

Our reference: DFCEP 4357

Date: 11 October 2019



Bat Survey Report

of 330, Grays Inn Road on behalf of 330
Grays Inn Road Limited

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Length of Time Report is Valid:

Provided no significant changes are made to the proposal (where provided) or on the proposed site (*e.g.* significant changes to management practices or habitats present) subsequent to the report's issue; this report can be considered valid for one survey season from the date of issue.

Document History

This document has been issued and amended as follows:

Version	Report Issue Date	Description	Author	Job Title	Verified and Approved by	Job Title
1		Draft	Maithri Jayasuriya	Assistant Ecological Consultant	Harry Smith	Ecologist
2		Issue	Maithri Jayasuriya	Assistant Ecological Consultant	Harry Smith	Ecologist

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Qualifications of Principal Author and Surveyors

Recommendations included within this report are the professional opinion of an experienced ecologist, based on an ecological survey results, a review of any existing ecological records and the client's proposal for the site.

The survey report was written by Maithri Jayasuriya, an assistant ecologist with an MSc in Ecology and Environmental Management and a qualifying member of CIEEM. The preliminary bat roost inspection was undertaken by William Hurrey, an ecologist with Environmental Science (Hons), and 1 years' experience, as well as being a graduate member of CIEEM.

The bat emergence and re-entry surveys were carried out by:

- Alexandra Zemanova BSc (Hons) MSc. Student member of CIEEM. 2 years bat survey experience;
- Maithri Jayasuriya BSc (Hons) MSc. Qualifying member of CIEEM. 3 years of bat survey experience.
- Rebecca Elvidge is a surveyor who is starting their first season of bat surveys.

Quality Assurance

This report has been produced in accordance with guidelines produced by The Chartered Institute of Ecology and Environmental Management (CIEEM) and British Standards Institute (BSI):

- BSI (2013) *Biodiversity – Code of practice for planning and development. BS 42020: 2013.*
- CIEEM (2015) *Guidelines on Ecological Report Writing.* Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins (2016) *Bat surveys for Professional Ecologists: Good Practice Guidelines 3rd edition.* The Bat Conservation Trust, London.

All survey reports produced by DF Clark Bionomique Ltd are checked, verified, and approved by a second competent ecologist.

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1 Summary

This report should be read in full to identify potential impacts on bats as well as any further actions required as a result of the proposed development.

Bat surveys were undertaken on buildings and a tree at 330, Grays Inn Road, Kings Cross, London WC1X 8DA (TQ 30562 82803) in August 2019. It is proposed that the current medical facility be redeveloped to form residential dwellings, commercial office spaces and an apart-hotel.

No bats or evidence of roosting bats was recorded during the surveys, and low levels of foraging bats were recorded within and adjacent to the site, and a European Protected Species Mitigation (EPSM) licence is not required to allow demolition to proceed.

Best practice enhancement measures have been recommended.

1.1 Summary of key recommendations

Recommended Mitigations	Timings
No mitigation measures required	N/A
Recommended Enhancements	Timings
One Schwegler 2FR bat tube to be installed into the brickwork of the new dwellings (Appendix 3). The bat tubes should be placed facing south, south-east or south-west and approximately 5-7m off the ground and not near features where they can be accessed by cats. A Schwegler 2FN bat box should be attached to a tree in a residential garden to be created as part of the new developments.	Design phase
Any lining to new roofs is recommended to be traditional type 1F bitumen felt lining. Breathable roofing membranes have been shown to cause injury and/or deaths to bats by entangling them in the fibres and other non-woven linings. As such it is recommended that these type of membranes are not used.	Design phase
In order to enhance the site for bats, any lighting on the site associated with the development should be directed downwards to where it is needed, with hoods, cowls, louvres, or shields used to direct the light to the intended area only. Measures to reduce the impacts of lighting need particular consideration with respect to areas where trees have been found to have bat potential or near foraging and commuting areas such as; hedgerows, woodland and boundary flowing drains. Further lighting advice can be found in Appendix 5.	Design phase
Plantings of climbers can be attached to sections of trellis on external walls of buildings, sections of fence and other walls and structures to increase the space available for wildlife. Climber plantings should incorporate at least three species, such as: honeysuckle <i>Lonicera periclymenum</i> ; ivy <i>Hedera helix</i> ; common jasmine <i>Jasminum officinale</i> , golden hop <i>Humulus lupulus</i> 'Aureus' and old man's beard <i>Clematis vitalba</i> .	Design phase

2 Introduction

2.1 Instruction

- 2.1.1 The focus of this report is a site at 330, Grays Inn Road in Kings Cross, London, WC1X 8DA (TQ 30562 82803).
- 2.1.2 D.F. Clark Bionomique Ltd were instructed in 17th May 2019 by 330 Grays Inn Road Limited to undertake a preliminary bat roost assessment of the site; and subsequently in August 2019 to carry out dusk emergence and dawn re-entry bat surveys of the buildings within the site.

