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PHASE 2 BAT SURVEY REPORT,
GUNNERSBURY PARK SPORTS
PROJECT,
POPES LANE,
GUNNERSBURY PARK,
LONDON, W5.

To:
London Borough of Ealing

August, 2015

From:
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Abbreviations:

LBAP	London Biodiversity Action Plan
BAP	Biodiversity Action Plan
HAP	Habitat Action Plan
SAP	Species Action Plan
POS	Public Open Space
UDP	Unitary Development Plan
SNCI	Site of Nature Conservation Importance
GP	Gunnorsbury Park



1.0 INTRODUCTION

1.1 PURPOSE

Furesfen was asked by L.B. of Ealing Council to undertake a Phase 2 Bat Survey at Gunnersbury Park, Gunnersbury, London (TQ187790). The park is jointly managed with Hounslow Council, in whose jurisdiction it is located. The survey was carried out by A. Fure, Class Survey Licence 2015-10381-CLS-CLS assisted by A. Chipchase. The investigation was necessary in order to determine if any species might be affected by proposals to reconfigure the sports facilities, particularly to introduce floodlit pitches in the north-east quadrant. A leisure centre is planned for a former nursery site south of the Bowling Pavilion. The Greenscene buildings may be demolished (to be used for car parking) along with elements of the Model Farm and Sports Pavilions.

1.2 DESIGNATION

The park is designated as a Site of Borough Importance for Nature Conservation Grade 11 (SNCI). It lies to the south of the borough boundary along Pope's Lane, opposite Barons Pond, which is a Site of Local Importance for Nature Conservation. South Ealing Cemetery (Borough SNCI Grade 2) lies on its western edge with Gunnersbury Triangle Local Nature Reserve (LNR) Site of Metropolitan Importance, almost 1km to the east.

2.0 METHOD

2.1 DESK STUDY

This report should be read along with the Phase 1 survey 2013 as well as the Historic Core Bat Surveys, 2015. There is an updated Desk Study to include an additional bat specie recorded during this year's surveys.

2.2 WALKOVER SURVEY

A walkover of the area was undertaken on 24.6.15 and 10.8.15 with the Landscape Architect for the Major Projects Team in line with Bat Conservation Trust Guidelines (2012) to establish features of bat interest, including any flight lines there might be around the site and any roost opportunities. This included a binocular inspection of the Bowls Pavilion, Model Farm and Sports Pavilions as well as the Greenscene buildings.

2.3 BAT EMERGENCE SURVEYS

Three bat emergence surveys were undertaken, ~ three weeks apart as follows:

- Public Car Park, Treeline and the environs of the Bowling Green 13.6.15
- The north-west quadrant including the New Lodge and the Lionel Road Copse 7.8.15; and
- The Model Farm Building and Sports Pavilions, including the activity around the Municipal Area along the main tree-line, 24.8.15.

2.4 BAT ACTIVITY SURVEYS

Passive bat detection equipment was left for periods at the following locations:

- An Anabat at the Lleylandii hedge behind the Bowling Pavilion 22.6.15 - 26.6.15;
- An Anabat Express attached to an Oak tree opposite a composting area, south of the Bowling Pavilion 14.7.15-15.7.15; and
- An Anabat situated amongst suckering Robinia at the mid-point along the western fence (between the New Lodge and the second entrance in Lionel Road) 7.8.15-10.8.15.

Additional activity surveys were undertaken at the Golf Course and Cow Pond.

2.5 SURVEY TECHNICAL INFORMATION

Emergence surveys covered the period just after dusk when bats would be expected to be leaving roost sites. Observation times in relation to sunset are important when interpreting bat activity. Bats on emerging from roost sites will often fly first in darker areas close to their roost, such as a copse, before dispersing along flyways (treelines) to their foraging sites when light conditions have become suitable. This could be sunset + 45 minutes. Anabat static bat detection equipment can be very useful for gauging activity levels but has limitations when it comes to indicating emergence times. This is because it is static and cannot seek bat activity. The equipment can only be located where it is safe to do so, which may mean it is sub-optimal for bat activity.

