

ANDREW SCOTT LTD

SPORTS PITCHES AT YSGOL GYFUN YSTALYFERA, NEATH PORT TALBOT

PRELIMINARY ECOLOGICAL APPRAISAL REPORT AND SUMMARY OF BAT SURVEY RESULTS

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SUMMARY

Soltys Brewster Ecology were commissioned to undertake an ecological appraisal of existing playing fields associated with Ysgol Gyfun, Ystalyfera (YGY) as part of the third phase of its redevelopment. The proposal is for a hockey pitch. Ecological baseline conditions at Phase 3 of the site were established from spring 2020 through a combination of desk study, Extended Phase 1 Habitat Survey & bat activity surveys.

Desk based consultation confirmed that the site itself does not hold any form of statutory or non-statutory nature conservation designation. Local records received from the South East Wales Biodiversity records Centre (SEWBRc) indicate the presence of a number of protected or notable mammal species associated with the surrounding area although these primarily relate to use of other school building by bats and of Otters associated with nearby watercourses.

The Ecological Appraisal undertaken in March 2020 identified that the site was dominated by amenity grassland and hard standing with some small areas introduced planted shrubs and scattered scrub. Generally the amenity field is considered of limited ecological interest and represents the most suitable area of the site to support development. The main potential constraint identified pertained to bats, where commuting links and areas of foraging opportunities for bats could be affected by additional light spill (from pitch floodlights) illuminating bordering vegetation of woodland to the east and riparian corridor to the west.

Automated Bat surveys identified that the western riparian corridor recorded higher numbers of Bat passes while the eastern border displayed a greater variety of bat species. Flood lighting timings and carefully considered pitch orientation will reduce light spill and minimise potential impacts to foraging bats, although removal or altering the existing street lamps is likely to have a greater beneficial effect if practicable.

Other consideration would include the avoidance of the bird nesting season (March-August) for any vegetation clearance. The use of native species or species of known benefit to biodiversity within the soft landscaping scheme would also be recommended and the provision of bird or bat boxes as part of the scheme (i.e. incorporated as on retained trees) would provide localised enhancement for these groups.

INTRODUCTION

- 1.1 Soltys Brewster Ecology were commissioned by Andrew Scott Ltd to undertake ecology surveys – entailing a Preliminary Ecological Appraisal and Bat Activity surveys - to inform the Pre-Application Consultation. The proposal is for the creation of a Multi-Use Games Area (MUGA) and a 2G astro turf (hockey pitch) on the existing hard surface compound area and grass playing fields to the east of the river (see Appendix I).
- 1.2 The works footprint of the proposed sports pitch and MUGA occupies an area of approximately 0.6 hectares and is centred at grid reference SN 77081 08842 (see location plan in Appendix I). The site is located immediately east of the river Twrch, YGY and Ystalyfera town and 350m North West of the river Tawe. To the North, West and South, the site is bordered by residential developments. Immediately adjacent to site along its eastern border lies an area of Broadleaved Woodland with agricultural land, watercourses, river and woodland further afield to the East and South East.
- 1.3 The current report presents the findings of an ecological desk study, Extended Phase 1 Habitat survey and Ground-Based Tree inspection, as well as both automated and walked transect bat activity surveys. The ecological desk study, Extended Phase I Habitat survey and Ground-based Tree Inspection were undertaken at the site in March 2020. The Bat Activity surveys were carried out in April, May and July of 2020, with the scope of the work discussed at the outset with the Local Authority ecologist. This report describes the existing ecological conditions as well as identifying any potential ecological constraints/opportunities associated with the proposed development at the site.

2.0 METHODOLOGY

- 2.1 In order to establish the baseline ecological conditions on site and in the adjoining habitats, a combination of desk-based consultation and Extended Phase 1 Habitat survey were undertaken in March 2020. With regard to bats, activity surveys were conducted over a three-month period (April – July 2020).

Desk study

- 2.2 The desk study primarily involved consultation with the South East Wales Biodiversity Records Centre (SEWBReC) in March 2020 to identify any records of rare, protected or notable flora and fauna within the site boundary and surrounding 1km area. In addition to the above, a search for relevant 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) was undertaken online via the Defra's MAGIC Map. A review of previous site survey work completed to inform Phases 1 – 3 of the redevelopment was also undertaken where appropriate.

Extended Phase 1 Habitat Survey

- 2.3 The fieldwork was undertaken on 19 March 2020 by a suitably experienced ecologist¹ and followed standard Phase 1 Habitat Survey protocol (JNCC, 1990) as amended by the Institute of Environmental Assessment (1995). All habitats within and immediately adjacent to the site were classified and mapped as accurately as possible. Habitats considered having 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.
- 2.4 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 Wales priority habitats as described under the Environment Act (Wales), 2016.
- 2.5 Any trees present on site or immediately adjacent/overhanging site were assessed from the ground using near-focus binoculars for their potential to support roosting bats and, along with the buildings 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 and Environmental Management. with 4+yrs Phase I survey experience
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- **High** - A structure or 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 structure or 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 structure 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 bats.

2.6 Additionally any species listed as a pernicious weed under Schedule 9, Section 14 of the Wildlife and Countryside Act 1981 (as amended) were also noted and mapped during the field survey. Examples of such species include Japanese Knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera*.

Phase 2 Bat Survey

2.7 The proposed playing fields site was considered to be of 'low/medium habitat quality' (as described in the BCT 2016 guidelines) due to the majority of the footprint being dominated by amenity grassland and hard standing. However, the areas of grassland are bordered by woodland to the east and a narrow riparian corridor to the west. Gardens lie to the north and a regularly managed blackthorn hedge to the south.

2.8 To provide an indication of bat activity within these habitats a programme of 3 dusk activity surveys and 3 *in situ* automated bat detector (Anabat Express units) surveys (over at least 5 consecutive days) were conducted, with the scope of work discussed/agreed with the local authority ecologist. The dusk activity surveys were conducted by a team of 2 surveyors walking a transect around the linear features that bordered site i.e. woodland edge, riparian edge and residential garden boundaries (Appendix III). The manual transects were conducted on the 20th April, 20th May and 15th July 2020. Activity surveys followed good practice guidelines as described by Bat Conservation Trust (2016) and were undertaken under suitable weather conditions (dry, temperature >10°C, light wind) (see Table 1). Bat calls recorded during the surveys were done so using an Echo Meter Touch 2 unit and were later analysed via desktop bat analysis software (Kaleidoscope Viewer).

2.9 The manual transect surveys were also supplemented by automated *in situ* detector surveys conducted between the 20th – 27th April, 20th – 26th May and 15th – 20th July 2020. The automated surveys included

the deployment of two bat detectors (Anabat Express units) around the perimeter features of the amenity grassland recreational field i.e. along the woodland edge and riparian zone. Recorded bat calls were later analysed via desktop bat analysis software (AnalookW and Anabat Insight). The aim of the surveys was to ascertain the bat species present; level of use of the site by bats and the resources the site provides for bats e.g. commuting habitat/ foraging resource. See plan included in Appendix III for map of the transect route during the activity surveys and the location of the automated detectors.

- 2.10 Some constraints were encountered during the automated surveys. On the third monitoring period (15th – 20th July) the static detector deployed along the riparian zone encountered a malfunction and did not record any data. It is not considered that this had a significant impact on the overall findings of the surveys.

Table 1 – Conditions for bat activity surveys.

Visit	Temperature (°C)	Weather conditions	Sunset	Start time	End time
20 th April 2020	14	No cloud cover or rain, moderate breeze	20:22	20:20	21:50
20 th May 2020	17	<5% cloud cover, no rain, no wind	21:10	21:10	22:40
15 th July 2020	16	Approx. 40% cloud cover, no rain, light breeze	21:27	21:27	22:57

3.0 RESULTS

Desk Study

- 3.1 A review of the SEWBrEC data search and Defra's MAGIC MAP confirmed that the site itself and surrounding 1km area does not contain any statutory nature conservation designations. Although several statutory sites exist slightly further afield in Powys.
- 3.2 Nant Y Rhos SSSI – a 2.5 ha species-rich fen meadow lies over 2km to the SE. A Local Nature Reserve, Nant Y Rhos is home to three wildflower meadows and broadleaved woodland. Based on the habitats present on the existing school playing fields (dominated by amenity grassland,) these Sites are not considered of particular ecological relevance to the current proposals. However, more mobile species such as birds and bats may use nearby off-site habitats for foraging opportunities.
- 3.3 SEWBrEC data confirmed records of a number of species in the surrounding 1km area including Hedge Bedstraw *Galium mollugo*, Rough Hawkbit *Leontodon hispidus*, Wood Sedge *Carex sylvatica*, Thyme-Leaved Sandwort agg. *Arenaria serpyllifolia*, Devil's-bit Scabious *Succisa pratensis*, Otter *Lutra lutra*, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Dipper *Cinclus cinclus*, Starling *Sturnus vulgaris*, Hobby *Hypotriorchis*, Tawny Owl *Strix aluco*, Swallow *Hirundinidae* Hedgehog *Erinaceus europaeus*, Badger *Meles meles*, Grass Snake *Natrix natrix*, and Stag Beetle.
- 3.4 A number of these records were associated with habitats in areas other than the site and were not considered of relevance to the playing fields, based on the known habitat preferences of the species listed above. Although some, such as Hedgehogs, may make use of foraging opportunities – albeit limited – of the amenity grassland. There are 19 records of Otter associated with the nearby river and a known Common Pipistrelle roost located in one of the new school buildings (Primary block). Mobile species such as birds and bats in the surrounding area are considered of some relevance to the site. Although there is better quality off-site roosting and foraging opportunities. A line of mature planted Beech *Fagus sylvatica* is situated on the east boundary; one Beech tree has fallen and another with stem decay displays Moderate Potential to support roosting bats.

Extended Phase 1 Habitat Survey

- 3.5 The distribution and extent of habitats within and adjacent to the site is illustrated with accompanying target notes in Appendix II. The site is dominated by amenity grasslands and hardstanding. The bare ground areas also hold some ruderal vegetation whilst some instances of encroaching scrub, bracken and introduced shrubs are displayed on the eastern and northern borders of the amenity grassland.

Amenity grassland

- 3.6 Mainly used as playing fields, the amenity grassland (Target Note 3) sward is kept short. For the most part, the field displays limited species diversity including Cock's Foot *Dactylis glomerata*, Perennial Ryegrass *Lolium perenne*, Annual Meadow Grass *Poa annua*, White Clover *Trifolium repens*, Daisy *Bellis perennis*, Dandelion *Taraxacum officinale*, Ribwort Plantain *Plantago lanceolata*, Creeping Buttercup *Ranunculus repens* and one small clump of Wood Avens *Geum urbanum*. A small area of wetter ground is marked by localised soft rush (see Target Note 3 in Appendix II).