2.2 Proposals

- 2.2.1 It is understood that the proposals comprise 'Demolition of the existing buildings and erection of a new one to three storey block to provide 20 new homes'.

2.3 Site description

- 2.3.1 The proposed development site is currently in use as a medical facility with associated buildings, hardstanding. A small garden is located in the centre featuring amenity grassland, introduced shrub and a tree. The surrounding area is predominantly urban with roads and residential dwellings. Kings Cross St Pancras train station is located 240 metres to the north as is Regent's Canal.

2.4 Purpose of the report

- 2.4.1 An Extended Phase 1 Habitat Survey of the site was undertaken by D.F. Clark Bionomique Ltd in May 2019. Based upon the recommendations made, a series of bat surveys were undertaken to:-

- Determine the presence/likely absence of roosting bats in the buildings onsite;
- Identify any important foraging and/or commuting habitats within the site;
- Where possible at this stage, set out the mitigation measures required to ensure compliance with protected species legislation; and
- Summarise the overall ecological value of the site in the context of legislation, planning policy and other relevant indicators of importance for bats.

3 Planning policy & legislation

- 3.1 All bat species in England and Wales, and their resting and breeding places (roosts), are afforded protection under The Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence for anyone to **intentionally** or recklessly kill or injure a bat, or disturb a roosting bat. It is also an offence to damage, destroy or obstruct access to any place used by bats for shelter, whether they are present or not.

4 Methodology

4.1 Desk study

4.1.1 A previous report produced for this site has been referred to in the production of this assessment:

- DF Clark Bionomique Ltd (2019) Preliminary Ecological Appraisal Report of 330, Grays Inn Road on behalf of 330, Grays Inn Road Ltd. Maithri Jayasuriya: 14th August 2019

4.1.2 Aerial imagery (google.co.uk/maps, accessed 25th July 2019) was used in order to provide an indication of land-use in the surrounding area and the connectivity of habitats on and adjacent to the proposed development site.

4.2 Bat roost potential

4.2.1 The buildings had flat roofs and as such did not have roof voids. An internal inspection was not conducted. The external inspection found two buildings (Buildings 2 and 4) to be of low bat roost potential. Building 2 featured two holes on the northern elevation, with the roof of Building 4 to have cracks along it. A walnut tree in the central courtyard was found to be of moderate bat roost potential.

4.3 Bat emergence and re-entry surveys

4.3.1 The buildings had flat roofs and as such did not have roof voids. An internal inspection was not conducted. The external inspection found two buildings (Buildings 2 and 4) to be of low bat roost potential. Building 2 featured two holes on the northern elevation, with the roof of Building 4 to have cracks along it. A walnut tree in the central courtyard was found to be of moderate bat roost potential. In accordance with Collins (2016), for buildings with low bat roosting potential, one dusk emergence survey was undertaken on Buildings 2 and 4. For the tree of moderate bat roosting potential, one dusk emergence survey and one dawn re-entry survey was undertaken.

4.3.2 The surveys were carried out in suitable weather conditions *i.e.* on nights with relatively dry conditions, low wind speeds and minimum temperature of at least 10°C. The surveys were spaced at least two weeks apart. Details of dates, times and weather conditions are show in Table 1.

Date	Buildings Surveyed	Sunset / Sunrise Time	Start Time	End Time	Weather conditions
23/08/2019	Building 2 Building 4 Walnut Tree	20:07	19:52	21:37	Start: 24°C; cloud cover: <5%; Wind = 6 mph; no rain End: 23°C; cloud cover: <5%; Wind = 5 mph; no rain
30/08/2019	Walnut Tree	06:09	04:39	06:34	Start: 18°C; cloud cover: 30%; Wind = 5.6 mph; no rain End: 17°C; Wind = 7 mph; no rain. Cloud cover = 20%

Table 1: To show the dates, times and conditions for each survey undertaken.

4.3.3 The surveys were carried out in accordance with guidance contained within the manual: *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016). Dusk surveys commenced approximately 15 minutes before sunset and concluded 1.5 hours after sunset. Dawn surveys commenced at 1.5 hours before sunrise and concluded 15 minutes after sunrise. Sunrise and sunset times are taken from the online sunrise/sunset calendar at: <http://sunsettimes.co.uk/>.