3.0 RESULTS

3.1 DESK STUDY

The desk study showed that eight/nine species of bat are recorded locally two of which are roosting nearby. Roosts of both common pipistrelle bats *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* are known within 1,000 metres. Daubenton's bats *Myotis daubentonii* are recorded at Chiswick Park (CP) along with *Nyctalus* species. During the 2015 surveys a Serotine *Eptesicus serotinus* bat was recorded around the Round Pond, which is a species which favours historic buildings. It is of note that the brown long-eared bat *Plecotus auritus* is known to roost at two sites within 2km.

Table 1: Status of bats recorded in the local catchment.

Species	Frequency	Main roosts sites
Common pipistrelle	Common	Buildings nearby (LBG) Roosts nearby (authors data)
Soprano pipistrelle	Common	Buildings and trees especially near water (LBG).
Serotine bat <i>Eptesicus serotinus</i>	Uncommon in London	Recorded at the Round Pond June, 2015
Nathusius's pipistrelle <i>Pipistrellus nathusii</i>	Rare	Buildings Trees roosted within the catchment but its local status is variable
Daubenton's bat <i>Myotis daubentonii</i>	Declining in London region (Briggs, 2007)	Trees, structures and underground sites in the local area. Recorded at Chiswick Park
Natterer's bat <i>Myotis nattereri</i>	Infrequent since 2009 at this location	Trees and structures. Recorded at Chiswick Park
Noctule bat <i>Nyctalus noctula</i>	Becoming less common in London	Records at CP
Leisler's bat <i>Nyctalus leisleri</i>	rare	No known roosts in the area flight records only but early registrations CP
Brown long-eared bat <i>Plecotus auritus</i>	Becoming rare in London	Roosts within 2 km, difficult to detect in flight

Adapted from Mitchell-Jones (2007)

Authors data, 2004 LBG=London Bat Group records, 2013

3.2. BUILDING INSPECTION AND EMERGENCE AND ACTIVITY SURVEYS

No bat ingress was found in any of the buildings inspected during the visual survey. Bat potential was found at the Bowling Pavilion with areas of low potential at the Greenscene offices and outbuildings. The bowls compound and associated tree nursery was assessed as the most biodiverse site within the project area. Vegetation management has relaxed since previous surveys (2013) and the hedgerows and long grass encourage a range of invertebrates, which in turn attract thrushes and hedgehogs etc.

3.3. CAR PARK AND TREES 13.7.15

During a bat emergence survey, the car park trees and related treelines were the route via which bats entered the park from offsite gardens. The Popes Lane copse (left) was particularly important for early bat movement. The direction of travel was from the north to the south and there was a delay between the activity recorded in the car park and the movement along the treeline into the park as bats await darkness before venturing into more open areas. A security light at Capel had a negative effect on vegetation.



Table 2: Bat emergence (13.7.15)

Sunset 21.12.p.m. Cloud cover 7/8 .Temperature 16 degrees centigrade at start.

Time	Details: AC: Car park and AF: Capel fence and Pavilion hedge
21.32	Soprano pipistrelle commuting along treeline along Capel but bats already foraging around Car Park trees where they remained throughout the rest of the survey.
21.34	Common <input type="checkbox"/> Pipistrelle commuting along treeline AF
21.37	Bats foraging over open areas of the Bowling Green
21.39	Soprano Pipistrelle
21.41	Soprano Pipistrelle foraging
21.52	Soprano Pipistrelle foraging activity along tree line

3.4 BOWLING PAVILION



Figs. 1-3: Rear of the Bowling Pavilion; compost area between the Oak and Lleylandii hedge; and naturalised grassland habitat.

3.4.1 Inspection

During the building inspection medium potential for bat ingress was determined. This was on account of certain features inherent in the building, such as the weatherboarding and the fascia board. Good links to vegetation are apparent and the building is dark and undisturbed at night. No bat ingress was noted, there were no bat droppings or staining on the whitewashed elevations.