Bracken and other Scrub & Shrubs

- 3.7 In the NE corner of site a small but dense bracken clump exists (see Note 10, Appendix II) but forms part of the northern border vegetation that lines the site side of residential garden boundaries. Other shrubs and scrub that make up the rest of this 'gappy' feature include Bramble, Ferns, Cypress, Laurel and other garden ornamentals and escapees.

Buildings and hardstanding

Buildings and hardstanding areas comprise the existing compound and associated prefabricated single-storey building. It is mostly devoid of any vegetation, with exception to a small number and thinly dispersed ruderal plants such as Curled Dock, Buddleia and Groundsel.

Fauna

- 3.8 During 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 listed under Section 7 of the Environment (Wales) Act;
 - Nationally rare or nationally scarce species;
 - Species of Conservation Concern (e.g. JNCC Red List, RSPB/BTO Red or Amber Lists);

Bats

- 3.9 The site supported a single prefabricated building and has no features which provide any opportunities for roosting bats. A single flat roof prefabricated building is the only structure on site (Target Note 2, Appendix II); it is associated with its previous use as a school sports area and its current use as a compound. Given the lack of entry points, suitable roof voids or crevices, roosting bats are unlikely to find any opportunities in existing onsite structures. This building was considered of negligible potential to support roosting bats.
- 3.10 A short mature treeline comprised of Beech that extended to the west as a finger from the eastern woodland (Plate 5 Target Note 6) was considered to be of low/moderate due to the small amounts of deadwood and height of trees. The only Moderate Potential tree was the northern most standing Beech tree (Target Note 8, Appendix II) due to potential of a cavity from stem decay to provide suitable roosting opportunities for bats. It is accessible from ground level and lends itself well to an internal inspection via use of an endoscope. The rest were of low bat roosting potential due to the lack of obvious bat roosting features on the trunks and branches (BCT, 2016).
- 3.11 The woodland edge on the east of site (Target Notes 2, 7, & Plate 13) contained a variety of mature trees that contained several potential bat roosting features associated with dead wood, holes and ivy. It is considered highly unlikely that the proposed development will affect these trees.
- 3.12 In general, linear features such as hedgerows, treelines and woodland margins were considered as likely to be utilised as a foraging and commuting resource for the local bat species.

Plate 13: South western woodland edge with mature trees.



Badger

- 3.13 Three records of Badger were identified within the 1km search buffer of the site although no evidence of use of the site by Badger was found during the current survey onsite or along boundary features (i.e. setts, latrines/dung pits and/or feeding signs) during the survey and no setts were identified onsite. Badgers are not considered to be of ecological relevance to the proposals although habitats onsite could be used as an occasional foraging resource for this species.
- 3.14 SEWBRc data search identified multiple records of badgers within the surrounding woodland with the closest record approximately 500m from the centre of the application site. Badgers will not be considered further in this report.

Dormice

- 3.15 There was one intact species poor hedgerow associated with a private lane to the south of the site. It was almost entirely Blackthorn and regularly managed. A Hazel nut search was not conducted onsite due to the absence of Hazel within the Hedgerow and limited availability in the woodland. A single record was returned by SEWBRc across the river approximately 1900m west of site. Dormice cannot be precluded from site but due to the types and extents of habitats on and adjacent to site as well as the limited records, their presence, and the risk of any development related impacts, is considered very unlikely.

Reptiles

- 3.16 With the only available amenity grassland being tightly mown and disturbed by human footfall with no direct links to habitats outside of the site, their presence on site is very unlikely. No suitable habitat is present and Reptiles are not considered to be of ecological relevance in within the context of the site.

Amphibians

- 3.17 There are no records and no suitable habitat on site for amphibians and as such are not considered of relevance to the report or works proposed within the context of the site.

Birds

- 3.18 During the walkover survey conducted on the 19th March, a number of bird species were noted on or flying over the site including Chaffinch *Fringilla coelebs*, Wood Pigeon *Columba palumbus*, Magpie *Pica pica*, Great Tit *Parus major*, Blue Tit *Cyanistes caeruleus*, , Pied Wagtail *Motacilla alba*, Robin *Erithacus rubecula*, Blackbird *Turdus merula*, Wren *Troglodytes troglodytes*, Common Gul *Larus canus* and House Sparrow *Passer domesticus*. Although the bird species present at the time of surveys are considered typical in terms of the displayed assemblage it would not be considered representative of the full range of species that the site could potentially support (in winter, during the breeding season etc.).

Phase 2 Bat Survey

Walked Transect

- 3.19 Bat species and behaviour recorded during the activity transects and their locations are displayed in Appendix III. In general, the level of bat activity was considered to be between low/moderate across the site, with relatively small numbers of bat passes recorded during the transect activity surveys. A limited range of bat species were recorded during the surveys with passes recorded only for Common Pipistrelle and Soprano Pipistrelle. The highest level of bat activity recorded/observed was during the first activity transect conducted in April 2020.
- 3.20 During the 20th April dusk survey 163no. bat passes were recorded, with most of these calls produced by Common Pipistrelle (see Figure 1). During the 20th May dusk survey 95no. bat passes were recorded, with most calls again attributed to Common Pipistrelle (see Figure 2); whilst during the 15th July dusk survey 131no. bat passes were recorded and of these 122no. calls were produced by Common Pipistrelle (see Figure 3). It should be noted that the number of bat passes does not necessarily correlate with bat numbers.
- 3.21 During the transect surveys the majority of bat activity (most number of bat passes/observations) was associated with the eastern woodland margin, southern hedgerow boundary and residential gardens along the northern boundary (listening stops 1, 2 and 4). A limited level of bat activity was associated with the areas of amenity grassland and western field boundary (listening stop 5). This boundary was illuminated by artificial lighting throughout the surveys. During the third survey visit in July 2020 approx. 5-6 individual Common Pipistrelle bats were observed foraging within the rear gardens of the residential properties at the north-west corner of the site. On each survey occasion, a number of Common and Soprano Pipistrelle bats were also observed foraging within the tree canopies at listening stop 2. Small numbers of Pipistrelle bats were observed commuting along the eastern woodland boundary and southern hedgerow on each survey visit.

Figure 1 – Bat activity recorded during the 20th April dusk survey.

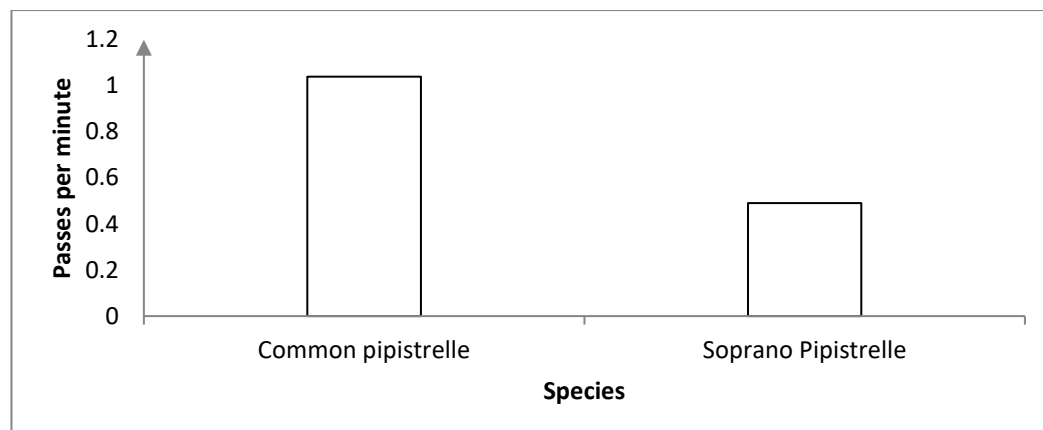


Figure 2 – Bat activity recorded during the 20th May dusk survey.

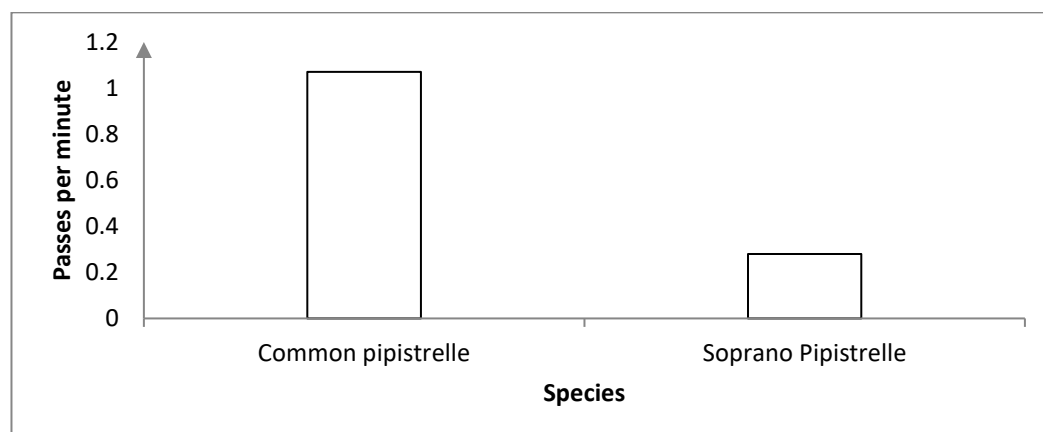
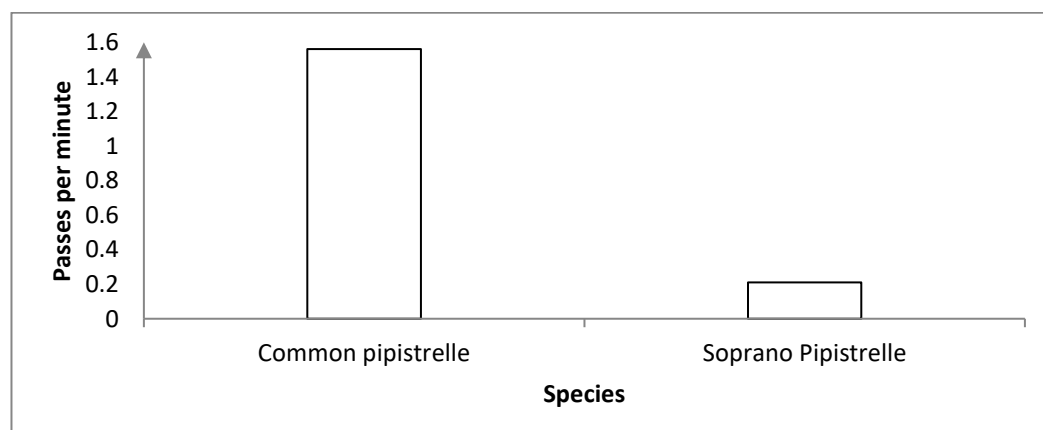


Figure 3 – Bat activity recorded during the 15th July dusk survey.



