

LEWIS HOMES

SANDY LANE, YSTRADOWEN

PRELIMINARY ECOLOGICAL APPRAISAL

JULY 2023



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CONTENTS

Summary

1.0 Introduction

2.0 Methodology

Desk study

Extended Phase 1 Habitat Survey

3.0 Results

Desk study

Extended Phase 1 Habitat Survey

Fauna

4.0 Policies and Plans

5.0 Conclusions and Recommendations

References

Appendices

Appendix I Site Location & Proposed Layout

Appendix II SEWBRc Desk Study Records

Appendix III Extended Phase 1 Habitat Survey Plan & Target Notes

Appendix IV Bats and Artificial Lighting in the UK Guidance Note

SUMMARY

Soltys Brewster Ecology (SBE) were commissioned by Lewis Home to undertake a preliminary appraisal of an area of land to the north of Sandy Lane in Ystradowen, Vale of Glmaorgan. The site is proposed for the development of 46no. residential units. Previous ecological survey work was undertaken at the site by SBE in April 2020. An updated desk study and Extended Phase 1 Habitat Survey was undertaken at the application site in February 2022 to establish the current ecological baseline conditions and identify any constraints or opportunities associated with the proposals.

Desk based consultation confirmed that the application site does not hold any designation for nature conservation. The proposed site is located within close proximity to 2no. locally designated Sites of Importance for Nature Conservation (SINC). However, given the small extent of the proposals and residential development separating the sites, no significant impacts to the qualifying features of the SINCs are considered likely. The desk study also returned a list of records for protected fauna and flora within 1km of the application site. This included multiple records of foraging/commuting bats within the surrounding area as well as records of protected and priority listed bird species, Great Crested Newt, common reptiles and Badger within the 1km search buffer.

An Extended Phase 1 Habitat survey undertaken in March 2022 identified a limited range of habitats present at the application site including poor semi-improved grassland, scattered broad-leaved trees and hedgerows. The habitats at the site were considered likely to support locally foraging/commuting bat species, roosting bats, foraging Badgers and nesting birds with a low potential to support Hazel Dormouse, common reptiles and Great Crested Newt within their terrestrial phase.

The proposed layout plan indicates that the hedgerow located along Sandy Lane will be removed to accommodate the development design as well as a tree assessed to have high potential to support roosting bats. Further survey work will be required to establish the presence/absence of roosting bats and how bats are using the site to inform any mitigation measures or licencing requirements. In addition, further survey work is recommended to determine the presence/absence of Hazel Dormouse within habitats at the proposed site and GCN within ponds located in close proximity.

The development design should also include the translocation and on-site retention of the Sandy Lane hedgerow to ensure no loss of priority habitats. Vegetation removal (i.e., tree and scrub removal) will also be subject to seasonal constraints and should be undertaken via a directional two-staged process to minimise risks to nesting birds and reptiles that may be present. Other mitigation and enhancement opportunities at the proposed site include the covering of any excavations during the construction phase to minimise risks to Badgers, the inclusion of bat and bird boxes onto new residential units, the design the proposed attenuation basin and other SuDS features to benefit biodiversity, use of native species or those with a known biodiversity benefit within the soft landscape plan, creation of

reptile hibernaculum and the design of any external fences to include a 130x130mm gap to allowed continued connectivity for Hedgehog and other small mammals throughout the development.

1.0 INTRODUCTION

- 1.1 Soltys Brewster Ecology (SBE) were commissioned by Lewis Homes to undertake a preliminary ecological appraisal of an area of land to the north of Sandy Lane, Ystradowen, located in the Vale of Glamorgan (central grid reference: ST 01547 77862). The site, approx. 1.5 ha in size, is proposed for the development of 46no. residential units. To inform a planning application a survey to establish the ecological baseline conditions is required.
- 1.2 The proposed site comprises of a single field parcel with hedgerow boundaries and is located adjacent to Sandy Lane, Ystradowen. A plan showing the site location and proposed layout is included in Appendix I.
- 1.3 Previous ecological survey work was undertaken at the proposed site in 2020 by SBE (SBE, 2020). This included an Extended Phase 1 Habitat survey of the current site boundary as well as an additional field parcel to the north. The survey identified areas of poor semi-improved grassland, scattered trees and hedgerows within the current site boundary.
- 1.4 The current report presents the findings an updated desk study and Extended Phase 1 Habitat survey undertaken at the proposed site in March 2022. The report describes the existing ecological conditions at the site and identifies any potential ecological constraints/opportunities associated with proposed residential development.

2.0 METHODOLOGY

2.1 In order to establish the baseline ecological conditions at the proposed site a combination of desk-based consultation and Extended Phase 1 Habitat survey were undertaken in March 2022.

Desk study

2.2 The desk study involved consultation with the South East Wales Biodiversity Records (SEWBRc) and the Vale of Glamorgan Council to identify any records of rare, protected or notable flora and fauna within 1km of the proposed site. 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), Special Areas of Conservations (SACs) or Sites of Importance for Nature Conservation (SINCs).

2.3 The desk study also included a review of previous ecological survey work undertaken at the proposed site by SBE in April 2020.

Extended Phase 1 Habitat Survey

2.4 The fieldwork was undertaken on 8th March 2022 by a suitably experienced ecologist¹ and followed standard Phase 1 Habitat Survey protocol (JNCC, 2010) as amended by the Institute of Environmental Assessment (1995). All habitats within and immediately adjacent to the proposed site boundary 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 drawn up and 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.

2.6 During the field survey any trees at the proposed site were assessed for their potential to support roosting bats and were categorised in relation to the bat roosting features (BCT, 2016). The categories are as follows:

- **Known or confirmed roost**

¹ Associate member of the Chartered Institute of Ecology & Environmental Management (CIEEM)

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Sandy Lane, Ystradowen

Preliminary Ecological Appraisal

E22108601/Doc 01

- **High** - A tree 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.
- **Moderate** – A tree 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.
- **Low** – A tree with one or more potential roost sites that could be used by individual bats opportunistically. Or: A tree of sufficient size & age to contain PRFs (Potential Roost Features) but with none seen from the ground or features seen with only very limited roosting potential.
- **Negligible** – Negligible habitat features on site likely to be used by roosting bat

3.0 RESULTS

Desk Study

SEWBRc Records

- 3.1 Consultation with SEWBRc identified that the proposed site holds no designation for nature conservation, nor are any national or international designated sites (e.g. SACs or SSSIs) located within a 1km radius. However, the proposed site is located within close proximity to 2no. locally designated Sites of Importance for Nature Conservation (SINCs). Ystradowen North SINC and Old Quarry, Cowbridge Road SINC are located approx. 180m north and 200m east of the proposed site, respectively. Both sites are designated for their broad-leaved semi-natural woodland habitats. Although the designated SINCs are located in close proximity to the proposed site they are physically separated by existing residential development and the A4222 carriageway. It is considered unlikely that the proposed development will have any significant impact on the qualifying features of the SINCs based on the small extent of the proposals (confined to site boundary) and physical separation. On this basis they were considered of limited ecological relevance. Summary plans to illustrate the SEWBRc records are included in Appendix II.
- 3.2 The data search returned a limited list of protected species records within 1km of the proposed site. This included the identification of an unidentified bat roost approx. 900m from of the proposed site as well as roosting Common and Soprano Pipistrelle *Pipistrellus pipistrellus/pygmaeus* within approx. 925m. There were also foraging and commuting records of Common and Soprano Pipistrelle, Noctule *Nyctalus noctula*, Serotine *Eptesicus serotinus* and unidentified *Myotis sp.* bats within the 1km search radius.
- 3.3 The desk study results included the identification of a Badger sett within approx. 350m of the proposed site, although this record is dated from 2009. Previous survey work undertaken at the site found Badger guard hairs and multiple well-used mammal paths (see paragraph 3.7). Other priority listed mammal species recorded within the 1km search radius include Hedgehog *Erinaceus europaeus* and Harvest Mouse *Micromys minutus*.
- 3.4 There were multiple records of Great Crested Newt *Triturus cristatus* included within the data search results. The nearest of which is located approx. 300m east of the proposed site relating to an individual newt found within terrestrial habitats along Sandy Lane. Previous survey work undertaken by SBE in 2017 within the surrounding area also identified the presence of GCN (eDNA analysis) within a pond close to the Village Hall, approximately 350m west of the proposed site. Additional GCN records were identified up to 1km north-east of the proposed site, associated with habitats at Morfa Ystradowen. Other common amphibian records identified within the 1km search include those for Common Frog *Rana temporaria* and Common Toad *Bufo bufo*. The data search also included a single Common lizard *Zootoca vivipara* sighting located approx. 1km

north-east of the proposed site, again associated with habitats at Morfa Ystradowen. A single Slow-Worm *Anguis fragilis* was also recorded within the former field to the south of the site in 2013 as part of the residential development at Badgers Brook Rise (Planning Reference: 2013/00856/OUT).

- 3.5 The data search included a limited number of protected and priority listed bird records within 1km of the proposed site. This included records of Red Kite *Milvus milvus*, Barn Owl *Tyto alba* and Merlin *Falco columbarius*, all of which are protected under Schedule 1 of the Wildlife and Countryside Act (1981) (as amended). Other priority listed bird species, as listed under Section 7 of the Environment Act (Wales) 2016, recorded within the 1km search radius include House Sparrow *Passer domesticus*, Starling *Sturnus vulgaris*, Dunnock *Prunella modularis*, Song Thrush *Turdus philomelos*, Reed Bunting *Emberiza schoeniclus*, Linnet *Linaria cannabina*, Grasshopper Warbler *Locustella naevia* and Skylark *Alauda arvensis*. However, based on the habitats present at the proposed site not all of these records were considered of ecological relevance to the proposals e.g., ground nesting bird records.
- 3.6 The desk study results included a single record of Himalayan Balsam *Impatiens glandulifera*, located approx. 1km south-east of the proposed site. The species is listed as invasive plant species under Schedule 9 of the Wildlife and Countryside Act (1981) (as amended).