3.4.2. Emergence Survey

No dedicated emergence survey was undertaken on this building as the compound is locked at night, although the building could easily be seen during the ‘car park survey’. No early bats were detected here.

3.4.3 Activity

An Anabat static bat detector was left along the Lleylandii hedge from 22.6.15 – 26.6.15. Very little bat activity was recorded during this period and the hedge was not proved important for commuting bats. However an Anabat Express was left strapped to an Oak tree facing the compost area (Fig. 2 pictured) and bats were found foraging here all through the night, indicating it as a sheltered area for harbouring insects.

Table 3: bat activity (14.7.15-15.7.15).

Sunset 21.12.p.m.

Time	Details: Anabat Express Compost area
21.39 Compost area Sunset + 27 minutes	Common Pipistrelle bat
21.52	Common Pipistrelle from this time foraging was recorded throughout the night
03.44	Noctule bats were recorded overhead along with the continuous pipistrelle activity.
03.49	Last pipistrelle bat registration

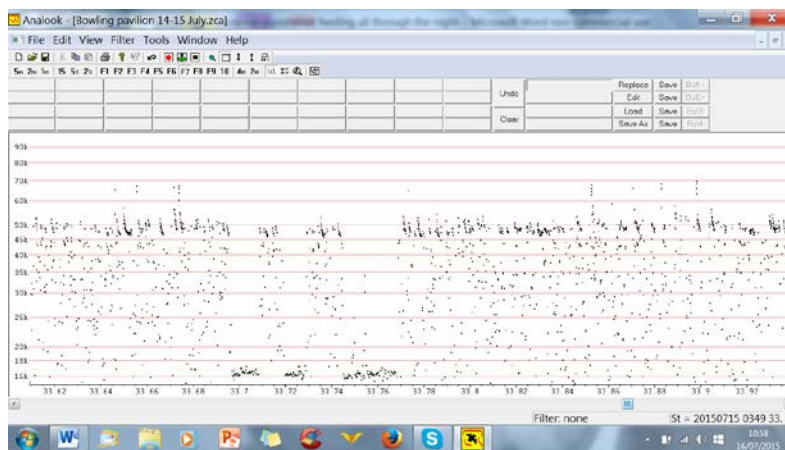


Fig.4 Screenshot of the sonogram of a commuting Noctule bat as well as Common Pipistrelles foraging around the compost area 03.49, 15.7.15

3.4.4 Additional species: mammals

During the survey a large number of small droppings thought to pertain to hedgehogs were noted around the path. It is likely that this species is using the hedgerow and may hibernate around the compost heap. Mitigation will be required for this animal depending on the timing and extent of works due to its protection as a species of Principal Importance under the NERC Act, 2006.

3.4.5 Birds and reptiles

A large number of bird species are associated with the Lleylandii hedge, which included: Robin, Blackbird, Song Thrush as well as Dunnock (around the compost area). For this reason, the Lleylandii should be retained and reduced to a more manageable height. The nursery area has been allowed to naturalise and has succeeded to neutral grassland, which may now contain reptile interest.

3.5 MODEL FARM AND CHANGING ROOMS 10.8.15 and 24.8.15



3.5.1 Model Farm (Fig 5)

There are a number of outbuildings at the Model Farm compound some still in use by horticultural teams. The remaining buildings have deteriorated further since the Phase 1 survey, 2013. With one exception, none of them had trussed roofs, which might be of interest to bats. The main building had gaps between roof tiles, which could allow bat access as there were reasonable vegetation links at the front and rear elevations.

3.5.2. Sports Pavilion Inspection

These buildings cannot be entered due to reasons of Health and Safety. During binocular inspections from the periphery there were no signs that bats had accessed any of the sports pavilions. Gable apices, fascias, soffits and the barge boards could offer opportunities for bat ingress. During an inspection (24.8.15) soffits were found to be failing, which could allow ingress for opportunistic birds or bats. However, the buildings were deemed to be of low potential for any bats species due to their low grade roof construction. The buildings had been vandalised and pigeons had accessed internal areas.