4.3.4 Surveyors were positioned at vantage points close to the buildings and tree which offered a clear view of any bats entering or exiting potential roost features. See Appendix 1 for surveyor locations.

4.3.5 Surveyors were equipped with *Elekon Batlogger* detectors to allow otherwise unseen bats to be detected. The detectors recorded the bats to allow analysis of bat calls at a later stage. This was conducted using *Bat Explorer* or *Bat Sound* software.

4.4 Limitations

4.4.1 There were no significant limitations to the surveys.

5 Results: Baseline Ecological Conditions

5.1 Desk study

5.1.1 A desk study was undertaken as part of the 2019 Preliminary Ecological Appraisal.

5.1.2 The results of the desk study produced numerous bat records within 2km of the proposed site and within the last 10 years (GiGL, 2019). Species recorded included:

- Common pipistrelles recorded 409m away to the SW (closest records) in 2016.
- Soprano pipistrelles recorded 1km away to the west in 2017 (most recent record).
- Nathusius pipistrelle (*Pipistrellus nathusii*) recorded 1.6km away to the north-west in 2012 (most recent record).
- Three records of noctules (*Nyctalus noctula*) recorded 626m away to the north (closest record) in 2011.
- One Leisler's bat (*Nyctalus leisleri*) recorded 1.8km away to the north in 2011.
- Three Daubenton's bats (*Myotis daubentonii*) recorded approximately 725 metres away to the north in 2009 (closest record).

5.1.3 There have been two European Protected Species Mitigation Licences (EPSM) issued for sites within 2km of the site within the last 10 years. They were for the destruction of a common pipistrelle resting place in 2015 and a soprano pipistrelle resting place in 2017.

5.2 Habitat description

5.2.1 The site is approximately 0.67 hectares in size and is made up of buildings currently in use as a medical facility. Also present are areas of hardstanding, amenity grassland and introduced shrubs.

5.2.2 The site is located on adjacent to Grays Inn Road on its western boundary and Wicklow Street along its northern boundary. The surrounding area is predominantly urban habitats with residential dwellings and associated gardens.

5.2.3 There are two designated sites of UK/local importance and 52 non-statutory designated sites within a short distance of the site that would offer foraging and commuting opportunities for bats including:

- Camley Street Natural Park – Local Nature Reserve (LNR) approximately 750m to the north-west. Contains multiple habitat types.
- Barnsbury Wood – LRN approximately 1.3km to the north-east. Contains woodland habitats including habitats for saproxylic invertebrates.
- Calthorpe Community Gardens – Site of Nature Conservation Interest (SINC) 300 metres to the south with a range of wildlife habitats.
- Winton Primary School Gardens – SINC 400 metres to the north, a small school nature garden with pond and semi-improved grassland.

- St Andrews Gardens – SINC 400 metres to the north, a former churchyard now with tree and shrub species.
- Coram's Field –SINC 490 metres to the north with acid and amenity grassland, hedges, a pond/lake and scattered trees.

5.3 Bat emergence and re-entry surveys

5.3.1 No bats were seen emerging or re-entering from any of the buildings during any of the surveys.

5.3.2 Overall there was a low level of bat activity recorded throughout the two surveys. Four common pipistrelle (*Pipistrellus pipistrellus*) passes were recorded during the emergence survey, with only one sighted by the surveyors at positions 1 and 2 flying from west to east over the courtyard. No bats were recorded during the re-entry survey of the tree.

5.3.3 The survey data is shown in Appendix 2.

6 Conclusions and Recommendations

6.1 Impacts

- 6.1.1 No bats were recorded emerging or entering the buildings and tree at 330, Grays Inn Road.
- 6.1.2 A robust survey was undertaken, and the site is not considered to support roosting bats. As such a European Protected Species Mitigation licence (EPSM) will not be needed in order for the proposed developments to continue lawfully.
- 6.1.3 A very low bat activity was recorded within the site itself, with a single common pipistrelle recorded during the emergence survey.
- 6.1.4 There is a low risk of adverse impacts to foraging bats as a result of artificial lighting associated with the proposed development.
- 6.1.5 In the unlikely event that any of the bats are found during works, work must stop immediately, and the ecologist should be contacted for advice on the most appropriate course of action.

