readings should be taken at ground level on the horizontal plane (to give illuminance hitting the ground), and in at least one direction on the vertical plane at between either 1.5m or 2m above ground (to replicate the likely location of bats using the feature or site). The orientation should be perpendicular to the dominant light sources, or perpendicular to the surface/edge of the feature in question (such as a wall or hedgerow), in order to produce a 'worst case' reading. Further measurements at other orientations may prove beneficial in capturing influence of all luminaires in proximity to the feature, or principal directions of flight used by bats. This should be discussed with the ecologist.

4.57 Baseline measurements should be taken systematically across the site or features in question, with time, date and time of sunset also recorded. They will need to be repeated at intervals to sample across the site or feature, either in a grid or linear transect, as appropriate. The lighting professional will be able to recommend the most appropriate grid spacing.

4.58 Measurements should always be taken in the absence of moonlight, either on nights of a new moon or heavy cloud, to avoid artificially raising the baseline. As an alternative, moonlight can be measured at a place where no artificial light is likely to affect the reading.

4.59 As all illuminance level contours will be produced from modelled luminaires at 100% output, baseline measurements should, wherever practicable, be taken with all lights on and undimmed, and with blinds or screens over windows removed. Cowls and other fittings on luminaires can remain in place.

4.60 Where possible, measurements should be taken during the spring and summer, when vegetation is mostly in leaf, in order to accurately represent the baseline during the principal active season for bats, and to avoid artificially raising the baseline.

4.61 The topography of the immediate surrounding landscape should be considered in order to determine the potential for increased or decreased light spill beyond the site.

Post-construction/operational phase compliance-checking

4.62 Post-completion lighting surveys are often required where planning permission has been obtained on the condition that the proposed lighting levels are checked to confirm they are in fact achieved on site, and test that the lighting specification (including luminaire heights, design and presence of shielding etc.) is as proposed.

4.63 All lighting surveys should be conducted by a suitably qualified competent person. They should be conducted using the same measurement criteria and lighting states used in the preparation of the illuminance contour plots and/or baseline surveys, as discussed above. It may be necessary to conduct multiple repeats over different illumination states, or other conditions specific to the project.

4.64 Depending on the potential for residual impacts on bats, and the scale of the proposed scheme, it is often appropriate to factor in bat monitoring surveys. These should have the aim of confirming an absence of significant changes in bat presence, species assemblage or behaviour between lit and unlit areas, compared to baseline results. Results should always be reported to the LPA as per any such planning condition. A 'Statement of Conformity' or similar report should be prepared in order to provide an assessment of compliance by the lighting professional, and a discussion of any remedial measures which are likely to be required in order to achieve compliance. Any limitations or notable conditions such as deviation from the desired lighting state, or use of blinds/barriers should be clearly reported. Ongoing monitoring schedules can also be set, especially where compliance is contingent on automated lighting and dimming systems, or on physical screening solutions.

Conclusion

4.65 **In summary,** the importance of integrating avoidance measures (as per the first step of the mitigation hierarchy) into developmental design, cannot be overemphasised. Retaining ecologically functional 'dark corridors' and Key Habitats for bats within schemes (in preference to seeking lighting mitigation strategies), avoids costly and time-consuming additional surveys, mitigation and post-development monitoring. Furthermore, LPAs are likely to favour applications where steps have been taken to avoid such conflicts. This master-planning work needs to be informed by robust ecological survey data and lighting assessments, carried out by the relevant experts at the earliest opportunity in the project. Ultimately, light levels should always be designed to minimise potential environmental impact, and maximise the potential of habitat and species enhancement work, through multidisciplinary working and evidence-based new, or retrofit, scheme design.