Previous survey work

- 3.7 The Extended Phase 1 Habitat Survey undertaken by SBE at the proposed site in April 2020 identified a limited range of habitats including poor semi-improved grassland, scattered trees and hedgerows. The survey also recorded areas of marshy grassland, dense scrub and running water to the north of the current site boundary (not included in the current application). The survey found evidence to suggest the use of the site by foraging/commuting Badger, with guard hairs found along well-used mammal paths. A tree with high potential to support roosting bats was also identified along the northern site boundary. The habitats at the site were considered to have potential to support foraging/commuting bats, Hazel Dormouse *Muscardinus avellanarius* and Great Crested Newt in their terrestrial phase.

Extended Phase 1 Habitat Survey

3.8 The distribution and extent of habitats recorded in March 2022 at the proposed site are illustrated on the Extended Phase 1 Habitat Plan with accompanying target notes in Appendix III. The proposed site supports a limited range of habitat types including poor semi-improved grassland, hedgerows, scattered trees and ditch, consistent with habitat features described during the previous (2020) survey.

Poor semi-improved grassland

3.9 The entire proposed site comprises of species poor semi-improved grassland (Plate 1 and cover image). The grassland appears to be currently managed for hay cutting, but a review of Google Earth imagery indicates that it has historically been used for cattle and horse grazing. The grassland sward is tussocky with abundant Cock's Foot *Dactylis glomerata*, Yorkshire Fog *Holcus lanatus* and Creeping Bent *Agrostis stolonifera* with less frequent Perennial Rye Grass *Lolium perenne*. The sward is characterised by a limited diversity of herbaceous plants containing Dandelion *Taraxacum officinale* agg., Yarrow *Achillea millefolium*, Ribwort Plantain *Plantago lanceolata*, Creeping Buttercup *Ranunculus repens*, Common Sorrel *Rumex acetosa*, other unidentified Dock *Rumex* sp. and Thistle *Cirsium* sp. as well as occasional stands of Soft Rush *Juncus effusus*.

Plate 1: Poor semi-improved grassland sward, viewing eastwards across site.



Scattered broad-leaved trees

3.10 A single mature Oak *Quercus* sp. tree is located along the northern boundary. The tree appears over-mature/veteran in appearance and contains multiple potential bat roosting features which are described in paragraph 3.18.

Hedgerows

3.11 The proposed site is bordered by a series of species-poor hedgerows and hedgerows with trees (labelled H1-5 on the Extended Phase 1 Habitat Plan). Hedgerows are listed as a priority habitat in Wales under Section 7 of the Environment Act (Wales) 2016.

Intact species-poor hedgerow

3.12 The southern site boundary comprises of an intact species-poor hedgerow (H2). The hedge is regularly managed and has been recently cut/flailed to a height of approx. 1.5m (Plate 2). The hedge largely comprises of Hazel *Corylus avellana* but also includes Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Holly *Ilex aquifolium*, Elder *Sambucus nigra*, Bramble *Rubus fruticosus* and Ivy *Hedera helix* (no hedgerow at the site contained 5 or more woody species within a 30m section i.e., criteria for species-rich hedgerow). However, the hedgerow does contain a diverse ground-flora layer consisting of Lesser Celandine *Ficaria verna*, Nettle *Urtica dioica*, Herb Robert *Geranium robertianum*, Cow Parsley *Anthriscus sylvestris*, Lords-and-Ladies *Arum maculatum*, Cleavers *Galium aparine*, Hart's Tongue *Asplenium scolopendrium*, Hogweed *Heracleum sphondylium*, Primrose *Primula vulgaris*, Opposite-Leaved Golden Saxifrage *Chrysosplenium oppositifolium*, Dog's Mercury *Mercurialis perennis*, Bluebell *Hyacinthoides sp.*, cultivated Daffodil *Narcissus sp.* and Bracken *Pteridium aquilinum*. Hedgerows H1 and H5, located along part of the eastern and western boundaries, are similar in species and structure.

Plate 2 – Hedgerow located along southern site boundary (H2), viewing westwards.



Species-poor hedgerow with trees

3.13 A species-poor hedgerow with trees is located along the northern site boundary (H3 and H4) and at the north-west corner of the site. These sections of hedgerow are unmanaged and contain taller stands (approx. 2-5m in height) of Hazel, Hawthorn, Oak and Holly (Plate 3). A similar assemblage of ground flora is present with stands of Horsetail *Equisetum telmateia* frequent within damper sections.

Ditch

3.14 A small ditch is located north of the proposed site. The ditch is heavily shaded and contains leaf litter and woody debris.

Invasive species

3.15 No invasive plant species listed under Schedule 9 of the Wildlife and Countryside Act (1981) (as amended) were identified at the proposed site during the current survey.

Plate 3 – Species-poor hedgerow with trees located along northern site boundary (H4), viewing westwards.



Fauna

3.16 In 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);

Badgers

3.17 The current survey found a single Badger latrine/dung pit located along the southern hedgerow boundary (Target Note 1). Multiple well-used mammal paths were found within the hedgerow boundaries, as well as evidence of foraging badgers (snuffle holes). However, no setts were found at the proposed site. The 2020 survey work also found evidence of Badger at the site including guard hairs. The data search results indicate that a main sett is located within close proximity to the proposed site (<250m) and the habitats present at the site were considered likely to support foraging and commuting Badgers on an occasional basis.

Bats

3.18 The area of poor semi-improved grassland, which occupies the majority of the proposed site, provides limited opportunities for foraging bats. However, the hedgerow boundaries, specifically the unmanaged hedges with trees along the northern and western boundary, were considered likely to support locally commuting and foraging bat species. In addition, a single mature oak tree at the site was assessed to have high potential to support roosting bats (Target Note 4). The tree is located along the northern hedgerow boundary and contains multiple potential bat roost features (PRFs) capable of supporting several roosting bats including a woodpecker hole on the main trunk and vertical desiccation fissures.

Birds

3.19 During the survey a small number of birds were seen/heard at the proposed site. This included Robin *Erithacus rubecula*, Blackbird *Turdus merula*, House Sparrow, Dunnock, Wren *Troglodytes troglodytes*, Song Thrush, Coal Tit *Parus ater*, Woodpigeon *Columba palumbus* and Magpie *Pica pica*. House Sparrow, Dunnock and Song Thrush are all listed as priority bird species within Section 7 of the Environment Act (Wales) 2016, and Wren is Amber listed as part of the latest Birds of Conservation Concern Review (Stanbury *et al.*, 2021). The assemblage of species observed was considered typical of the habitats present at the site (e.g., hedgerow, scrub and farmland setting). The hedgerows and trees at the proposed site are likely to be used by a number of birds for nesting and foraging purposes. During the current survey a number of old bird nests were noted within the hedgerow boundaries along the southern and western margins. Based on the size and location of the proposed site, as well as the abundance of farmland in the surrounding landscape, the grassland habitats were not considered likely to support ground nesting bird species such as Skylark.

Great Crested Newt

3.20 Although there are no ponds located at the proposed site itself the hedgerow boundaries were considered suitable terrestrial habitats for foraging and hibernating Great Crested Newt (GCN), with the areas of tussocky poor semi-improved grassland considered to be sub-optimal. The data search returned multiple records of the species within 1km of the proposed site and a review of Ordnance Survey maps indicates that

several ponds are located within 500m of the site. This includes two attenuation ponds within Badgers Brook Rise, located approx. 90m south of the site, as well as a pond located approx. 175m north of the site across the A4222 carriageway.

- 3.21 The attenuation ponds at Badgers Brook Rise (Target Notes 7 and 8) were found to support breeding Common Frog with tadpoles and spawn present. The ponds contain a high macrophyte coverage and moderate terrestrial habitats in the surrounding area, however, they are relatively small in size (125-150m²) and likely to dry out annually. A Great Crested Newt Habitat Suitability Index (HSI) assessment was undertaken for both ponds during the current survey based on the guidance developed by Oldham *et al.*, 2000 (full assessment included in Appendix III). The two ponds were assessed to be of Average and Below Average suitability with a score of 0.61 and 0.58, respectively. Given that suitable terrestrial habitats for GCN exist at the proposed site and the number of ponds within the surrounding area there is a low potential for the species to be present at the site during their terrestrial phase.

Hazel Dormouse

- 3.22 The hedgerow habitats at the proposed site were considered structurally suitable to support Hazel Dormouse, specifically the hedgerow with trees along the northern site boundary (H3 and H4). The hedge contains a well-connected continuous canopy and existing habitat connectivity (via the hedgerow network, A4222 corridor and former railway line) to larger parcels of broad-leaved woodland located further north-east of the site. The hedgerows also contain suitable food resources for Dormouse; Hazel is abundant throughout with other food sources such as Oak and Bramble present. The hedgerow margins along Sandy Lane and the western boundary (H2 and H5) are more intensively managed (regularly trimmed/flailed) and were considered less suitable to support Dormouse although are likely to contribute to habitat connectivity (for Dormice and other species) in the immediate local area. A search/check of gnawed hazelnuts at the proposed site did not indicate the presence of Dormouse – these were attributed to vole and/or Wood Mouse *Apodemus sylvaticus*.

Reptiles

- 3.23 The habitats present at the proposed site were considered of low suitability to support common reptiles. The site is characterised by a north facing slope which is unsuitable for basking reptiles, however, the hedgerow margins and tussocky grassland are likely to provide some foraging and sheltering opportunities. In addition, the desk study search included single records of both Common Lizard and Slow-Worm within 1km of the site. Based on the above, it is considered unlikely to proposed site supports anything other than an individual/small population of common reptiles.