Automated detector surveys

- 3.22 Anabat express units were deployed onsite (see Appendix III for locations) for a series of three recording sessions (20th – 26th April, 20th – 25th May and 15th – 20th July 2020). A summary of the results are displayed in Figures 4 - 8. Over the three recording sessions, at least 6no. species of bats were positively recorded at the site including Common and Soprano Pipistrelle, Noctule, Serotine, Brown Long-Eared and *Myotis* sp. bat. A number of the *Myotis* sp. calls that were recorded were indicative of Natterer's *Myotis nattereri*.
- 3.23 The automated surveys recorded an increase in species diversity compared to those recorded during the manual transect surveys. The majority of the bat passes recorded by the automated detectors during all sessions were attributed to Common and Soprano Pipistrelle with approx. 93% of the calls recorded by the static detectors in the first session being produced by Pipistrelle species, approx. 94% of the calls recorded during the second session and approx. 97% in the third recording session. It should be noted that the number of bat passes does not necessarily correlate with bat numbers.
- 3.24 The automated detectors recorded smaller numbers of *Myotis* sp., Brown Long-Eared bat and large bat species (Noctule and Serotine) during the monitoring sessions. Brown Long-Eared bat was only recorded 6 occasions on a single night (16th July 2020) along the eastern boundary. Serotine was only recorded on 3 occasions along the eastern boundary during the April 2020 recording period. Low levels of *Myotis* sp. and Noctule activity were recorded at both detector locations on all 3 monitoring sessions.
- 3.25 It was evident from the results that the automated detector location associated with the highest level of bat activity (largest number of bat passes recorded) was located along the western boundary/riparian corridor, whilst the detector deployed along the eastern boundary was associated with the greatest diversity of bat species identified. The maximum number of bat passes recorded at a single location on a single night during the recording sessions was 273no. passes along the western boundary on 20th April 2020. In total, 1182no. bat passes were recorded during the April monitoring session, 591no. passes during May and 435no. passes during July.

Figure 4 – Passes per night April session detector 1 (western boundary)

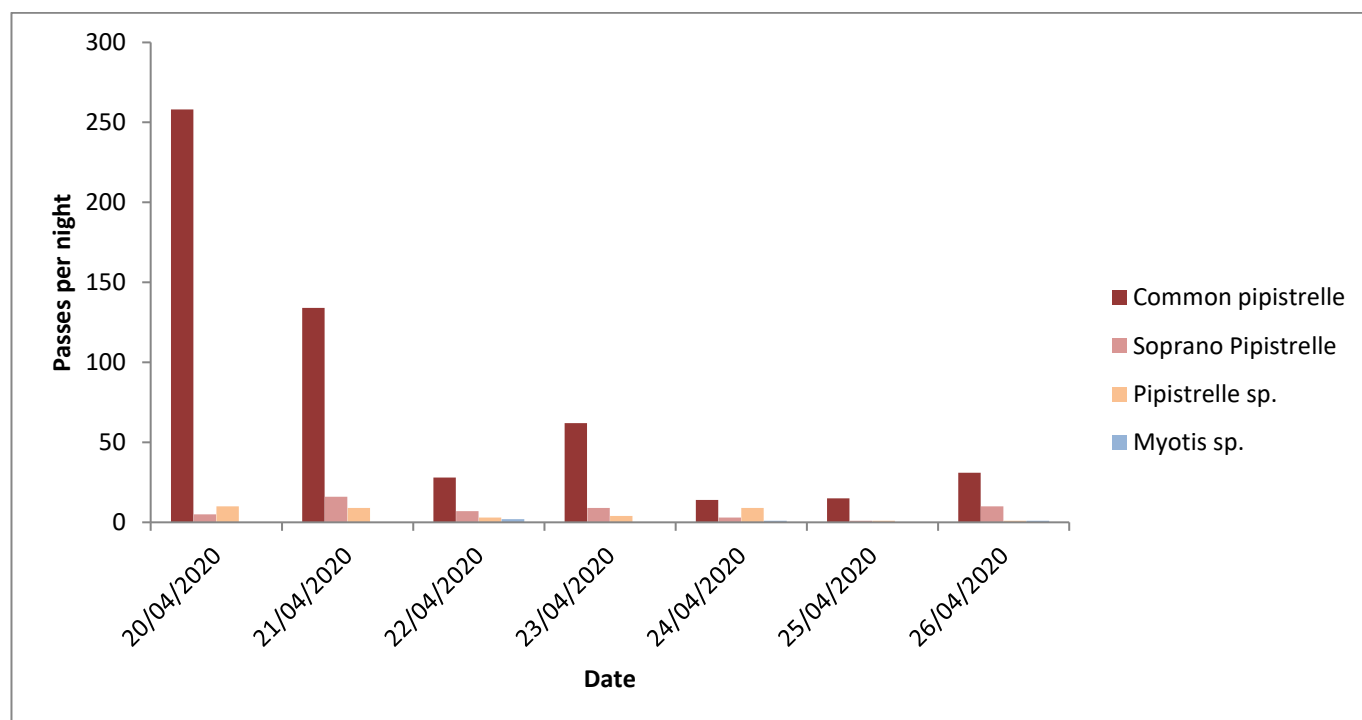


Figure 5 – Passes per night April session detector 2 (eastern boundary)

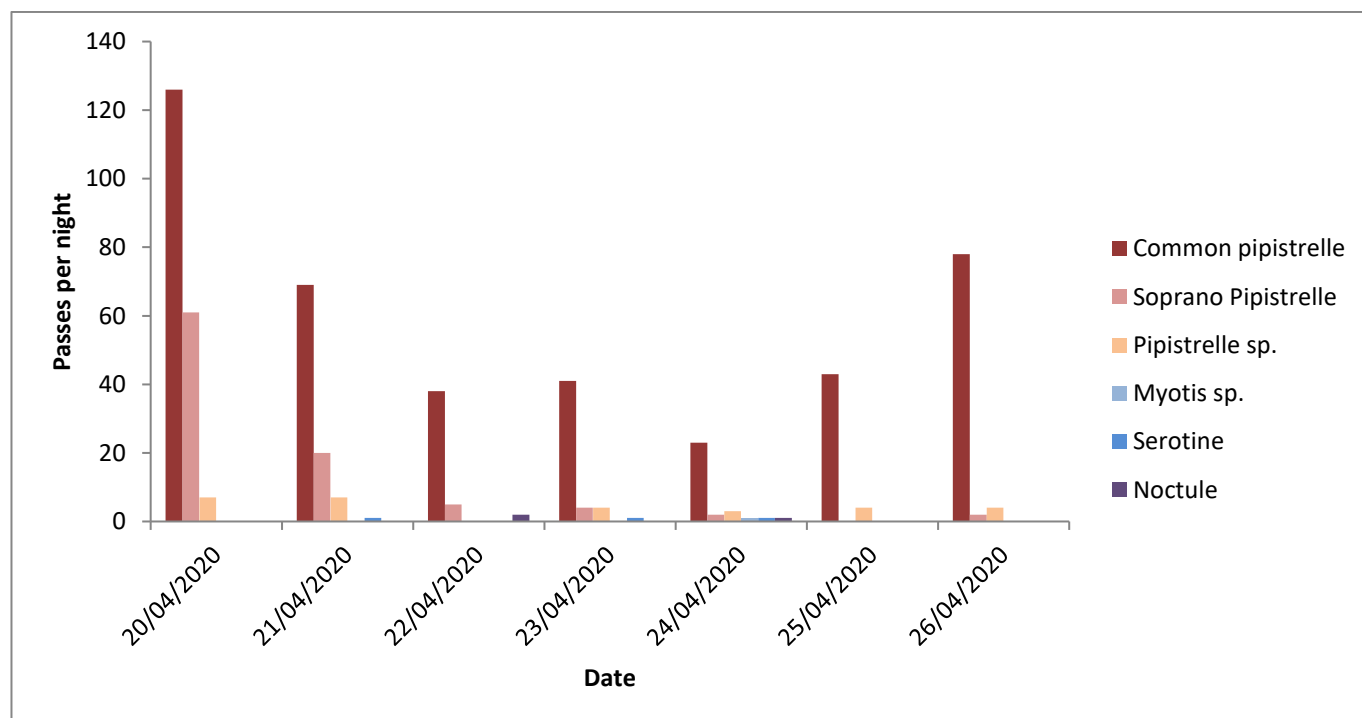


Figure 6 – Passes per night May session detector 1 (western boundary)