3.5.3 Emergence survey 24.8.15

Two bat species were recorded during the emergence survey: Common and Soprano Pipistrelle. Emergence was very early considering this was the central core of the park. The first bat could have travelled from offsite residences in Popes Lane, following the central spine of the tree line. Alternatively, it could have been using in trees.

3.5.4 Activity

There was a strong affinity with trees and lots of social calls around the roofs of the Farm buildings (as bats call on others for mating) which is expected at this time of year. Song-flighting occurred for approximately thirty minutes and the activity ceased after sunset + forty five minutes, with the assumption that bats had travelled to the Potomac Lake.

Table 4: Selected bat activity (24.8.15)

Sunset 20.04.p.m. Cloud cover 6/8 .Temperature 16 degrees centigrade at start.

Time	Details: AC and AF emergence at the Model Farm and Sport Changing Facilities
20.17 Sunset + 13 minutes	Soprano Pipistrelle from north to south heard by both surveyors AC AF
20.17	Common Pipistrelle feeding around the Model Farm AC
20.29	Common Pipistrelle pass AF AC
20.35	Song flighting AF AC
20.37	Common Pipistrelle AC
20.39	Passes every two minutes or so with occasional song flighting bats.

3.6 SPORTS PITCHES

3.6.1 Inspection northern boundary

The Plane, Oak, Ash and Lime trees along the northern boundary were isolated in the landscape especially where there was a lack of garden vegetation. Even where some 'gapping' had taken place, new trees had often failed. Because of their isolation the trees were deemed to be of low potential for roosting bats.

3.6.2 Western boundary



Along the western boundary vegetation cover increased on a north-south gradient. Trees here have potential for bat ingress including: an old hawthorn tree with several holes, Lime, Oak, Robinia, Norway Maple and a massive Box Elder with several important cavities. The south-western quadrant has an important copse (along Lionel Road) where additional species such as Sweet Chestnut, Silver Birch are found. Here are dense stands of Hawthorn and Hazel hedging, which were found to harbour insect prey, creating a buffer between the open areas of the pitches and protect the ambience of the Lionel Road copse.

3.6.3 Emergence and roosts.

A 'roving' transect survey around the sports pitches found that bats were only present where there was vegetation cover. A static bat detector was chained to a Robinia tree 7.8.15 – 10.8.15 along the western boundary (pictured above). This survey was indicative of a nearby mating roost of Soprano Pipistrelles, which could indicate use of the trees.

3.6.4 Activity

No activity was detected during the transect survey at the northern boundary. The western boundary had more structured vegetation including a suckering Robinia and bats were found using the boundary to travel to their foraging site. The south-western quadrant has an important copse along Lionel Road where early bats were found foraging for prolonged periods perhaps before moving to the Potomac Lake.

Table 5: All bat activity (7.8.15)

Sunset 20.38p.m. Cloud cover 1/8 .Temperature 28 degrees centigrade at start.

Time	Details: Duet detectors AC mid-point western boundary and AF Lionel Road entrance trees and hedgerow
20.59 Sunset+ 21 minutes	First bat Soprano Pipistrelle Copse along Lionel Road constant foraging throughout the survey at this location
21.03	Common Pipistrelle commuting
21.07	Soprano Pipistrelle commuting
21.10	Common Pipistrelle foraging
21.11	Soprano Pipistrelle
21.24 Sunset + 46 minutes	AC first bat along western boundary (bats probably using gardens for movement until it gets darker)
Anabat 3 days 8.8.15	
21.55	Common Pipistrelle
01.03	Common Pipistrelle
01.08	Common Pipistrelle
01.36	Common Pipistrelle
01.46	Common Pipistrelle
02.15	Common Pipistrelle
4 passes per hour until 04.28	
Similar activity 9.8.15	
Increase in activity 10.8.15	This includes a large amount of social interaction all through the night of both <i>pipistrellus</i> species. This can be interpreted in two ways as <ol style="list-style-type: none"> 1. Territorial behaviour 2. Mating behaviour The latter is suspected due to the final bat registration at 05.01 which suggests a roost is nearby



3.7 GREENSCENE BUILDINGS AND WALLED GARDEN

No dedicated bat surveys have been undertaken at this location. There are proposals to convert this area into car parking. Surveys are recommended prior to demolition of the buildings.