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 (2021)

4.2 This document (Edition 11) sets 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.

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.

Environment Act (Wales) 2016

4.4 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

4.5 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

4.6 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 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

Vale of Glamorgan Local Development Plan (2011-2026)

4.7 The Local Development Plan (LDP) was formally adopted on 28th June 2017 and will be used for decision-making during the Plan period (2011-2026) to 'ensure the most efficient use of land and other limited resources, whilst at the same time promoting the regeneration and stimulation of the local economy for the benefit of the present and future population'. Policies within the LDP relating to biodiversity which are considered of relevance to the proposed development include:

Policy MD 9 - Promoting Biodiversity

New development proposals will be required to conserve and where appropriate enhance biodiversity interests unless it can be demonstrated that:

- 1. The need for the development clearly outweighs the biodiversity value of the site; and*
- 2. The impacts of the development can be satisfactorily mitigated and acceptably managed through appropriate future management regimes.*

Policy MG19 – Sites and Species of European Importance

‘...Development proposals likely to have an adverse effect on a European protected species will only be permitted where:

- 1. There are reasons of overriding public interest;*
- 2. There is no satisfactory alternative; and*
- 3. The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.*

Policy MG20 – Nationally Protected Sites and Species

‘...Development proposals likely to affect protected species will only be permitted where it is demonstrated that:

- 1. The population range and distribution of the species will not be adversely impacted;*
- 2. There is no suitable alternative to the proposed development;*
- 3. The benefits of the development clearly outweigh the adverse impacts on the protected species; and*
- 4. Appropriate avoidance, mitigation and compensation measures are provided...’*

Policy MG21 – Sites of Importance for Nature Conservation, Regionally Important Geological and Geomorphological Sites and Priority Habitats and Species

Development proposals likely to have an adverse impact on sites of importance for nature conservation or priority habitats and species will only be permitted where it can be demonstrated that:

- 1. The need for the development clearly outweighs the nature conservation value of the site;*
- 2. Adverse impacts on nature conservation and geological features can be avoided;*
- 3. Appropriate and proportionate mitigation and compensation measures can be provided; and*
- 4. The development conserves and where possible enhances biodiversity interests.*

Supplementary Planning Guidance Biodiversity & Development (2018)

4.6 The SPG provides further detail and guidance on the implementation of LDP policy in order to assist those involved in the development process in meeting statutory and policy requirements in relation to development proposals that may adversely impact upon biodiversity within the Vale of Glamorgan. Specifically, the SPG aims to:

- Ensure that the key principles of national planning guidance on biodiversity and nature conservation are fully met at the local level and specifically that local planning decisions ensure that new developments maintain, enhance, restore or increase biodiversity in the Vale of Glamorgan;
- Ensure that best practice is followed in a consistent and open manner;

- Provide clarity to developers, statutory consultees, local residents and other stakeholders and interested parties involved with ecology / biodiversity and the planning and development process;
- Minimise delays and cost to developers by ensuring that nature conservation is incorporated into the planning process at the earliest stages so that impacts are predictable and only relevant development proposals are affected; and
- Ensure that any adverse impacts of developments undertaken today will not only protect biodiversity today, but will still be delivering environmental benefits in the future. Mitigation shall ensure that the developments are future-proof.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 The combination of desk study and Extended Phase 1 Habitat survey identified a limited range of habitats at the proposed site including poor semi-improved grassland, scattered broad-leaved trees and hedgerows. Hedgerows are listed as a priority habitat under Section 7 of the Environment Act (Wales) 2016. The area of species-poor semi-improved grassland, which occupies the majority of the proposed site was considered to be of low ecological value, with the hedgerow and tree margins considered to be of the greatest ecological value in the context of the site. The habitats at the site (i.e. hedgerow and trees) were considered likely to support small numbers of foraging and commuting bats and nesting birds. They were also considered to have a low potential to support Hazel Dormouse, common reptiles and Great Crested Newt in their terrestrial phase. A single tree at the site was also assessed to have a high potential to support roosting bats. The proposed layout plan (Appendix I) indicates that the development design will result in the loss of majority of grassland habitats as well as the loss of hedgerow along Sandy Lane. The following avoidance, mitigation and enhancement measures are considered appropriate to the current application.

Badgers

5.2 The current survey found evidence of Badger at the proposed site, including a latrine located along the southern hedgerow boundary as well as multiple mammal pathways. In addition, the data search identified the location of a sett within approx. 200m of the proposed site (dating from 2009). Based on this information and survey findings, the proposed site is likely to support foraging and commuting Badgers on an occasional basis. It is recommended that during the construction phase of future development at the site any excavations 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 Badger and any other small mammals that may become trapped (e.g. Hedgehog).

Bats

5.3 The survey identified a single Oak tree at the proposed site with high potential to support roosting bats. The proposed layout plan indicates that this tree will be retained as part of the development. All UK bat species and their roosts are afforded protection under the Conservation of Habitats and Species Regulations (2017) and the Wildlife and Countryside Act (1981) (as amended). As such, further survey work to establish the presence/absence of roosting bats would be required to inform any mitigation or licencing requirements if plans were to change and involve felling or pruning. For trees with high bat roost potential current best practice guidelines (BCT, 2016) recommend that 3no. survey visits are undertaken between May – September comprising of at least one separate dusk emergence and dawn re-entry survey. In the first instance, a potential roost feature (PRF) inspection survey would also be considered appropriate to determine the likely presence/absence of roosting bats. This would involve the use of an endoscope and ladder/tree-

climbing equipment to access PRFs to assess more in detail their suitability to support roosting bats and search for any evidence of bats e.g. live or dead bats or droppings. This survey can be undertaken at any time of the year.

- 5.4 The hedgerow margins at the site were also considered likely to support locally foraging and commuting bat species. The proposed layout indicates that the entire hedgerow boundary along Sandy Lane will be removed to accommodate the development design. Although this hedgerow is regularly managed and maintained at a height of 1.5m it is recommended further activity surveys are undertaken in order to establish how bats are using the habitats present at the proposed site (in particular the Sandy Lane hedgerow) to inform any particular mitigation/avoidance measures. Based on the small size of the site and habitat present the minimum level of a survey identified in the best practice guidelines (BCT, 2016) would be appropriate to achieve a representative sample of bat activity across the site. This would comprise of 3no. activity survey visits in spring, summer and autumn in appropriate weather conditions for bats. Separate automated/statics surveys (minimum of 1 detector per transect) would also be required, with each session recording for 5 consecutive nights *in situ* per season. The locations of the static bat detectors (e.g. Anabat swift units) would be focused on the areas likely to be subject to development impacts (e.g. hedgerow section to be removed).
- 5.5 Any proposed lighting design at the development should be designed to reduce artificial light spill onto retained and created habitat features (e.g. retained hedgerow boundary to the north). See lighting guidelines extract provided in Appendix IV for advice on how to mitigate for the impacts of acritical lighting on bats. The proposed development should also provision for the inclusion of bat boxes into new residential units and retained trees.

Birds

- 5.6 The hedgerow and tree habitats at the proposed site are likely to support a number of scrub/tree nesting bird species. A number of old bird nests were noted within the hedgerow boundaries during the current survey. Under the Wildlife and Countryside Act (1981 (as amended) all wild birds and their nests are protected against damage or destruction whilst in use or being built. Given the high likelihood of nesting birds being present any future vegetation clearance at the site (i.e. hedgerow and tree removal) would be subject to seasonal constraints and should be undertaken outside of the nesting bird season (between September – February). If this is not possible an ecologist should be present to inspect habitats prior to removal to confirm the absence of nesting birds. Timing of vegetation clearance would also need to consider common reptiles (see 5.11) and a co-ordinated approach regarding nesting birds and reptiles would be required. The proposed development design should also provision for the inclusion of bird boxes on new residential units e.g., House Sparrow terraces.

Great Crested Newt

- 5.7 The habitats at the proposed site were considered to have a low potential to support Great Crested Newt (GCN) in their terrestrial phase. The hedgerow boundaries provide opportunities for hibernating and foraging newts with the areas of tussocky poor semi-improved grassland considered to be sub-optimal. A review of Ordnance Survey maps revealed several ponds within 250m of the proposed site and GCN are known to be present within ponds approx. 350m west of the site. Individual newts are known to disperse up to 1km away from waterbodies and use terrestrial habitats for foraging within 500m of ponds (Langton *et al.*, 2001). The two ponds located at Badgers Brook Rise (approx. 90m south of the site) were assessed to be of Average and Below-Average suitability for breeding GCN, with HSI scores of 0.61 and 0.58. The proportion of Average suitability ponds predicted to be occupied by GCN is 0.55, with this figure at 0.20 for Below-Average suitability (ARG UK, 2010). If GCN are present within these ponds, given the proximity to the proposals, there is some potential they may use terrestrial habitats at the proposed site.
- 5.8 Great Crested Newt and their breeding and resting places are afforded protection under the Conservation of Habitats and Species Regulations (2017) and the Wildlife and Countryside Act (1981) (as amended). Therefore, further survey work is recommended to establish the likely presence/absence within ponds located in close proximity to the proposed site to inform any mitigation measures or licencing requirements. In the first instance, an initial eDNA survey of the off-site ponds (2no. ponds at Badgers Brook Rise and 1no. north of A4222) would be recommended to establish if GCN are present. Based on current guidance, eDNA samples should be taken during a single daytime visit between 15th April and 30th June.