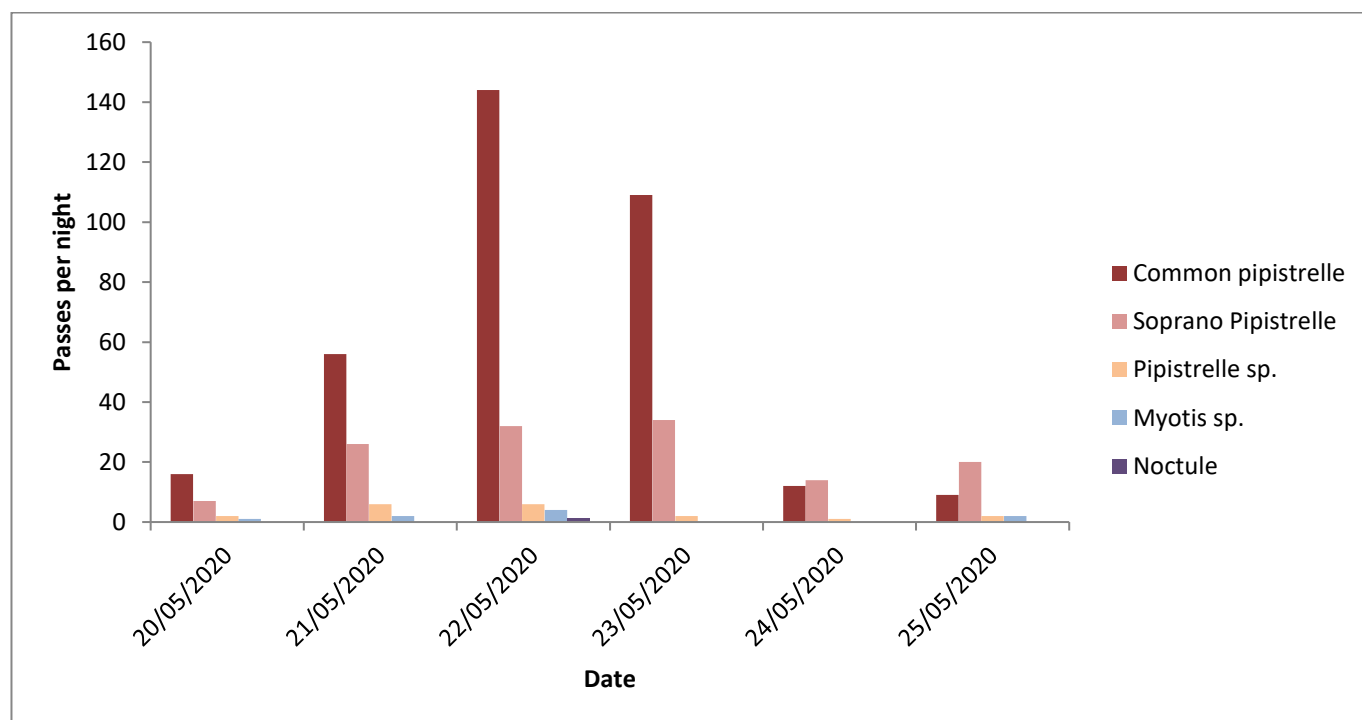


Figure 7 – Passes per night May session detector 2 (eastern boundary)

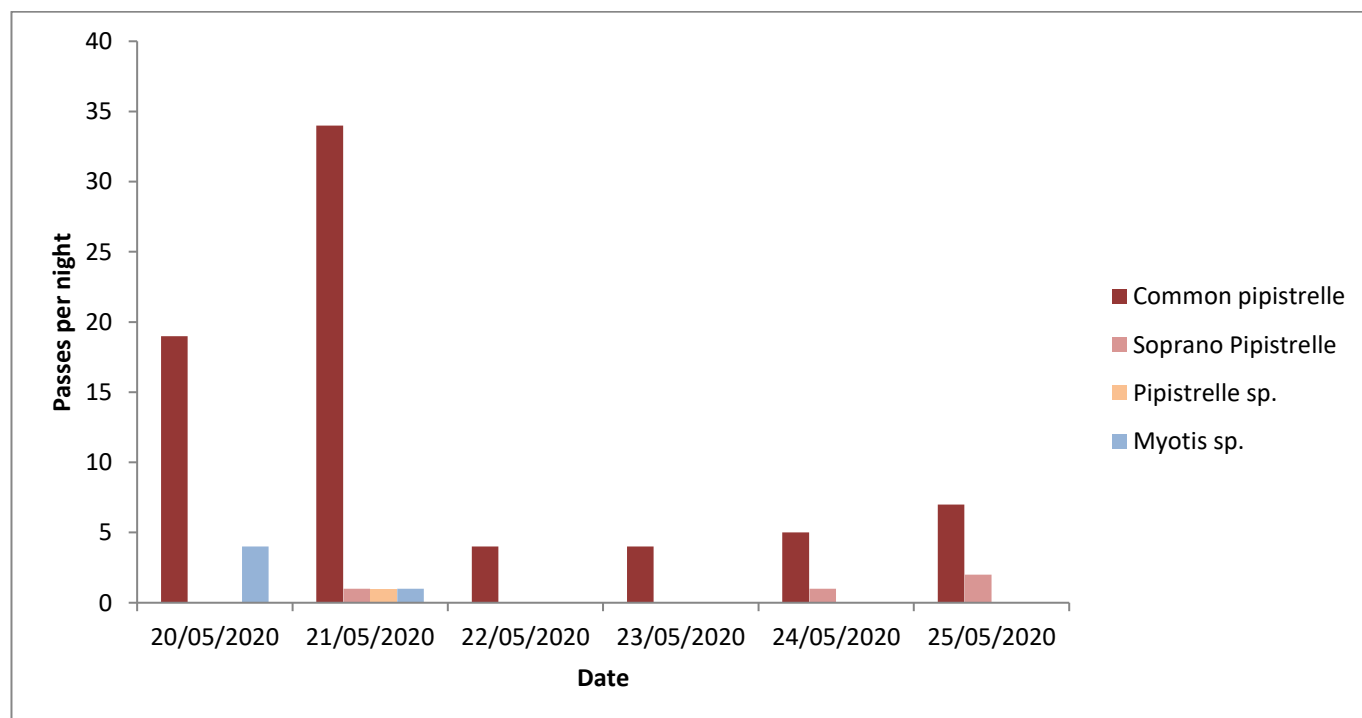
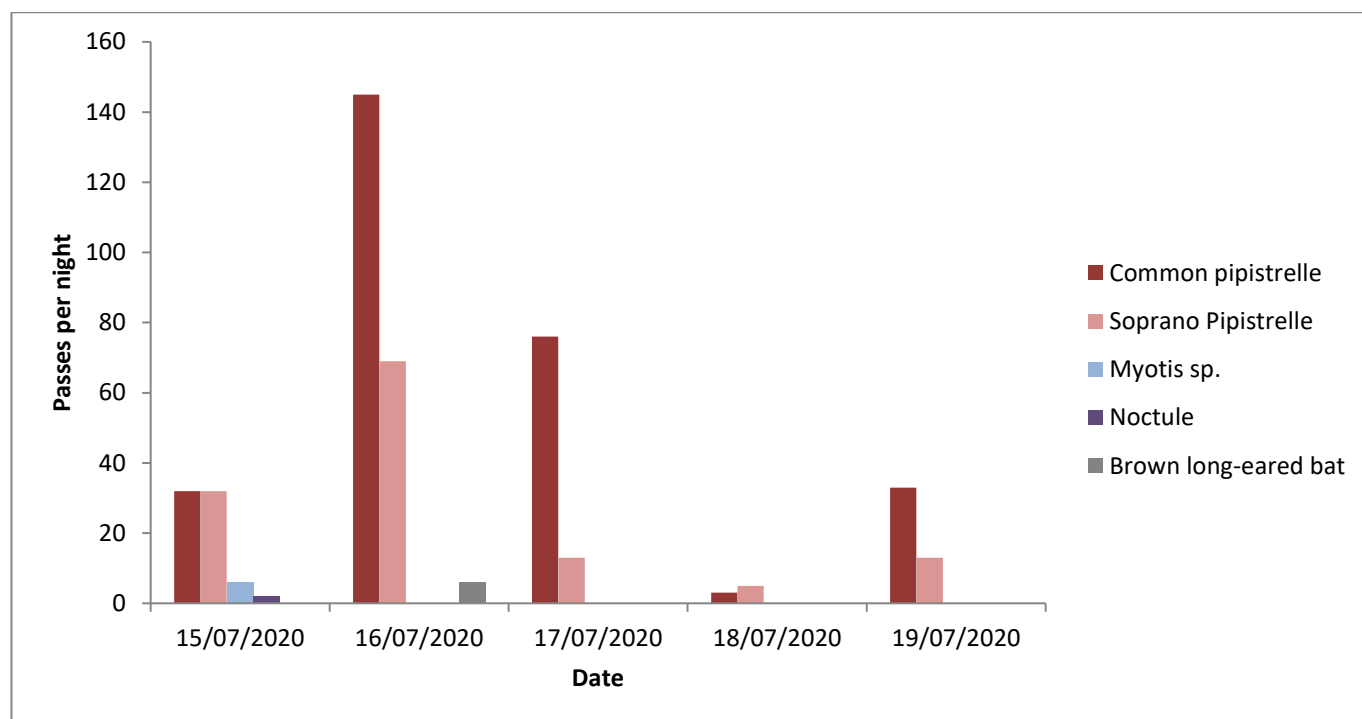


Figure 8 – Passes per night July session detector 2 (eastern boundary)



4.0 POLICIES, PLANS AND LEGISLATION

4.1 The following international, national and local legislation and planning policies and plans pertaining to nature conservation and biodiversity are considered of some relevance to the site surveyed and to the proposed works.

Planning Policy Wales (2018)

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.

Environment (Wales) Act, 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.

Wildlife and Countryside Act (As Amended) 1981

Under Part 1 of the Wildlife and Countryside Act 1981 all birds, their nests and eggs are protected by law and it is an offence, with certain exceptions, to:

- a) intentionally kill, injure or take any wild bird;
- b) intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- c) intentionally take or destroy the egg of any wild bird.

Other sections of the Act are also of relevance to the site and existing ecological features including Schedules 5 and Schedule 9 relating to the protection of animals (such as reptiles and bats) and non-native invasive weeds (such as Himalayan Balsa *Impatiens glandulifera*) respectively.

Local Planning Policy

The LDP for Neath Port Talbot was adopted in 2016 superseding the Unitary Development Plan, and provides the basis for decisions on land use planning in the County Borough up to 2026. Policies of relevance to the development include:

Policy SP 15

Biodiversity and Geodiversity. Important habitats, species and sites of geological interest will be protected, conserved, enhanced and managed through the following measures:

1. *The identification of the following Internationally and Nationally designated sites within the County Borough to enable their protection:*
 - (a) *Special Areas of Conservation (SACs) and Ramsar Sites;*
 - (b) *Sites of Special Scientific Interest (SSSIs);*
 - (c) *National Nature Reserves (NNRs).*
2. *The identification and protection of sites of regional and local importance;*
3. *The protection of important natural heritage features.*

Policy EN 6

Important Biodiversity and Geodiversity Sites Development proposals that would affect Regionally Important Geodiversity Sites (RIGS), Local Nature Reserves (LNRs), Sites of Interest for Nature Conservation

(SINCs), sites meeting SINC criteria or sites supporting Local Biodiversity Action Plan (LBAP) or S42 habitats or species will only be permitted where:

- 1. They conserve and where possible enhance the natural heritage importance of the site; or*
- 2. The development could not reasonably be located elsewhere, and the benefits of the development outweigh the natural heritage importance of the site. Mitigation and/or compensation measures will need to be agreed where adverse effects are unavoidable.*

Policy EN 7

Important Natural Features Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows / field boundaries, watercourses or ponds will only be permitted where:

- 1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or*
- 2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.*

5.0 CONCLUSIONS AND RECOMMENDATIONS

- 5.1 The combination of desk study and field surveys undertaken at the site identified a limited range of habitat types dominated by an amenity grassland playing field and hard standing with a single story prefabricated building. Small areas of garden scrub and marginal woodland vegetation as well as a small patch of soft rush make up the remainder of the existing habitat types. The amenity grassland field in its current condition is not considered to hold particular intrinsic ecological value; and, in combination with the existing hard standing is considered the most suitable area for any development works. The integrity of linear features beyond the site boundary should be carefully considered during the proposed works. In particular for mobile species such as birds and bats which are likely to utilise these features for foraging and commuting purposes.