3.8 GOLF COURSE

No structured surveys have been undertaken at the golf course although an Anabat was left for a few days beneath an Oak tree with a damaged limb. The survey highlighted the importance of mature trees as mating roosts. There was no indication that trees were being used by any *Nyctalus* bat species.

4.0 DISCUSSION

4.1 GENERAL

The emergence surveys targeted four strategic areas around the park in order to detect roost sites, commuting routes and to assess the risks to bats of undertaking certain re-configuration of sports pitches:

- Bowling Green and Tree Nursery;
- The Model Farm and Sports Pavilions;
- Sports pitches; and the
- Popes Lane car park.

4.2 BAT SPECIES

Three species of bat were recorded during the surveys Common and Soprano Pipistrelle as well as Noctule bats. This is compared with five/six species recorded in the entire park (2015) and suggests that the main foraging areas will not be affected by the proposals. However two slightly less important foraging areas will be impacted: the compost area near the bowls compound; as well as the Popes Lane copse. Mitigation will be required for the loss of these areas.

4.3 ROOSTS IN BUILDINGS

None of the buildings were used by bats for roosting purposes during the survey period. The Bowling Pavilion was deemed to have the highest potential for bats, but no evidence of ingress was found. A bat dropping was located beneath a gap in a soffit at one of the Greenscene offices. This was typically at the darker, quieter rear of the building. Some of the outbuildings, notably an old toilet exhibited potential as a feeding perch, or as a temporary night roost. No potential was found in the roofs of the Model Farm for bat interest although there was low potential for casual roosting in the weather boarding at the front gable, the gable apices as well as the soffits at the sports pavilions. If demolition is delayed until 2016, further walkover surveys should be undertaken at the Farm and Depot, which will inform the need for an emergence survey.

4.4 TREE ROOSTS

Bat mating roosts were indicated within trees along the western boundary by the overnight survey 10.8.15. Social or mating activity recorded around the Oaks near the Model Farm indicate the potential for tree use on a casual basis of virtually any tree cavity in the park at this time of the year. Tree works should be carried out according to Best Practice Guidance requiring works to be completed before the onset of cold weather in November. Any limbs with potential for bats should be section felled. The section should be gently lowered to the ground and left in place for a week. It is understood that no major works are planned although the schedule has not been completed at the time of writing. n.b. Tree roosts were also indicated in Cedars and Oak in proximity to the Round Pond during the survey of the Historic Core Buildings, 2015.

4.5 COMMUTING ROUTES

Tree lines formed important commuting routes into and around G.P. including the Planes Limes and Oaks around the Popes Lane car park as well as the tree line parallel to the privet hedge surrounding the bowls compound. There were hardly any trees along the northern boundary and no bat activity was recorded there. Bat activity increased along a north-south gradient at the western boundary from New Lodge, corresponding to the amount of vegetation cover. Some bat species will often not cross gaps of more than ten metres and the importance of intact tree avenues was discussed in the Phase 1 report. For example the treeline leading down to the Potomac Lake from the Model Farm was found to be an important commuting corridor (2013).

4.6 BAT FORAGING HABITAT

Some of the wooded copses were as important as the waterbodies for foraging bats where animals often remained through the night. This included: a wooded belt of trees along Lionel Road; the copse north of Popes Lane car park; and a large composting area south of the Bowling Pavilion. The Lleylandii hedge was not used by many commuting animals but it was used by foraging bats and gave substantial protection from the wind, creating a local micro climate. These areas were found to be especially important during windy and wet nights when the ponds were too open and inhospitable. There was surprising amount of continuous activity displayed at these locations, during very wet weather maternity (especially lactating) period. These areas will be affected by the siting of floodlit tennis courts and the new position for the Leisure Centre.