Hazel Dormouse

- 5.9 The northern and north-western hedgerow margins at the proposed site were considered structurally suitable to support Hazel Dormouse, containing a well-connected continuous canopy and abundance of food sources. The hedgerow is connected to a wider hedgerow network and parcels of broad-leaved woodland to the north-east. Although no evidence of Dormouse was found during the survey (gnawed hazelnuts found were attributed to vole or wood mouse) and no records were included in the SEWBRc search, the presence of Dormouse within the habitats present at the proposed site cannot be precluded. Hazel Dormouse and their breeding and resting places are also afforded legal protection under the Conservation of Habitats and Species Regulations (2017) and the Wildlife and Countryside Act (1981) (as amended). Given that the latest proposed layout plan indicates that trees and sections of hedgerows are to be removed under the development design, which may impact Dormouse dispersal, further targeted survey work would be recommended to inform the application and any associated mitigation measures.
- 5.10 Further surveys would involve the deployment of nest tubes along the boundary hedgerow margins at the proposed site. As per best practice guidelines (Bright *et al.*, 2006), nest tubes should be deployed in

March/April and checked at monthly intervals for the presence of Dormouse up until November. A minimum of 50no. nest tubes are required at a site to achieve a robust survey over the April – November period. The nest tube survey could also incorporate a more detailed nut search in the autumn.

Reptiles

- 5.11 The habitats at the proposed site were considered to have a limited suitability to support reptiles and are unlikely to support anything other than an individual/small population of common reptiles such as Slow-Worm. All UK reptiles are protected against intentional killing and injuring under Section 9(1) of the Wildlife and Countryside Act (1981) (as amended). On a precautionary basis it is recommended that a sensitive approach is taken to any future vegetation clearance at the site to minimise any risks to reptiles that may be present, specifically hedgerow and fringe grassland. Vegetation clearance should be undertaken via a two-stage process where an initial cut to 100-150mm is undertaken with the use of hand tools (strimmers/brush-cutters), followed by a second cut to ground level after a minimum period of 48hrs. Arisings should be removed immediately following each cut. This directional clearance would need to be implemented during the period when reptiles are active, typically April to October. Any larger root systems that require removal should be undertaken outside of the reptile hibernation period (typically October – March) under the supervision of an ecologist via a supervised destructive search.
- 5.12 Enhancement measures to improve habitat suitability for both reptiles and amphibians in the long-term post-development include the creation of hibernacula and log/brush piles around the proposed attenuation basin.

Priority habitats

- 5.13 The proposed layout plan indicates that the entire hedgerow along Sandy Lane will be removed as part of the development design. Hedgerows are listed as a priority habitat under Section 7 of the Environment Act (Wales) 2016 and the loss of these habitats will need to be appropriately mitigated for to ensure compliance with national and local planning policy MD9 (see sections 4.5 – 4.7). Although the hedgerow to Sandy Lane is regularly managed and species poor it does contain a diverse ground floral layer and it is recommended that the hedgerow is translocated and incorporated into the soft landscape design instead of removal from the site. This could include placement around the proposed areas of Public Open Space at the north-east corner and the strengthening of existing fence and hedgerow boundaries to the east and west of the site. The development design should seek to maintain and enhance biodiversity interests and priority habitats on site.

Other mitigation measures and enhancements

- 5.14 The areas of poor semi-improved grassland hedgerow margins are likely to be used by Hedgehog for foraging purposes. The design of any future development should consider the presence of Hedgehog and other small mammals at the site by incorporating a gap of 130mm x 130mm at the bottom of garden/boundary fencing

to ensure continued connectivity as part of the development, based on the Hedgehog Street principles by the People's Trust for Endangered Species². The proposed layout plan indicates that the development design will feature an attenuation basin as part of the SuDS strategy. The basin could be designed to hold water throughout most parts of the year and be seeded with a native wet grassland mix to provide benefits for biodiversity (see design of basins at Target Notes 7 and 8). The soft landscape plan should also include the use of native plant species or those with a known biodiversity benefit.

Avoidance, mitigation and enhancement

5.15 The avoidance, mitigation and enhancements described in the sections above are summarised below. Additional measures may be required following further survey work regarding the presence/absence of roosting bats, foraging and commuting bats, Hazel Dormouse and Great Crested Newt:

Avoidance

- Retention of hedgerow corridor (priority habitats) along northern boundary as far as practicable;
- Retention of mature Oak along northern boundary (retained within proposed POS);
- Vegetation clearance (tree and hedgerow removal) to avoid nesting bird season and be undertaken over the winter period (between September – February);

Mitigation

- Covering of any excavations overnight or means of escape provided during construction phase to minimise risks to badger, otter and any other small mammals that may become trapped;
- Design of site lighting to minimise artificial light spill onto retained northern hedgerow boundary for foraging/commuting bats;
- Sensitive approach to vegetation clearance to minimise any risks to reptiles that may be present (vegetation to be cleared via a directional two-stage process between April and October);
- Translocation and retention of Sandy Lane hedgerow on site, to be incorporated into soft landscape design;
- External boundary fencing to include 130x130mm gap to provide continued connectivity for hedgehog and other small mammals through the development;

Enhancements

- Landscape plan to include native tree and shrub species or those with a known biodiversity benefit;
- Strengthening of existing hedgerow and fence line margins along the eastern and western boundaries with new native tree and shrub planting;
- Native wet meadow grass seeding within proposed SuDS attenuation basin;

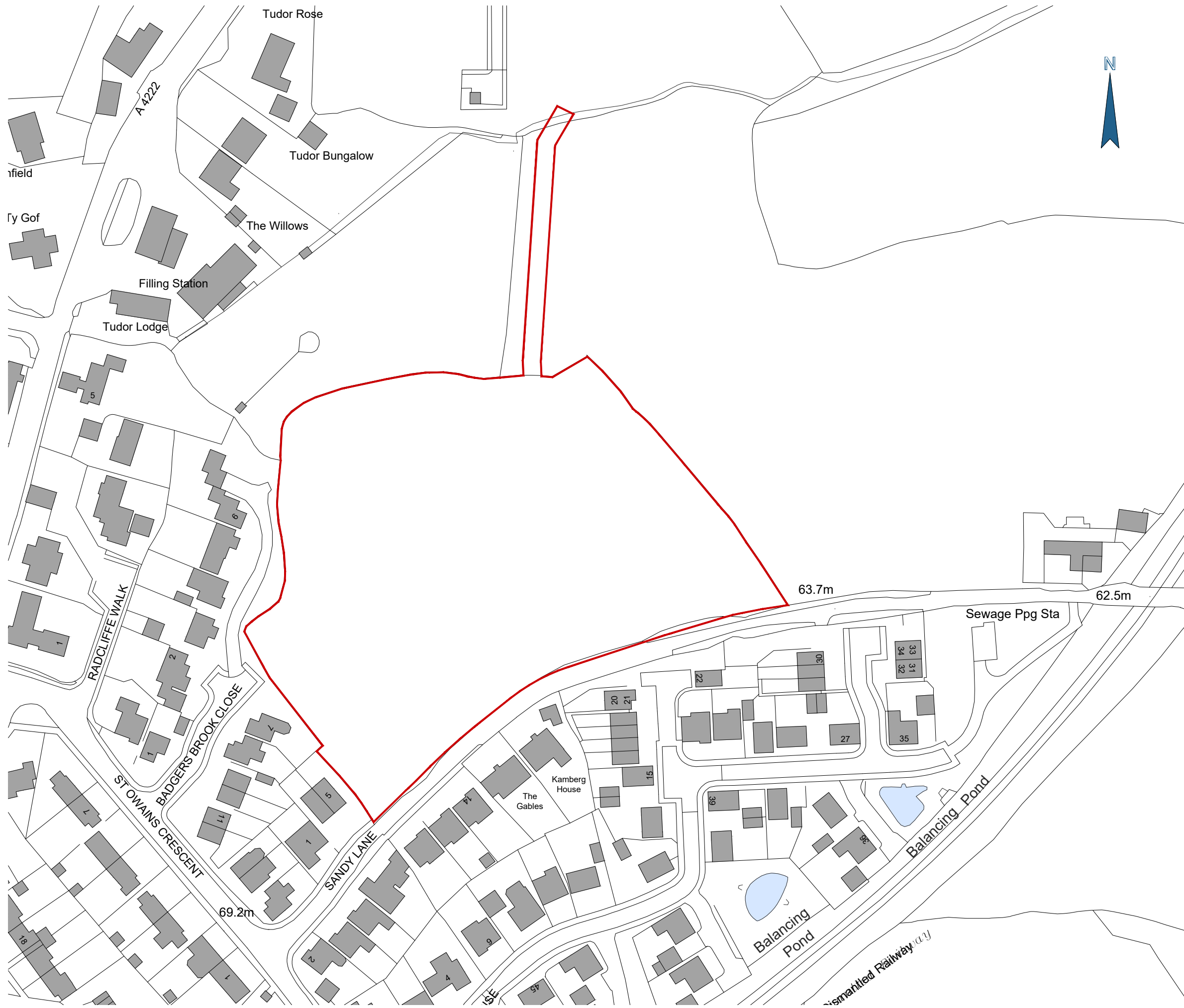
² <https://www.hedgehogstreet.org/>

- Creation of reptile hibernaculum and log/brush piles; and
- Inclusion of bat and bird boxes onto new residential units.
- Management plan to be implemented for retained/new planting

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APPENDIX I SITE LOCATION & PROPOSED LAYOUT



Site Key

 Application Boundary



REV.	DESCRIPTION	DATE
CLIENT		
<i>The key to quality</i> Lewis Homes		
JOB TITLE		
Sandy Lane, Ystradowen		
DRAWING TITLE		
Site Location Plan		
SCALE @ A3	DATE	DRAWN BY
1:1250	June '23	RW
JOB NO.	DRAWING NO.	REVISION
1941	SLP-01	-


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Accommodation Schedule					
House Name	Code	Beds	Structural Area (ft ²)	No. of Units	Total Area
Open Market Units					
Hyatt	HY	3	978	8	7824
Burnaby	BU	3	1021	5	5105
Shelby	SH	4	1213	8	9704
Roxbury	ROX	4	1417	3	4251
Thornbury	TH	4	1479	3	4437
Sub Total				27	31321
Affordable Units			Finished Area (ft²)		
1 Bed Flats	2.1.1	1	557	8	4456
2 Bed House	4.2.1	2	850	5	4250
3 Bed House	5.3.1	3	1003	6	6018
Sub Total				19	14724
Total				46	46045