Bats: Roosting

- 5.2 All buildings within the site affected by the proposed development were not found to be suitable for use by roosting bats.
- 5.3 Some limited potential was identified with the mature trees along the eastern boundary; in particular a moderate potential Beech tree. No trees within the site will be felled/removed by the proposed development. As such all identified features albeit mainly low potential will be retained. However, there was still some risk associated with light spill. Discussions with the client allowed the orientation of the pitch to be altered to minimise risk of light spill onto the woodland edge and bat activity surveys were also undertaken. It is recommended that the newly agreed pitch orientation is adhered to. On that basis, it is considered that an adverse impact to roosting bats is unlikely within the context of the site. A plan showing the revised pitch orientation and lux calculations is included in Appendix IV. This demonstrates that light spill outside the confines of the pitch reduces to a maximum of approximately 0.5 lux alongside the retained vegetation corridors. It is however understood that this does not take into account existing street lighting (see target note 10 appendix II), which may produce more light spill than the proposed development due to the vicinity of the street lamps to the trees.
- 5.4 Any clearance or work to a moderate or higher potential tree will require further bat survey. However, currently no such work is proposed.

Bats: Activity

- 5.5 Main usage of the sports pitches is for the school and therefore will mostly take place during school (daylight) hours. However, it will also be open to clubs and public, although it is understood that lighting of the sports pitch is intended only for periods of dark up until 21:00 in the evening. Over parts of the active bat season (May – August), it is unlikely that some bats, in particular light sensitive species, will have emerged by this time. As such, design and usage of pitch lighting - in combination with the improved orientation – is considered to have minimised potential affects at the design stage (see plans in Appendix IV).
- 5.6 A review of the bat passes recorded with automated detectors identified that a higher volume was associated with the western boundary (riparian zone) than with the eastern woodland boundary, yet diversity (number of recorded bat species) was higher within the woodland. The difference in numbers was mainly associated with pipistrelle species which are known to be less light averse than other bat species (e.g. myotis). Given the existing tall lighting columns situated along the track that runs parallel to the western boundary river and trees, prey from the river habitat is may be drawn to the lights, in turn attracting foraging pipistrelle species to such illumination.
- 5.7 Due to the vicinity of such tall columns, it is considered that an opportunity to reduce overall illumination of the riparian habitat exists by converting said lighting specification to something less intrusive – such as bollard lighting. This may allow more light sensitive species to utilise nearby riparian foraging opportunities.
- 5.8 Given that the new orientation of the sports pitch and its intended schedule is unlikely to have a significant adverse impact on foraging bats, changing the existing lighting along the western boundary path may hold potential for a net reduction in illumination as a result of the development and therefore, a possible beneficial impact. As such this approach is recommended to be considered.

Birds

- 5.9 Given the chance of birds nesting on site, clearance of trees and scrub vegetation associated with any future development should be undertaken outside of the bird nesting season (i.e. clearance possible between September and February inclusive). Demolition of the prefabricated building outside the bird nesting season would also be recommended, although no nesting behaviours were observed during the survey; it was early season (March) and birds using the roofs for nesting cannot be precluded. All wild birds are protected against killing and injury under the Wildlife and Countryside Act 1981 (as amended) and their nests against damage or destruction whilst in use or being built;

Other considerations

- 5.10 Further recommendations include the use of native species or species of known benefit to wildlife in any soft landscaping scheme associated with future development. Taller shrubs or trees may also provide additional shielding from proposed lighting and could also be considered as part of any soft landscape design. The incorporation of bird boxes as part of any proposed development – e.g. on retained trees - would also provide localised enhancement for these groups.

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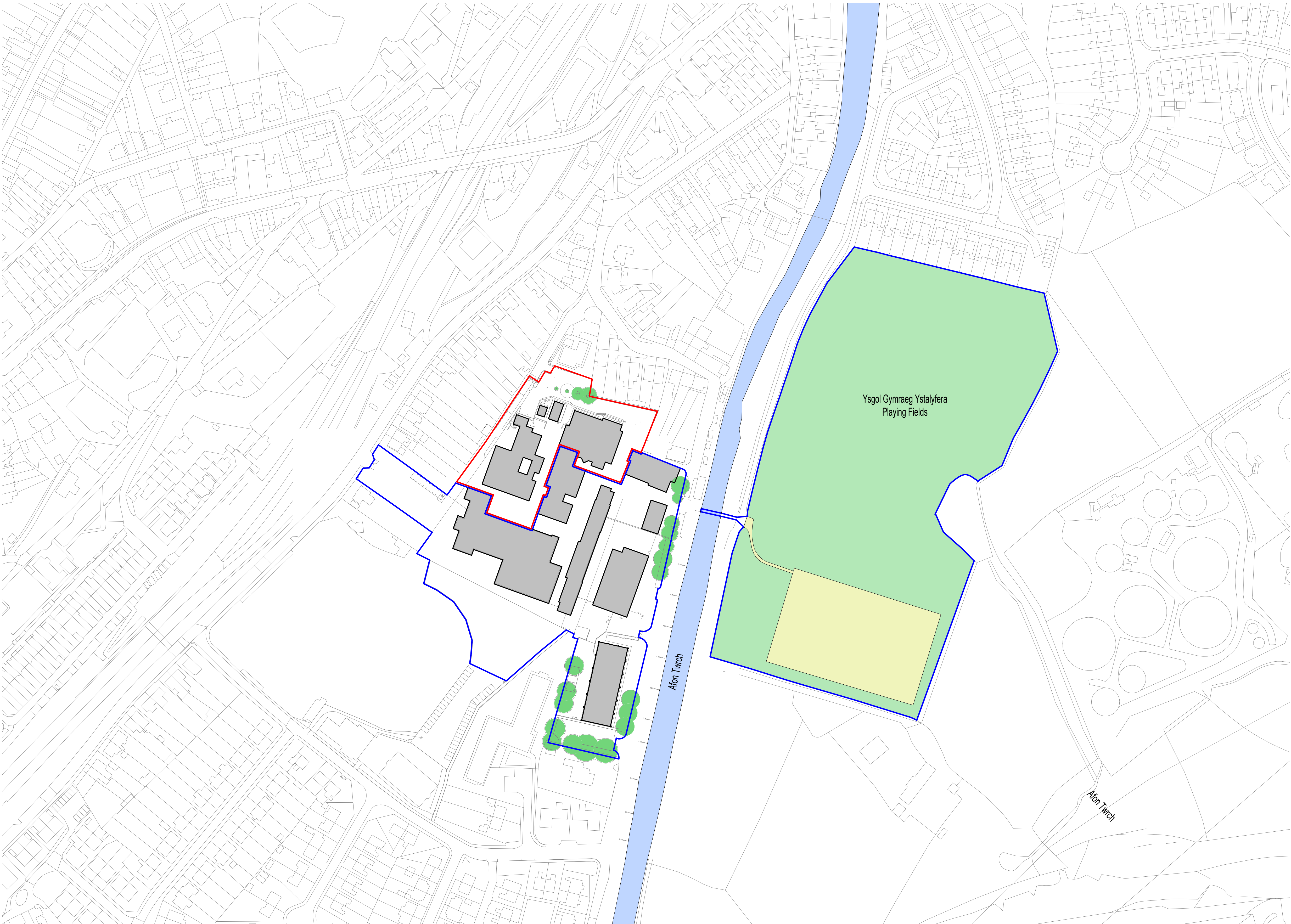
Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708–746

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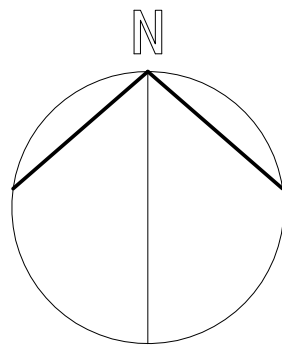
Mitchell-Jones, A.J. (2004) *Bat mitigation guidelines; January 2004*. English Nature. Peterborough.

APPENDIX I SITE LOCATION PLAN & PROPOSED LAYOUT PLAN



Location Plan - Ysgol Gymraeg Ystalyfera
1 : 1250

Construction (Design and Management) Regulations
Design risk assessments are carried out throughout the design stages of this project in accordance with company procedures and manuals. Where reasonably possible all areas of risk applicable to design and end use of the construction have been identified and then eliminated, mitigated or recorded as a residual risk. Note that general risks of which a competent designer or contractor should be aware are not included. This drawing is to be read in conjunction with the Pre-construction Information and all related documents prepared in accordance with the current Construction (Design and Management) Regulations 2015 and all applicable Health and Safety Legislation as currently amended.