4.7 IMPACTS OF THE PROPOSALS

The siting of the Leisure Centre will have an impact on a biodiverse area where the parks scarcer habitats are located. New floodlighting at the tennis courts will mean that the copse at Popes Lane will be affected by light spillage. This area has been identified as an important commuting corridor and foraging area for bats. The floodlighting will travel some distance into features of nature conservation value during the early part of the evening. It is hoped that a more suitable site could be found to locate the floodlit tennis courts away from an area where bats enter the park during the early part of the evening.

4.8 FLOODLIGHTING

Bats may refrain from using treelines or corridors if there is spill from lighting and this was discussed in the Phase 1 survey. Light levels of 14 lux can be a better indication of pipistrelle emergence in urban areas than minutes after sunset. In areas affected by light pollution, bats can emerge late in the evening. High pressure sodium and metal halide light associated with floodlighting is attractive to insects. This positive 'phototaxis' can lead to demographic insect losses and 1/3 of the insects that fly around light will damage themselves or die. The insects in the newly floodlit areas will be attracted to the lights and many will die without completing their life cycle. This includes rarer butterfly and moth species.

4.9 ADDITIONAL SPECIES

A range of species of Principal Importance, or those having their own legislative protection have been recorded within the project area. This mostly pertains to the nursery and former growing areas next to the bowls club. Foraging signs of badgers were recorded during the 2013 survey and this section should be referred to. No works should be commenced at this site during the bird nesting season (February [in the case of dunnock] to September; and a destructive search of the compost heap must be undertaken to ensure that hedgehogs are not harmed. The grass should be kept short prior to building works to deter reptiles. Natural habitats for insects include hedges, grassland and copses which will be lost during the construction of the Leisure Centre and should be encouraged elsewhere.

4.10 PLANNING GAIN

The National Planning Policy Framework (DCLG, 2012) seeks to achieve net biodiversity gain and mitigate harm within new development proposals. As such, consideration should be given to enhancing the ecological value of the survey site (with regards to habitats/ flora). Where possible such enhancements should consider habitats/ species which are included within the National and local BAP such as hedgehogs and bat species. This should include re-siting the tennis courts, provision of box luminaires with visors, relaxed mowing regimes, replanting of hedges, and pre-works mitigation surveys.

4.11 BOX LUMINAIRES

Box luminaires are recommended with the relevant shields or visors which will reduce light trespass onto vegetation. Specifically this will be Hi Lux forward, side and rear deflectors, which are visors fitted to the luminaires to ameliorate the impact of the light spillage onto vegetation. Luminaires should not be positioned at an angle as this allows the light to travel, but should be positioned facing downwards. Examples can be viewed close other sensitive sites in west London such as:

- Across the road at North Acton near Barons Pond;
- Pensford Tennis Club by Pensford Fields North Sheen; and
- Canons MUGA, Merton.

4.12 BUFFERS

The Bat Conservation Trust Guidance on Lighting and Mitigation for Bats (May, 2011) was discussed in the Phase 1 survey. Some physical barriers will be required to act as light shields to act as buffers to protect the most important features for bats, as well as to increase the supply of insect prey. One of the most effective natural barriers was the staggered lengths of native hedgerow that have been planted along Lionel Road. These functioned as excellent light shields, and are recommended as a mitigation strategy to be employed around the boundaries of the sports pitches. The 'gapping' of treelines by planting standard trees along with new staggered lengths of hedgerows will aid movement around the park for all species including hedgehogs. This can be undertaken with sensitivity towards resident's views of the park.