- Site Key**
- Application Boundary
 - + Social Rented Unit
 - + LCHO Unit
 - 1.8m Close Board Fence
 - 1.8m Screen Wall
 - Proposed Translocated Hedgerow
 - + Proposed Tree Planting
 - Existing Tree and RPZ
 - Refuse Storage Area
 - Refuse Collection Point
 - Bicycle Storage Shed
 - Easements
 - Proposed Rain Gardens
 - Proposed Retaining Walls and Steps

63.7m

T18

- D: Engineering information imported in to layout. 07.06.23
- C: Minor adjustments to house types. Private footpaths added with refuse storage added within rear gardens. Bicycle Storage sheds added to plots that have not been allocated a garage space. Refuse collection points added. Colour added and site key updated. 05.06.23
- B: New open market units added to site layout to comply with new Part 1 regulations, resulting in revised floor areas. To accommodate larger units, plot 28 substituted to a Shelby house type (previously a Roxbury), plot 43 substituted to a Roxbury (previously a Thornbury). Plots 38 and 39 switched. All units and boundaries adjusted as a result of revised footprints. 20.04.23
- A: New WDOCR affordable units added to layout (plots 3-21). Plots 15-18 reoriented to face north. Latest attenuation basin design imported from engineers site pack. Translocated hedgerow relocated to top edge of basin's southern boundary. 03.03.23

REV.	DESCRIPTION	DATE
CLIENT		
JOB TITLE		
Sandy Lane, Ystradowen		
DRAWING TITLE		
Proposed Site Layout		
SCALE @ A2		
1:500	DATE	DRAWN BY
	June '23	RW
JOB NO.		
1941	DRAWING NO.	REVISION
	TP-01	D

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APPENDIX II SEWBR_eC DESK STUDY RECORDS



Key

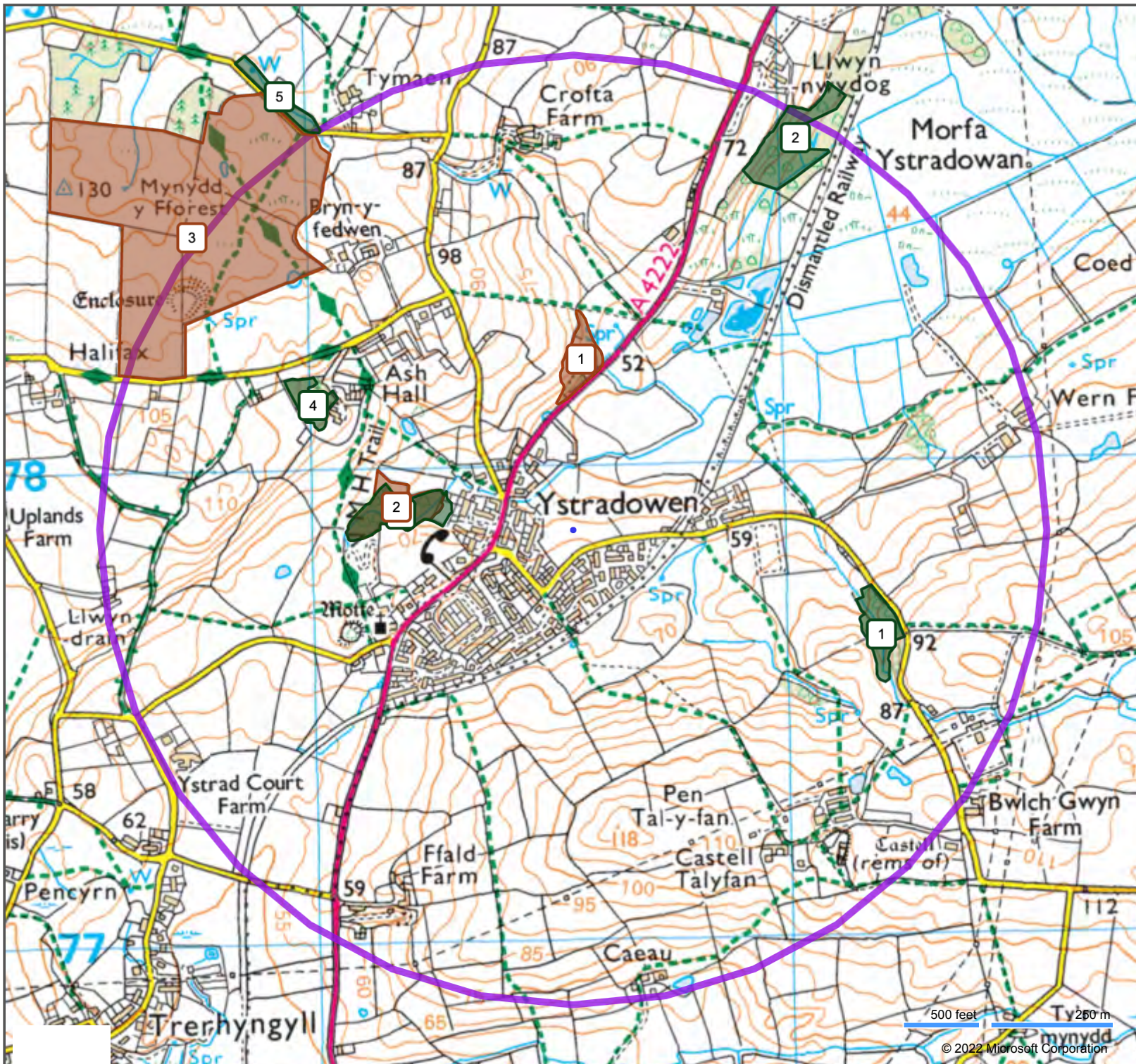
-  Search Location
-  Search Buffer (1000m)

 **Ancient Semi-natural Woodland**

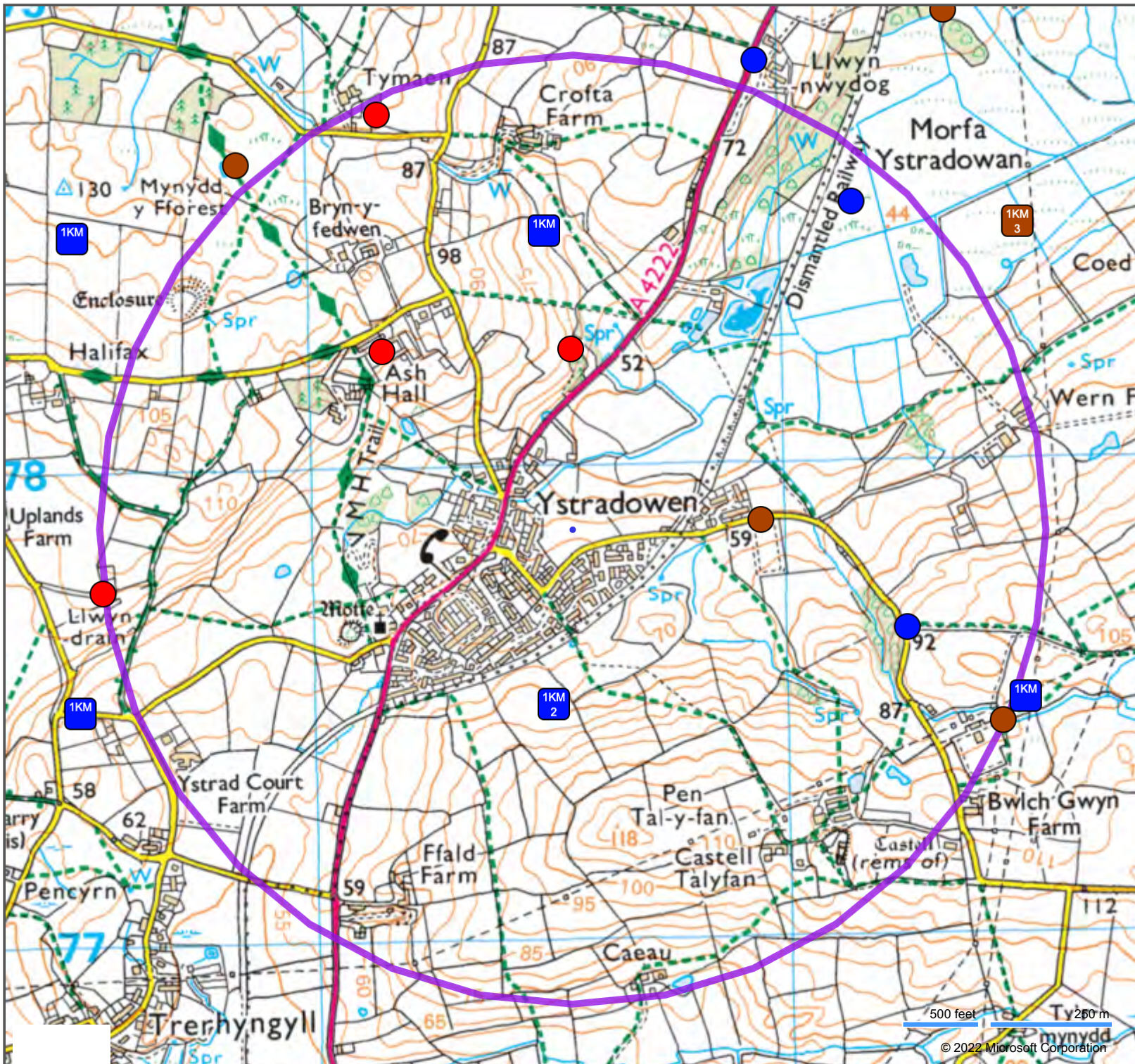
- 1: Ancient Semi Natural Woodland
- 2: Ancient Semi Natural Woodland
- 3: Ancient Semi Natural Woodland
- 4: Ancient Semi Natural Woodland
- 5: Restored Ancient Woodland Site