P01	Site Boundaries amended RE CE CE	26/03/2020
P00	First Issue RE CE CE	16/03/2020
REV	DESCRIPTION DRAWN BY CHECKED BY APPROVED BY	DATE
RIBA PLAN OF WORK 2013 WORKSTAGE	LEVEL OF MODEL DEFINITION (LoD)	
Stage 3 - Developed Design	LoD 3 - Approximate Model	
PURPOSE OF ISSUE - SUITABLE FOR ...	BS1192 STATUS	
Information	Status S2 - Information	



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PROJECT TITLE
Ysgol Gymraeg Ystalyfera - Phase 3

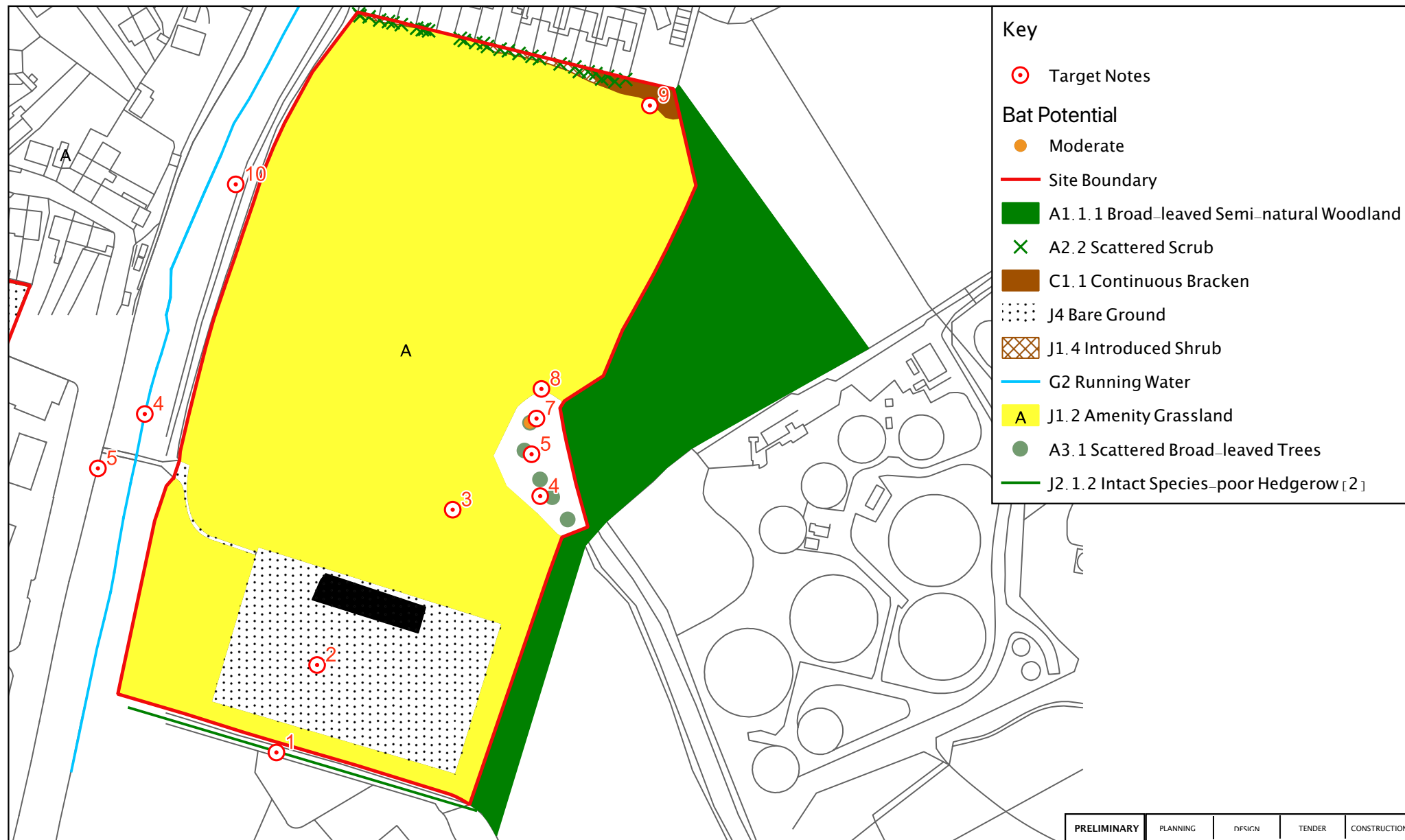
DRAWING TITLE
Location Plan - Ysgol Gymraeg Ystalyfera

PROJECT No 19194 SCALE @ A1 1 : 1250

DRAWING No	PROJECT	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER	REVISION
19194-001	YG-Y-LAW-X-X-DR-	A-039101	P01					

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APPENDIX II TARGET NOTES TO ACCOMPANY PHASE 1 HABITAT SURVEY MAP



PRELIMINARY	PLANNING	DESIGN	TENDER	CONSTRUCTION
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Andrew Scott Ltd

Phase I Habitat Map

**Sports Pitches at Ysgol Gyfun Ystalyfera,
Neath Port Talbot**

E20944001/D02

BF

MW

03 August 2020

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Ysgol Gyfun Ystalyfera Playing Fields, Neath Port Talbot

Target Notes Phase I Survey, March 2020

Target Note	Description/comment
General	Day-time inspection of existing habitat types and assessment of bat roost potential of trees within Phase3 areas of the Ystalyfera School redevelopment
Note 1 – Species poor intact hedge	A stockproof managed Blackthorn hedge runs along the southern border of the playing fields. It has a few woodland herbs amongst the ground vegetation which include: Celandine, Herb Robert, Hearts-tongue Fern, Lords and Ladies, Germander Speedwell, Fox Glove as well as Nettles, Yarrow, Cocksfoot and Broad-leaved Dock. 
Note 2 – Old sports pitch	Mostly consisting of hard-standing, the old sportspitch is fairly rundown with patchy ephemeral vegetation such as Buddleiaha, Curly Dock and Groundsel.

Target Note	Description/comment
	
Note 3 – Grass playing fields	Likely to be previous agricultural land, what would be considered improved grassland should it be left to grow will be recorded as amenity grassland for the purposes of this report due to its current use. Species present include: Cocksfoot, Annual meadow grass, Yorkshire Fog, Daisy, Chickweed, White Clover, Common Sorrel, Curly Dock, Dandelion, Creeping Buttercup. There is also a wetter area in the south east corner characterised by a cluster of Soft Rush. The woodland edge –predominantly Ash, with Oak and Beech, had an understory of Holly, Goat Willow and Dog Rose – displayed some further ground species that blurred the edge of the playing field; Nettles, Curled dock, Ribwort Plantain, Shephard’s Purse, 

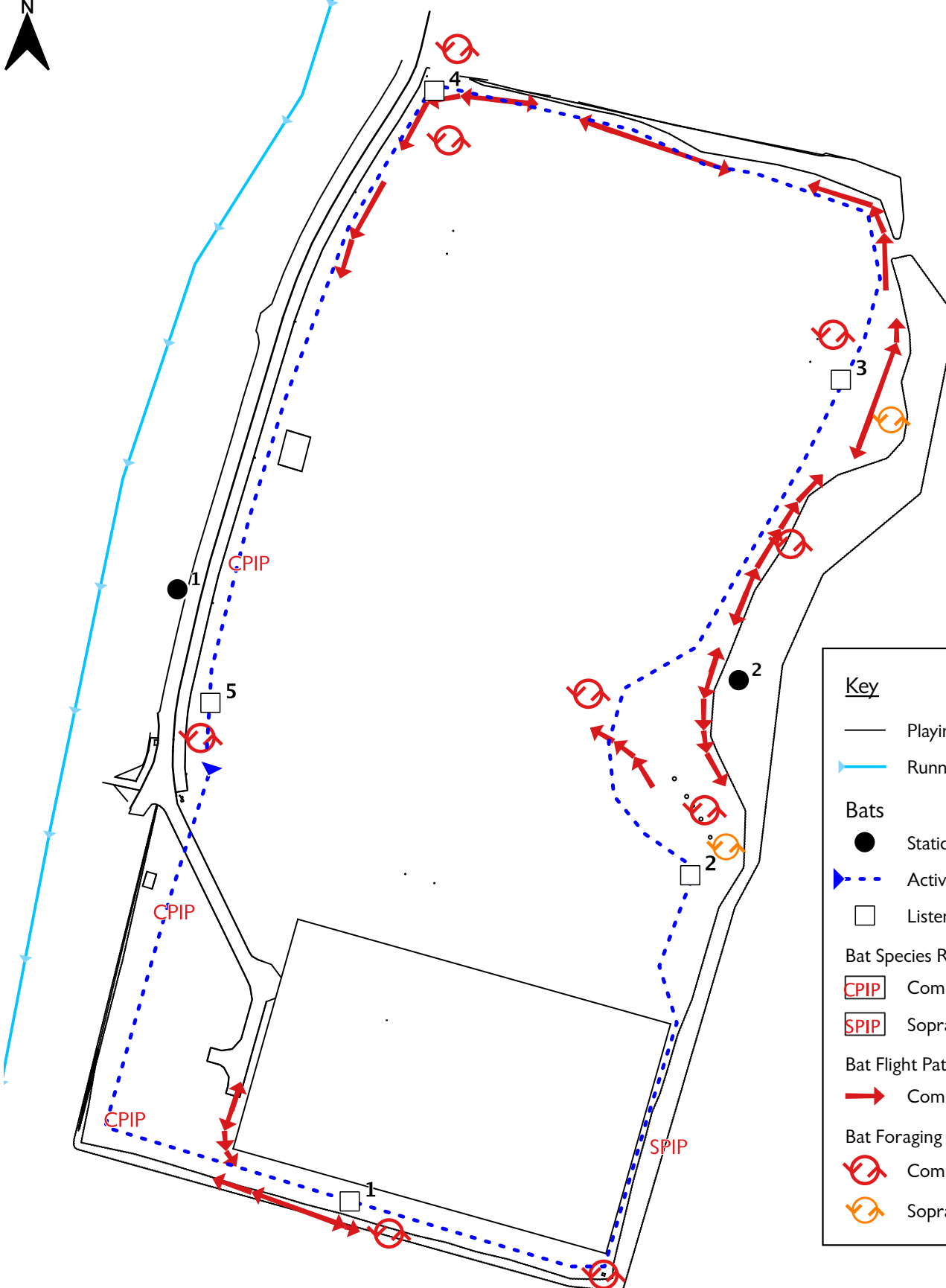
Target Note	Description/comment
	
Note 4 – Line of Planted Beech	A line of planted Beech trees exists along the eastern border of the playing fields and contains a couple with bat potential. See target Notes 10 and 11 respectively 
Note 5– Low Potential Beech	Small rot hole from decay of missing secondary limb at about 4m height, south facing.

Target Note	Description/comment
	
Note 7 – Moderate Potential Beech	Ground level decay on north side of stem with cavity at apex of feature. Extent of cavity unknown, a ground inspection of the cavity with an endoscope would provide additional information on survey requirements. 

Target Note	Description/comment
Note 8 – Fallen Beech	A fallen Beech with damaged limbs may provide opportunities for roosting bats in the future if it remains, no significant decay or crevices at present. 
Note 9 – Scrub and Bracken along northern boundary of playing fields adjacent to residential plots.	Species include: Bracken, Bramble, Ferns, Cypress, Laurel, Bindweed and a number of ornamental garden escapees. 