4.13 MOWING REGIMES

There may be some biodiversity gain when the current golf course is relocated although this remains to be quantified. Varied mowing regimes could be extended to areas around the sports pitches to increase butterflies and the diversity of insects. In fact, grass was not cut at the south-east meadow this year and this type of management is helpful in generating insects as well as creating a more natural appearance as well as a calming effect. The length of grass around the trees encourages ecological processes. Insects involved in fungal associations include members of the Coleoptera, Diptera, Homoptera, Hymenoptera, and Isoptera. The adult or juvenile stages of various flies, mites, gnats, beetles, springtails and nematodes eat fungal fruiting bodies, spores or mycelia.

4.14 MONITORING

Monitoring of the project should continue to ensure that meaningful measures are implemented to ensure there is no loss of features that bats are using and light pollution onto foraging areas. Further walkover surveys will be required for badgers closer to the time of construction of the car park.

5.0 RECOMMENDATIONS

5.1 Future surveys: The following surveys are recommended:

Where	When	Species/ feature
Greenscene Depot	In the nearest recording season prior to demolition of the buildings and structures	Walkover survey for Bats
Bowls area	Prior to construction	Walkover survey for Badgers
Bowls Compound (Compost heap)	Prior to construction works	Destructive search for Hedgehog
Copses identified in report	Post construction of MUGA and Tennis Court	Monitoring of light spillage onto vegetation and light curfew
Bowls compound and any vegetation removal	In the bird breeding season February-September	Birds

5.2 Habitat protection

- Where lost should be re-provided on the hawthorn/hazel model found at Lionel Road. This includes provision for the northern boundary; *Rationale: to ensure no net loss of a feature which is in short supply at GP.*
- Grass should be kept short at the compound from now to construction; *Rationale: so as not to encourage nesting, reptiles etc.*
- Works at the compound must take place outside of the bird breeding season; *Rationale: there were a large number of birds recorded during the bat surveys and these are protected under legislation.*
- The Lleylandii hedge should be reduced to a height of six feet; *Rationale: this is an important structural feature providing shade, nest sites, foraging areas, shelter etc.*
- The soffits at the Farm and Sports Pavilions should be removed now whilst the surveys are current. *Rationale: this would deter roosting in an often favoured by pipistrelle bats and the soffit boxes are becoming easily accessible due to wear and tear.*

5.3 Lighting

- The impact of the security light at Greenscene Depot should be minimised by using LED technology of a warmer wavelength as well as reducing the activation time; *Rationale: The Institute of Lighting Professionals issues guidelines (along with the Bat Conservation Trust) indicate that lights should only be illuminated where observers are present to use the light. If the security lights are generally less damaging to the local environment and the local insect population, this will mean there will be an overall reduction in impact throughout the night.*
- The tennis courts should be relocated to a less damaging area of the pitches; *Rationale: light trespass onto mature trees where bats were found foraging as well as damage to trees by cabling operations.*
- Box luminaires with front, side and back plates are strongly recommended; *Rationale: All light is angled downwards and if correctly positioned there should be no glare onto features identified in the report.*
- Visors should be fitted to box luminaires at the tennis court/MUGA to substantially reduce spillage onto vegetation; *Rationale: To ameliorate the impact and protect the woodland fauna using the trees on the northern boundary.*
- Light spillage onto tree lines should be monitored post-construction, in order to record the lux levels onto vegetation; *Rationale: To ensure the lights are fitted horizontal to the ground (not angled) and the back plates have been correctly supplied and a curfew has been implemented.*
- Floodlights should not be on automatic switching; *Rationale: this encourages them to be illuminated even when not in use.*
- Light curfews are normally requested during the summer months between mid-May to mid-September. *Rationale: This is the main bat breeding season.*

6.0 LEGISLATION AND POLICY

6.1 EUROPEAN AND UK LAW PERTAINING TO BATS

All species of bat are fully protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion in Schedule 5. All bats are also included in Schedule 2 of the Conservation (Natural Habitats, & c.) Regulations, 2010. The Act and Regulations make it illegal to:

- intentionally or deliberately kill, injure or capture (take) bats;
- deliberately disturb bats (whether in a roost or not);
- damage, destroy or obstruct access to bat roosts;
- possess or transport a bat or any other part of a bat, unless acquired legally; or
- sell, barter or exchange bats or parts of bats.