 **Adopted SINC**

- 1: Old Quarry, Cowbridge Road
- 2: North Ystradowen
- 3: Mynydd y Fforest



500 feet 250 m



Key

- Search Location
- Search Buffer (1000m)

Birds

- Common Reed Bunting
- Dunnock
- Eurasian Skylark
- Grasshopper Warbler
- House Sparrow
- Kestrel
- Linnet
- Merlin
- Red Kite
- Redwing
- Song Thrush
- Starling
- Western Barn Owl

Mammals

- Bats
- Common Pipistrelle
- Eurasian Badger
- Harvest Mouse
- Noctule Bat
- Pipistrelle
- Serotine
- Soprano Pipistrelle
- Unidentified Bat
- West European Hedgehog



Plants

Reptiles and Amphibians

- Common Frog
- Common Lizard
- Common Toad
- Great Crested Newt

500 feet 150 m

APPENDIX III EXTENDED PHASE 1 HABITAT SURVEY PLAN & TARGET NOTES

Target Note	Description/Comment
Birds seen/ heard:	Robin, Blackbird, Song Thrush, Coal Tit, Dunnock, Wren, Woodpigeon, Magpie, House Sparrow
1	<p>Badger latrine located along southern hedgerow boundary.</p> 
2	<p>Mammal footprints indicative of domestic dog or fox. Mammal footpath located under base of hedgerow/fence.</p> 
3	Mammal droppings indicative of fox.
4	<p>Mature/over-mature oak tree located along the northern boundary assessed to have high potential to support roosting bats. The tree contains a woodpecker hole located 3-4m high on main trunk, leading to an internal cavity that could support several roosting bats. The tree also contains several vertical desiccation fissures within the upper canopy that are suitable for use by small numbers of crevice dwelling bats, as well as crevices associated with a hazard beam on a lower branch.</p>



5	Brash pile located along hedgerow base. Could provide shelter for common reptiles and amphibians.
6	Mature oak tree located to the north of the proposed site (off-site) assessed to have moderate potential to support roosting bats. Tree contains several cervices and cavities associated with a significant hazard beam on the north facing lower branch.



7

Attenuation pond located within Badgers Brook Rise approx. 90m south of the site (Pond 1). The pond is approx. 150m² in area and contains a rocky substrate base (clean stone aggregate). Aquatic vegetation present includes Bulrush, Yellow Flag/Iris, Soft Rush, Creeping Bent, Floating Sweet-Grass and Brooklime as well as some filamentous algae cover. Surrounding terrestrial habitat includes managed grassland with newly planted shrubs and woodland. Based on the basin design (attenuation and infiltration) it was considered likely to dry annually. There is no evidence to suggest fish presence or impacts by waterfowl. Water quality was assigned to be moderate based on the assemblage of aquatic plant species present. Common Frog spawn/tadpoles were also present.

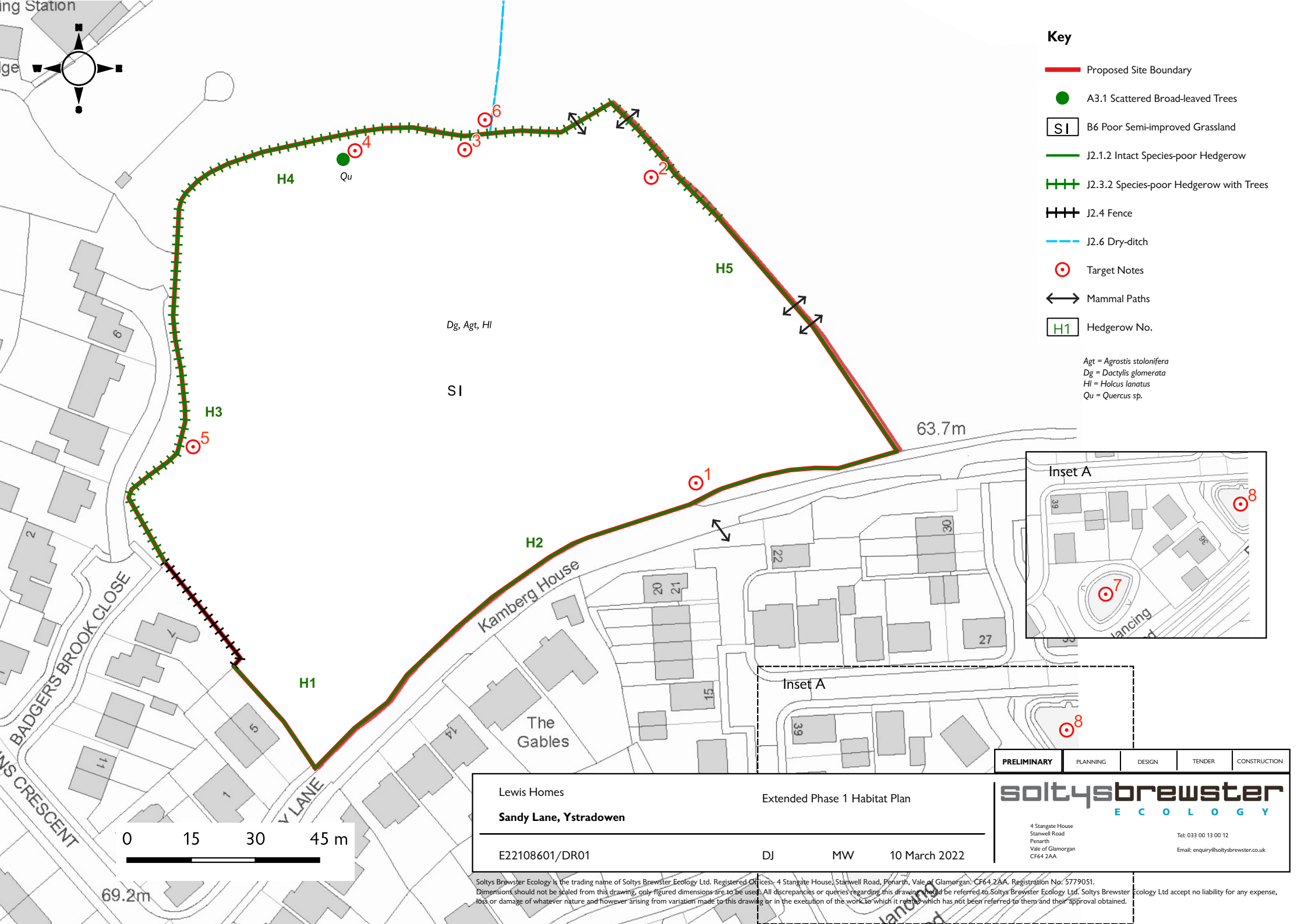
	Factor	Description	Score
S ¹	Geographic location	Zone B	0.5
S ²	Pond area	150m ²	0.3
S ³	Permeance	Dries annually	0.1
S ⁴	Water quality	Moderate	0.67
S ⁵	Shade	0-60%	1
S ⁶	Waterfowl	Absent	1
S ⁷	Fish	Absent	1
S ⁸	Pond count	12	1
S ⁹	Terrestrial habitat	Moderate	0.67
S ¹⁰	Macrophytes	66-80%	1
			0.61 (Average)



8 Second attenuation pond located within Badgers Brook Rise approx. 90m south of the site (Pond 2). The pond is approx. 125m² in area and again contains a rocky substrate base (clean stone aggregate). Aquatic vegetation present is similar to Pond 2 but with less overall cover. Surrounding terrestrial habitat includes managed grassland with newly planted shrubs and woodland. Based on the basin design (attenuation and infiltration) it was considered likely to dry annually. There is no evidence to suggest fish presence or impacts by waterfowl. Water quality was assigned to be moderate based on the assemblage of aquatic plant species present. Common Frog spawn/tadpoles were also present.

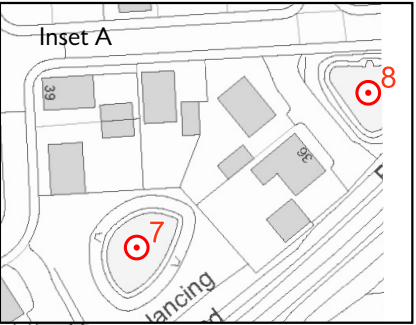
	Factor	Description	Score
S ¹	Geographic location	Zone B	0.5
S ²	Pond area	125m ²	0.25
S ³	Permeance	Dries annually	0.1
S ⁴	Water quality	Moderate	0.67
S ⁵	Shade	0-60%	1
S ⁶	Waterfowl	Absent	1
S ⁷	Fish	Absent	1
S ⁸	Pond count	12	1
S ⁹	Terrestrial habitat	Moderate	0.67
S ¹⁰	Macrophytes	46-50%	0.8
			0.58 (Below Average)





Key

- Proposed Site Boundary
 - A3.1 Scattered Broad-leaved Trees
 - SI B6 Poor Semi-improved Grassland
 - J2.1.2 Intact Species-poor Hedgerow
 - + + + J2.3.2 Species-poor Hedgerow with Trees
 - + + + J2.4 Fence
 - - - J2.6 Dry-ditch
 - Target Notes
 - ↔ Mammal Paths
 - H1 Hedgerow No.
- Agt* = *Agrostis stolonifera*
Dg = *Dactylis glomerata*
Hl = *Holcus lanatus*
Qu = *Quercus* sp.