Target Note	Description/comment
Note 10 – Lighting along western boundary	

APPENDIX III BAT SURVEY RESULTS



Key

—

Playing Fields Layout

—

Running Water

Bats

●

Static Detector

—

Activity Transect Route

□

Listening Stop

Bat Species Recorded

CPIP

Common Pipistrelle

SPIP

Soprano Pipistrelle

Bat Flight Path

→

Common Pipistrelle

Bat Foraging

↻

Common Pipistrelle

↻

Soprano Pipistrelle

Andrew Scott Ltd

Ysgol Gyfun Ystalyfera

E2094401/003

Bat Activity Transect Survey Plan 2020

DJ

MW

16 July 2020

PRELIMINARY

PLANNING

DESIGN

TENDER

CONSTRUCTION

soltysbrewster

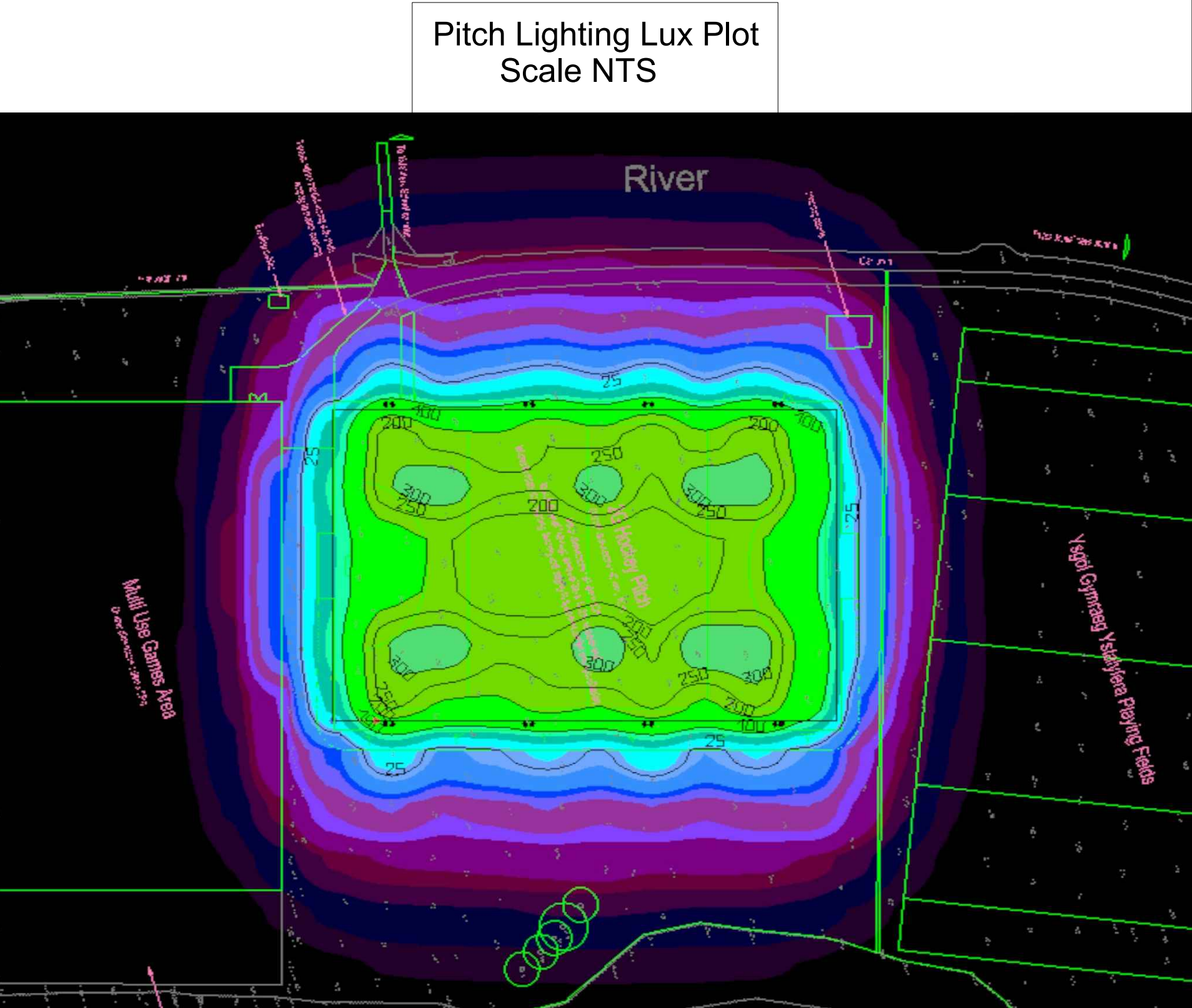
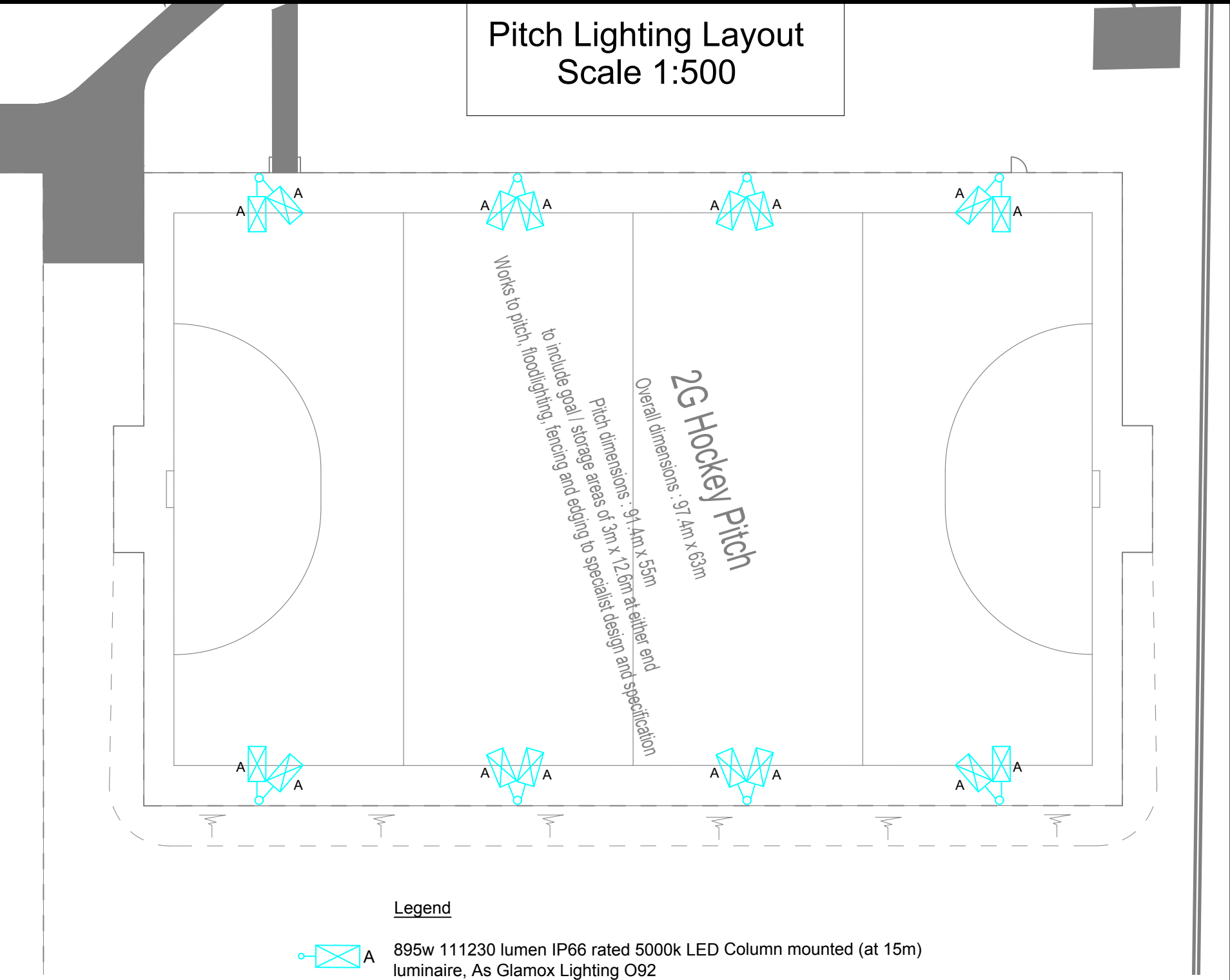
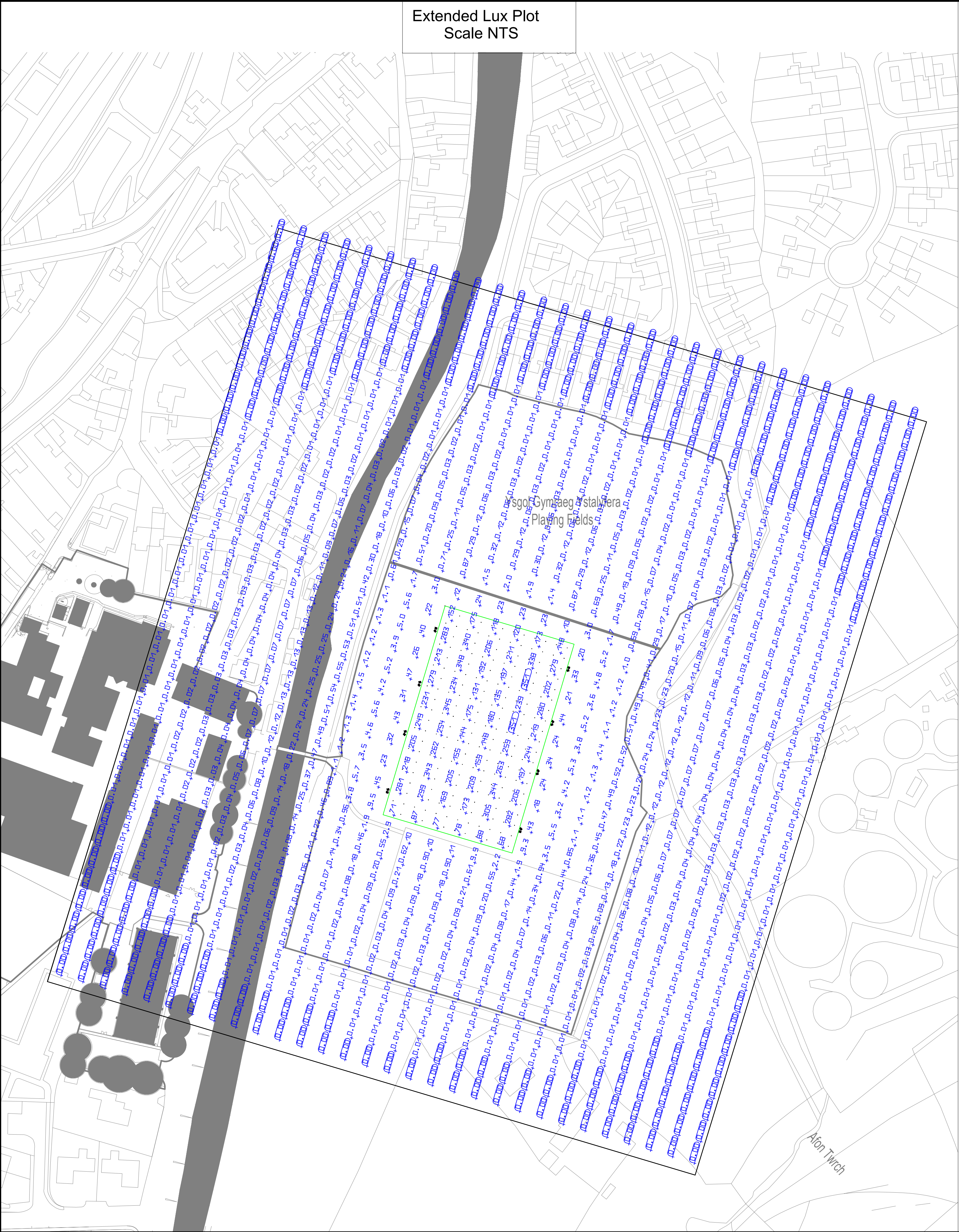
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APPENDIX IV PLAN OF PITCH ORIENTATION AND LUX PLOT



Note: For further detail see Pitch lighting calculations PDF

Do not scale this drawing or the computer digital data.
Lead Consultant to be notified of any discrepancies
in figured dimensions.
Contractors must check all site dimensions.
This drawing is copyright and is for use on this site only.