6.2 AMENDMENTS TO THE CONSERVATION OF HABITATS REGULATIONS (2010)

Moves to strengthen the protection of features of importance that protected species are reliant upon. This applies where there may be ANY disturbance to bats or a disturbance affecting:

- The ability of a group of animals of that species to survive, breed or rear or nurture their young;
- In the case of migratory species, impair their ability to hibernate or migrate or
- The local distribution or abundance of the species

This may preclude fragmentation of corridors caused by **light pollution** and a useful discussion of this is provided by Garland and Markham (2007). If a bat roost is to be affected by development activities, a licence from Natural England will need to be obtained.

Several species of bat are included as Priority Species in the UK Biodiversity Action Plan (UK BAP) and also as species of principal importance for the conservation of biological diversity in England under *Section 41* of the *Natural Environment and Rural Communities Act 2006* (NERC Act 2006). The London BAP (LBAP) includes a Species Action Plan (SAP) ten species of which are listed as priority species.
1<http://www.lbp.org.uk/londonpriority.html>

6.3 BADGERS

The Badger is protected in Britain under the *Protection of Badgers Act 1992* and *Schedule 6* of the *Wildlife and Countryside Act 1981* (as amended). The legislation affords protection to Badger and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a Badger, or attempt to do so;
- interfere with a sett by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or to disturb a Badger when it is occupying a sett.

6.4 REPTILES

Viviparous Lizard (*Zootoca vivipara*), Grass Snake (*Natrix natrix*), Slow-worm (*Anguis fragilis*) and Adder (*Vipera berus*) are all listed under *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), in respect of *Section 9(5)* and part of *Section 9(1)*. This protection was extended by the CRow Act. Under this legislation it is an offence to intentionally or recklessly:

- kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.

All four of the above listed reptiles are UK BAP priority species and are also included in *Section 41* of the *NERC Act 2006*. The LBAP includes a SAP for 'reptiles', with all the reptiles listed above being priority species.

6.5 BIRDS

All species of bird are protected under *Section 1* of the *Wildlife and Countryside Act 1981* (as amended). The protection was extended by the *Countryside and Rights of Way Act 2000*. The legislation makes it an offence to intentionally or recklessly:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Certain species of bird are listed on *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended) and receive protection under *Sections 1(4)* and *1(5)* of the Act. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.

6.6 NATURAL ENVIRONMENT AND RURAL COMMUNITIES (NERC) 2006

This states that every public authority in exercising its function, must secure compliance in conserving biodiversity

(3) Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat.

(4) "Public authority" means any of the following (c) a public body (including a government department, a local authority and a local planning authority);

Within the terms of this act are habitats and species of principal importance for the purpose of conserving biodiversity.

6.7 UK HABITATS AND SPECIES OF PRINCIPLE IMPORTANCE NERC 2006 AND THE ROLE OF CONSERVATION UNDER BIODIVERSITY ACTION PLANS (BAPS)

Section 40 (1) of the NERC Act (2006): lists principle habitats and species, which are often included in Local, Regional and National Biodiversity Action Plans (BAP's). For example, the UK Biodiversity Action Plan (BAP) contains a Bat Species Action Plan (SAP). The BAP aims to increase the number of this species within the district by protecting certain habitats; securing appropriate management for them and by halting the factors leading to their decline such as:

- Loss of maternity roost sites through damage or destruction resulting from a lack or a misunderstanding of the legislation protecting bats ;
- Loss of hibernation and other seasonally used roost sites;
- Lack of insect rich feeding habitats such as wetlands, woodlands and grasslands;
- Losses of linear landscape elements (flight line features) such as tree lines; and
- Excessive lighting, such as in streets and some open spaces.

7.0 REFERENCES

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