PRELIMINARY	PLANNING	DESIGN	TENDER	CONSTRUCTION
-------------	----------	--------	--------	--------------

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 E C O L O G Y

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Lewis Homes	Extended Phase 1 Habitat Plan		
Sandy Lane, Ystradowen			
E22108601/DR01	DJ	MW	10 March 2022

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APPENDIX IV BATS AND ARTIFICIAL LIGHTING IN THE UK GUIDANCE NOTE

The following is an extract from the **Bat Conservation Trust and Institution of Lighting Professionals (2018)** guidance note on **Bats and Artificial lighting in the UK**. Section 3 contains advice on how to mitigate for the impacts of artificial lighting on bats. Full citation:

Bat Conservation Trust & Institution of Lighting Professionals (2018) *Bats and artificial lighting in the UK. Guidance Note 08/18*. Bat Conservation Trust, London.

3. Mitigation of artificial lighting impacts on bats

This section provides a simple process which should be followed where the impact on bats is being considered as part of a proposed lighting scheme. It contains techniques which can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. It also provides best-practice advice for the design of the lighting scheme for both lighting professionals and other users who may be less familiar with the terminology and theory.

The stepwise process and key follow-up actions are outlined in the flowchart overleaf, and are followed throughout the chapter.

The questions within this flow chart should be asked as early as possible, so that necessary bat survey information can be gathered in advance of any lighting design or fixing of overall scheme design.

Effective mitigation of lighting impacts on bats depends on close collaboration from the outset between multiple disciplines within a project. 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 as early in your project as possible in order to ensure mitigation is as effective as it can be and to minimise delays and unforeseen costs.

Step 1: Determine whether bats could be present on site

If your site has the potential to support bats or you are at all unsure, it is highly recommended that an ecologist is appointed to advise further and conduct surveys, if necessary. This information should be collected as early as possible in the design process, and certainly before lighting is designed, so as to avoid the need for costly revisions.

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 newly proposed lighting may impact local bat populations:

- Woodland or mature trees
- Hedgerows and scrub
- Ponds and lakes
- Ditches, streams, canals and rivers
- Infrequently managed grassland
- Buildings – pre 1970s or in disrepair

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.
- 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, as long as the original source is credited.
- Local authority planning portals – 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.

The professional directory at the website of the Chartered Institute of Ecology and Environmental Management (www.cieem.net) will provide details of ecologists in your area with the relevant

Step 1

Could bats be present on site?

Consult local sources of ecological information or seek advice from an ecologist

Step 2

Determine the presence of – or potential for – roosts, commuting habitat and foraging habitat and evaluate their importance.

Appoint ecologist to carry out daytime and, if necessary, night-time bat surveys and to evaluate the importance of the site's features and habitats to bats.

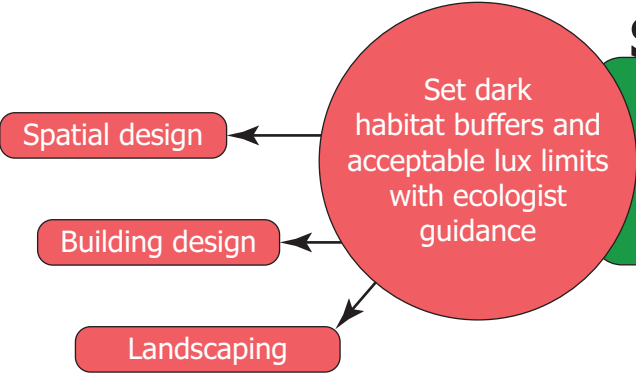
Step 3

Avoid lighting on key habitats and features altogether.

No illumination of any roost entrances and associated flightpaths, nor on habitats and features used by large numbers of bats, by rare species or by highly light-averse species.

Step 4

In other locations of value for bats on site, apply mitigation methods to reduce lighting to a minimum.



Step 5

Demonstrate compliance with lux limits and buffers.

Lighting professional to prepare final lighting scheme design and/or lux calculations or undertake baseline light surveys as necessary. Post-completion bat and lighting monitoring may be required.

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.

It should be noted that the measures discussed in this document relate only to the specific impacts of lighting upon 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 be necessary in order to avoid, mitigate or compensate for this legally and according to the ecologist's evaluation.

Step 2: Determine the presence of – or potential for – roosts, commuting habitat and foraging habitat and evaluate their importance

Your ecologist will visit the site in order to record the habitats and features present and evaluate their potential importance to bats, and the likelihood that bats could be affected by lighting both on and immediately off site. This may also include daytime building and tree inspections. On the basis of these inspections further evening surveys may be recommended, either to determine the presence of roosts 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 (ideally May to 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).

The resulting report will detail the relative conservation importance of each habitat feature to bats (including built structures, if suitable). 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 recorded or 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)

The evaluation of ecological importance for each feature is most commonly expressed on a geographic scale from Site level to International level, or alternatively in terms of that feature's role in maintaining the 'favourable conservation status' of the population of bats using it.

The ecologist should set out where any key bat roost features and/or habitat areas (ie flightpath habitat and broader areas of foraging habitat) lie on a plan of the site or as an ecological constraints and opportunities plan (ECOP) together with their relative importance. The ECOP and report can then be used to help guide the design of the lighting strategy as well as the wider project.

Step 3: Avoid lighting on key habitats and features altogether

As has been described in 'Artificial lighting', above, 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 24-hour operation. However in the public realm, while lighting can increase the perception of safety and security, measureable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully take into account the presence of protected species

and the obligation to avoid impacts on them.

Sources of lighting which can disturb bats are not limited to roadside or external 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. Additionally, glare (extremely high contrast between a source of light and the surrounding darkness – linked to the intensity of a luminaire) may affect bats over a greater distance than the target area directly illuminated by a luminaire and must also be considered on your site.

It is important that a competent lighting professional is 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. Your lighting professional will be able to make recommendations about placement of luminaires tailored to your specific project.

Where highways lighting schemes are to be designed by the local planning authority (LPA) post-planning, an ecology officer should be consulted on the presence of important bat constraints which may impact the design and illuminance in order for the scheme to remain legally compliant with wildlife legislation.

Where adverse impacts upon the 'favourable conservation status' of the bat population using the feature or habitat would be significant, an absence of artificial illumination and glare, acting upon both the feature and an appropriately-sized buffer zone is likely to be the only acceptable solution. Your ecologist will be best placed to set the size of such a buffer zone but it should be sufficient to ensure that illumination and glare is avoided and so the input of a lighting professional may be required. Further information on demonstrating an absence of illumination via lux/illuminance contour plans is provided in Step 5.

Because different species vary in their response to light disturbance (as discussed in section 1 'Bats'), your ecologist will be able to provide advice tailored to the specific conditions on your project, however examples of where the no-lighting approach should be taken in particular include:

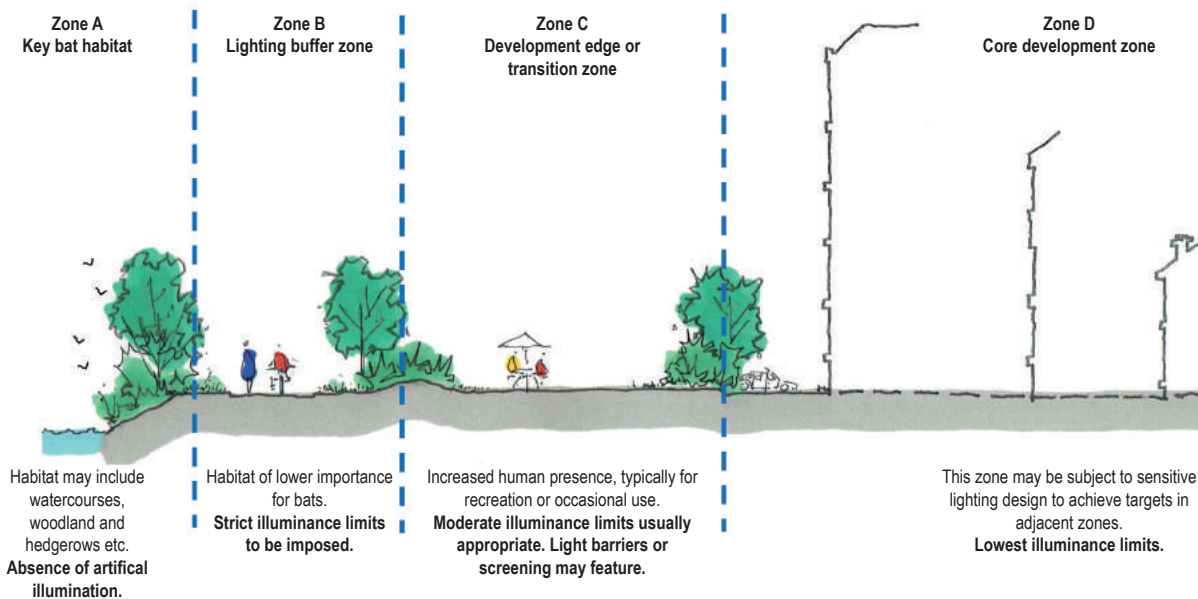
- Roosting and swarming sites for all species and their associated flightpath/commuting habitat.
- Foraging or commuting habitat for highly light-averse species (greater and lesser horseshoe bats, some *Myotis* bats, barbastelle bats and all long-eared bats).
- Foraging or commuting habitat used by large numbers of bats as assessed through survey.
- Foraging or commuting habitat for particularly rare species (grey long-eared bat, barbastelle, small *Myotis*, Bechstein's bat and horseshoe bats).
- Any habitat otherwise assessed by your ecologist as being of importance to maintaining the 'favourable conservation status' of the bat population using it.

Completely avoiding any lighting conflicts in the first place is advantageous because not only would proposals be automatically compliant with the relevant wildlife legislation and planning policy, but they could avoid costly and time-consuming additional surveys, mitigation and post-development monitoring. Furthermore, local planning authorities are likely to favour applications where steps have been taken to avoid such conflicts.

Step 4: Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the

Example of illuminance limit zonation



ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved.