This Drawing shall be used for pricing purposes and to highlight
extent of works only. This drawing shall not be used for installation
purposes. Contractor shall provide their own coordinated working
drawings prior to start on site.

Notes

- All lighting columns to comply with BS5649/E40.
- All lighting columns to be aluminium with anodised finish,
continuously tapered or conically extruded with an
appropriate spigot for the proposed fitting. See lighting
legend above for exact luminaire details.
- All lighting columns, bollards & floodlights to be installed to
the manufacturers recommendations, instructions & details.
- An earth electrode shall be installed to the last column in
each circuit or branch circuit & shall be connected to the
adjacent lighting column.

Ref	Revision	By	Date	Chk'd	Auth

Preliminary

Purpose of issue

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Fax: 01792 792339

SABA CONSULT

Client

SCOTT
Established 1870

Project
Ystalyfera Comprehensive School

Drawn AW	Checked WC	Authorised WC	Original Scale @ A1 VARIOUS
Date Apr '20	Date Apr '20	Date Apr '20	

Title
Proposed External Lighting

Drawing Number	Rev
1920-012 SKE02	0

APPENDIX V

ADVICE SHEET ON THE USE OF STREET LIGHTING AND BATS

APPENDIX VI 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.

Spatial design

Building design

Landscaping

Set dark habitat buffers and acceptable lux limits with ecologist guidance

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:

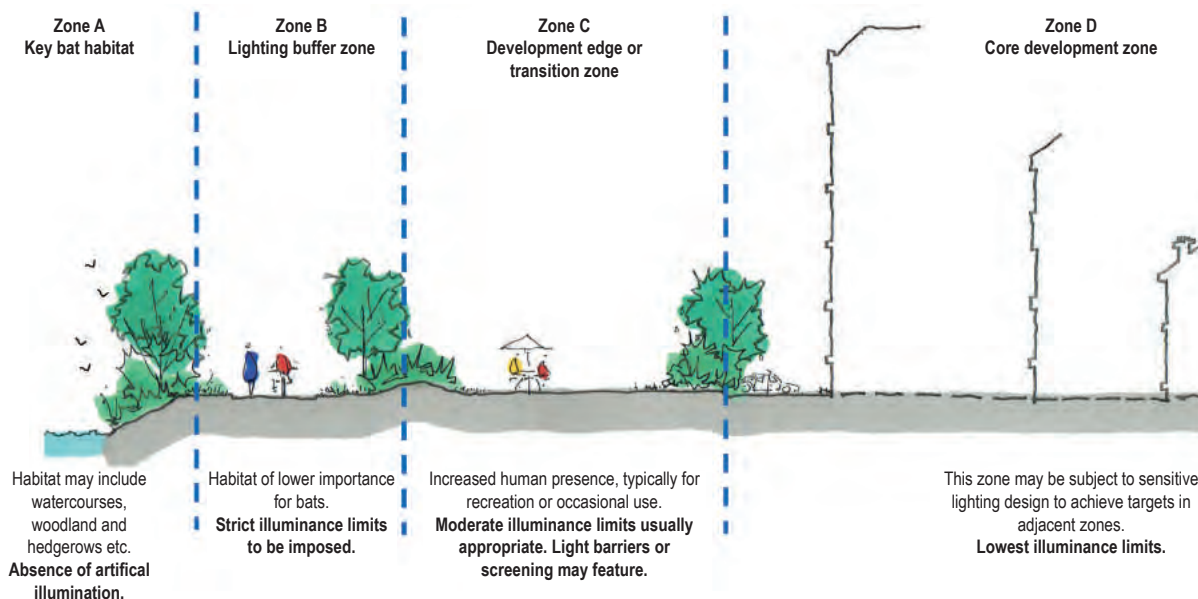
- Roosting and swarming sites for all species and their associated flightpath/commuting habitat.
- Foraging or commuting habitat for highly light-averse species (greater and lesser horseshoe bats, some *Myotis* bats, barbastelle bats and all long-eared bats).
- Foraging or commuting habitat used by large 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 into 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.

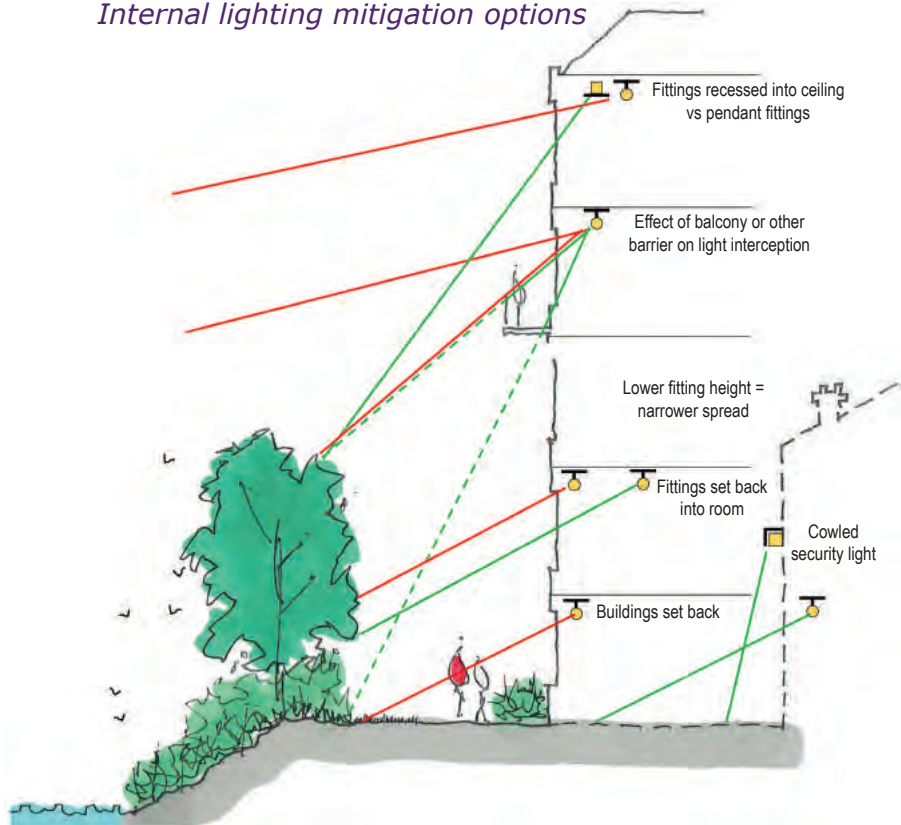
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires should always be mounted on the horizontal, ie no upward tilt.
- 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.

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.

Internal lighting mitigation options



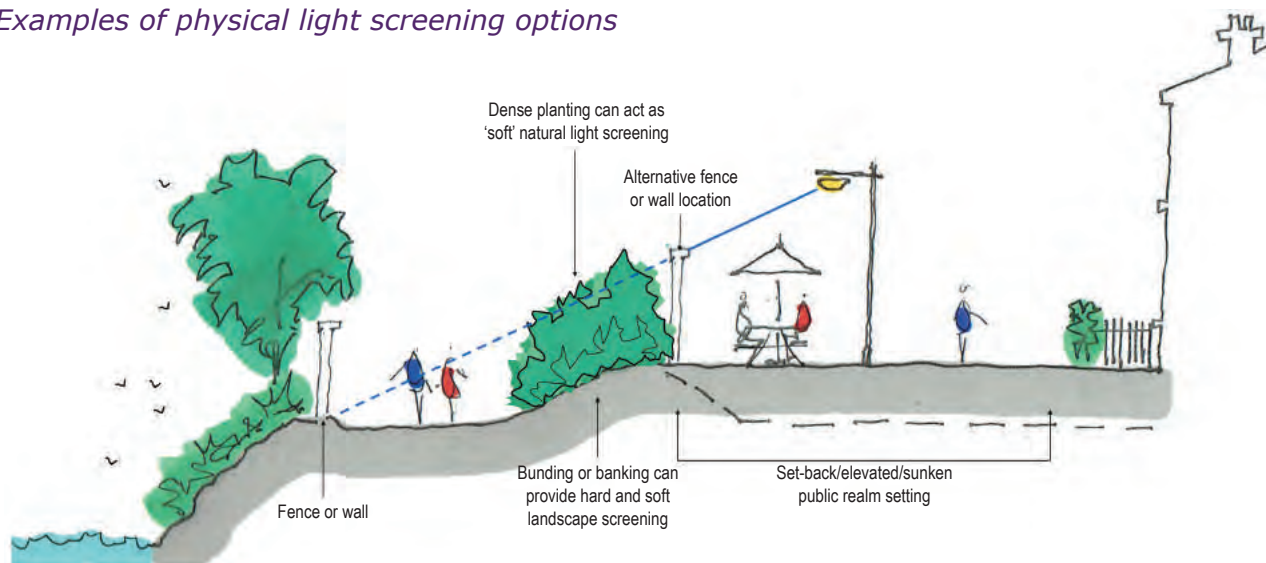
- Taller buildings may be best located toward the centre of the site or sufficiently set back from key habitats to minimise light spill.
- Street lights can be located so that the rear shields are adjacent to habitats or optics selected that stop back light thereby directing light into the task area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

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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