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.

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

Dark buffers, illuminance limits and zonation

Dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. Buffer zones rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in to zones of increasing illuminance limit radiating away from the feature. Examples of this application are given in the figure above.

Your 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 (as informed by species and numbers of bats, as well as the type of use).

Appropriate luminaire specifications

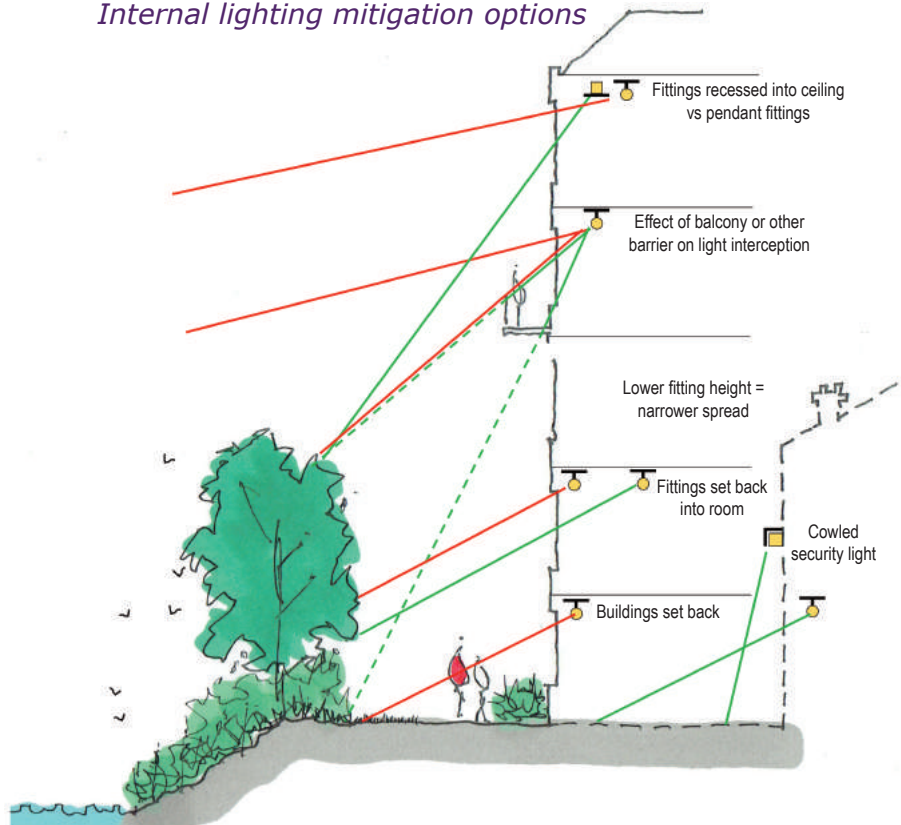
Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires.

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill. (See figure overleaf.)
- The use of specialist bollard or low-level downward directional luminaires to

retain darkness above can be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use should only be as directed by the lighting professional.

- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires should always be mounted on the horizontal, ie no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Internal lighting mitigation options



- Taller buildings may be best located toward the centre of the site or sufficiently set back from key habitats to minimise light spill.
- Street lights can be located so that the rear shields are adjacent to habitats or optics selected that stop back light thereby directing light into the task area where needed.

Sensitive site configuration

The location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill (see figure above for examples of good internal lighting design). Small changes in terms of the placement of footpaths, open space and the number and size of windows can all achieve a good outcome in terms of minimising light spill on to key habitats and features.

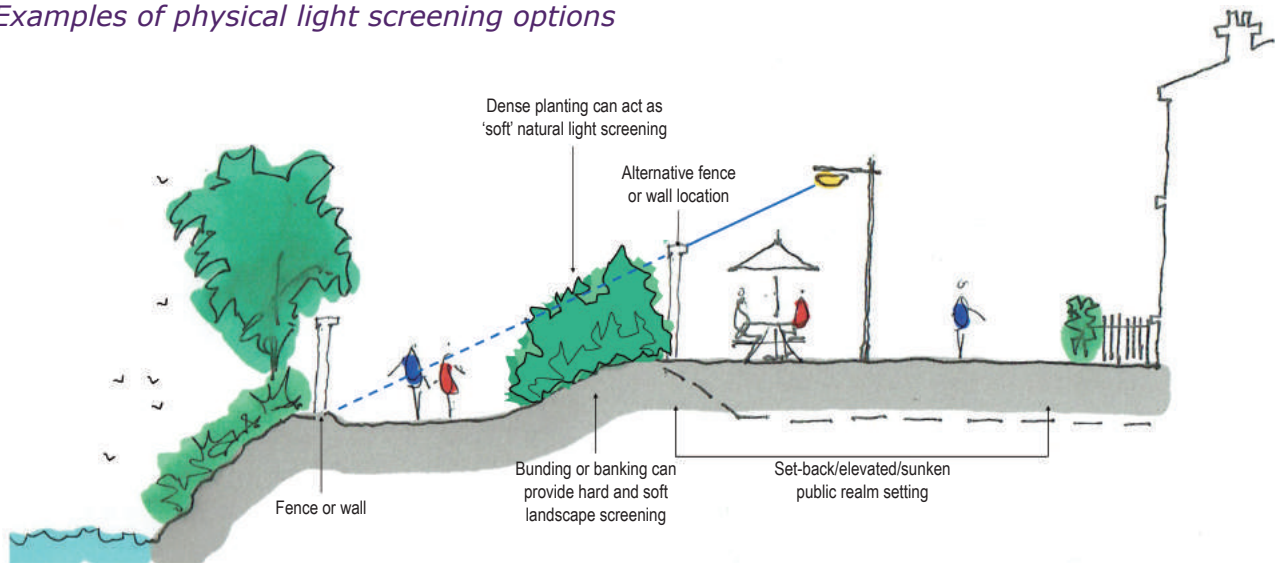
- It may be possible to include key habitats and features into unlit public open space such as parks and gardens.
- Buildings, walls and hard landscaping may be sited and designed so as to block light spill from reaching habitats and features.

Screening

Light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding (see figure overleaf for example of physical light-screening options). 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.

The planting of substantial landscape features integrated to the wider network of green corridors such as hedgerows, woodland and scrub is encouraged by

Examples of physical light screening options



planning policy and would make a long-term positive contribution to the overall bat habitat connectivity and light attenuation. A landscape architect can be appointed to collaborate with your ecologist on maximising these natural light screening opportunities.

It should be noted that newly planted vegetation (trees, shrubs and scrub) is unlikely to adequately contribute to light attenuation on 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 'instant hedgerows' or other similarly dense or mature planting, including 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.

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

Glazing treatments

Glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features. Where windows and glass

facades etc cannot be avoided, low transmission glazing treatments may be a suitable option in achieving reduced illuminance targets.

Products available include retrofit window films and factory-tinted glazing. 'Smart glass', which can be set to automatically obscure on a timer during the hours of darkness, and automatic blinds can also be used but their longevity depends on regular maintenance and successful routine operation by the occupant, and should not be solely relied upon.

Depending on the height of the building and windows, and therefore predicted light spill, such glazing treatments 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

The provision of new, additional or alternative bat flightpaths, commuting habitat or foraging habitat could result in appropriate compensation for any such habitat being lost to the development. Your ecologist will be able to suggest and design such alternative habitats although particular consideration 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 should be given.

Dimming and part-night lighting

Depending on the pattern of bat activity across the key features identified on site by your ecologist, it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

It should be noted that these systems depend on regular maintenance and a long-term commitment for them to be successful. Additionally, part-night lighting should be designed with input from an ecologist as they 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. 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 human 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.

Step 5: Demonstrate compliance with illuminance limits and buffers

Design and pre-planning phase

It may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.

A horizontal illuminance contour plan can be prepared by a suitably experienced and competent lighting professional (member of the Chartered Institution of Building Services Engineers (CIBSE), Society of Light and Lighting (SLL), Institution of

Lighting Professionals (ILP) or similar to ensure competency) using an appropriate software package to model the extent of light spill from the proposed 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.

Such calculations and documentation would need to be prepared in advance of submission for planning permission to enable the LPA ecologist to fully assess impacts and compliance.

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 horizontal calculation plane representing 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. Vertical planes will enable a visualisation of the effects of illumination at the various heights at which different bat species fly.
- Models should include light from all luminaires and each should be set to the maximum output anticipated to be used in normal operation on site (ie no dimming where dimming is not anticipated during normal operation).
- 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 one.

- Where dimming, PIR or variable illuminance states are to be used, an individual set of calculation results should accompany each of these states.
- 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 contour plan should be accompanied by a table showing their minimum and maximum 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 and transmissivity of windows. It should be assumed that blinds or curtains are absent or fully open although low-transmittance glazing treatments may be appropriate. 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. It is acknowledged that in many circumstances, only a 'best effort' can be made in terms of accuracy of these calculations.
- 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.

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 below 0.2 lux on the horizontal plane and 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 (Stone, 2012).

Baseline and post-completion light monitoring surveys

Baseline, pre-development lighting surveys may be useful where existing on- or off-site lighting is suspected to be acting on key 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, where screening should be implemented or establish a new illuminance limit reduced below existing levels. For example, where baseline surveys establish that on- and 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. Further information and techniques to deal with modeling pre-development lighting can be found in ILP publication PLG04 *Lighting Impact Assessments* due to be published late 2018.

Baseline lighting surveys must be carried out by a suitably qualified competent person. 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, for example, 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.

Baseline measurements should be taken systematically across the site or features in question. That is, 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.

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.

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

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.

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

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 that the lighting specification (including luminaire heights, design and presence of shielding etc) is as proposed.

All lighting surveys should be conducted by a suitably qualified competent person and 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.

Results should always be reported to the LPA as per any such planning condition. A 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.

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