6.2 Enhancement

- 6.2.1 The proposed plans have the potential to provide roosting opportunities on the new dwellings, to include:
- One Schwegler 2FR bat tube (or similar), which should be incorporated into the newly redeveloped. The 2FR Bat Tube is suitable for bat species which inhabit buildings and is designed to be built into the masonry of an external wall. It can either be built flush with the wall or beneath a rendered surface. Indicative locations are shown in Appendix 3. They should be at least 5-7m off the ground and placed in areas where they are unlikely to be accessed by cats, and should not face north.
 - One Schwegler 2FN bat box, added to a tree in the residential garden. The box should be placed between 3 to 6 metres high, ideally in an open position.
- 6.2.2 External lighting features should be limited to low intensity, motion sensitive, shielded lighting, with little to no permanent lighting. All lighting should be angled towards the ground away from the site boundaries. None of the roost entrances should be lit (Appendix 5 provides further information)

- 6.2.3 It is recommended that any lining to any new roofs within the proposed development uses traditional Type 1F bitumen felt lining in preference to breathable roofing membrane or other roof linings. There is growing scientific evidence that bats can be killed by becoming caught up in the fibrous strands of breathable roofing membranes and other non-woven linings with spun polypropylene filaments (www.batsandbrms.co.uk).
- 6.2.4 The proposed re-development also provides an opportunity to enhance the ecological value of the site. It is recommended that where possible, flowering and fruiting shrubs, trees, and climbers that are beneficial to wildlife are included in the soft landscaping of the development to provide an ecological enhancement.
- 6.2.5 Plantings of climbers can be attached to sections of trellis on external walls of buildings, sections of fence and other walls and structures to increase the space available for wildlife. Climber plantings should incorporate at least three species, such as: honeysuckle *Lonicera periclymenum*; ivy *Hedera helix*; common jasmine *Jasminum officinale*, golden hop *Humulus lupulus* 'Aureus' and old man's beard *Clematis vitalba*.
- 6.2.6 Prior to planting, more detailed horticultural instructions should be referred to for each plant species selected. This will help to ensure that the plantings are suitably located and managed and thus will remain viable post-development.
- 6.2.7 As far as possible, the habitats on site should continue to link to the habitats off site. This will help retain habitat corridors and landscape connectivity for a variety of species.

7 Bibliography

Bat Conservation Trust/Institute of Lighting Engineers (2009) *Bats and Lighting in the UK: Bats and the Built Environment Series*

Bat Conservation Trust (2012) *Bats and Buildings: Bats and the Built Environment Series*. Available from: http://www.bats.org.uk/pages/accommodating_bats_in_buildings.html

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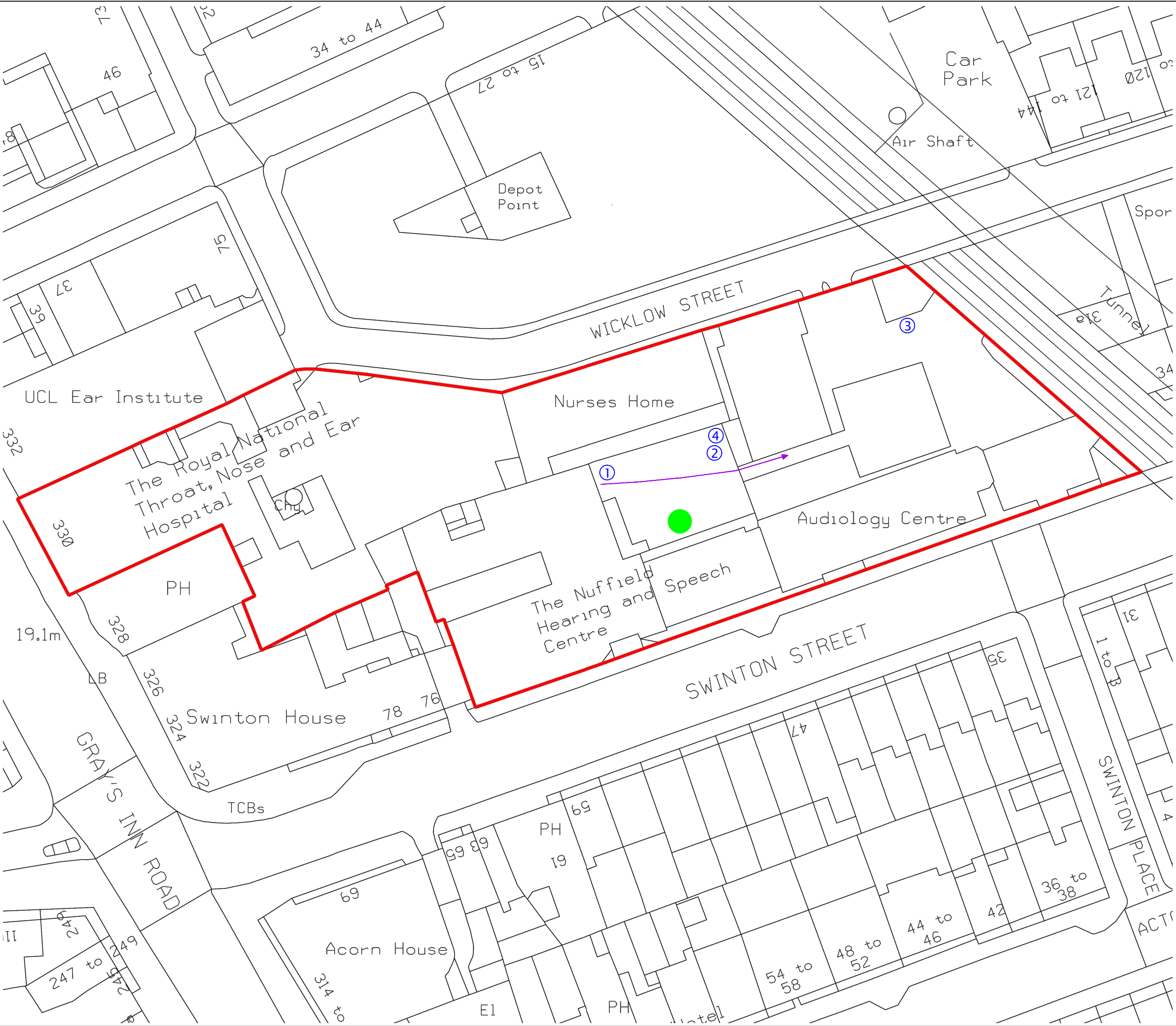
Mitchell-Jones A. J. and McLeish A.P. (2004) (rev). *The Bat Workers' Manual*. Joint Nature Conservation Committee

Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*. Available from: http://www.bats.org.uk/data/files/Bats_and_Lighting_-_Overview_of_evidence_and_mitigation_-_2014_UPDATE.pdf (accessed 09/01/2017).

Websites

Natural England's MAGIC	www.magic.defra.gov.uk	accessed 11/10/2019
Bat Conservation Trust website	www.bats.org.uk	accessed 11/10/2019

Appendix 1: Surveyor Positions



- Surveyor Positions
- ① - 28.08.19 & 30.08.19
 - ② - 28.08.19
 - ③ - 28.08.19
 - ④ - 30.08.19

Bat Activity

Tree

D F Clark

Bionomique
Ltd

Client

330 Grays Inn Road Ltd

Site address

330 Grays Inn Road

Drawing title

Bat Activity Plan

Orientation

North

Drawn

AH

Authorised

MJ

Drawing status

Information

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Date

September 2019

Scale

NTS

Drawing number

DFCP 4357

Revision

- Notes
1. Do not scale from this drawing
 2. Contractors must check all dimensions on site
 3. Any discrepancies must be reported to the Landscape Architect before proceeding
 4. This drawing is copyright © D F Clark Ltd 2015
 5. The original of this drawing was produced in colour - a monochrome copy should not be relied upon.

Appendix 2: Bat Survey Results

Dusk emergence survey: 23rd August 2019.

Surveyor at Position 1: Walnut Tree

Time	Species	Activity
20:40	Common Pipistrelle	Seen flying from west to east at approximately 4m flying height, towards position 2.
20:52	Common Pipistrelle	Pass heard but unseen
21:28	Common Pipistrelle	Two passes heard but unseen.

Surveyor at Position 2: Buildings 2 and 4 roofs.

Time	Species	Activity
20:40	Common Pipistrelle	Flew from behind surveyor, flying above heading east.
20:51	Common Pipistrelle	Pass heard but unseen
21:28	Common Pipistrelle	Pass heard but unseen

Surveyor at Position 3: Buildings 4.

Time	Species	Activity
20:39	Common Pipistrelle	Distant call but pass unseen
21:00	Common Pipistrelle	Pass heard but unseen
21:18	Common Pipistrelle	Pass heard but unseen
21:27	Common Pipistrelle	Pass heard but unseen

Dawn re-entry survey: 30th August 2019

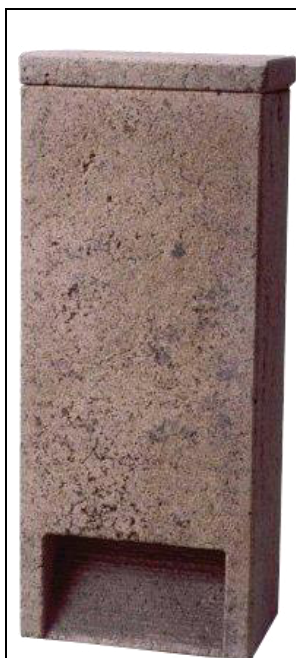
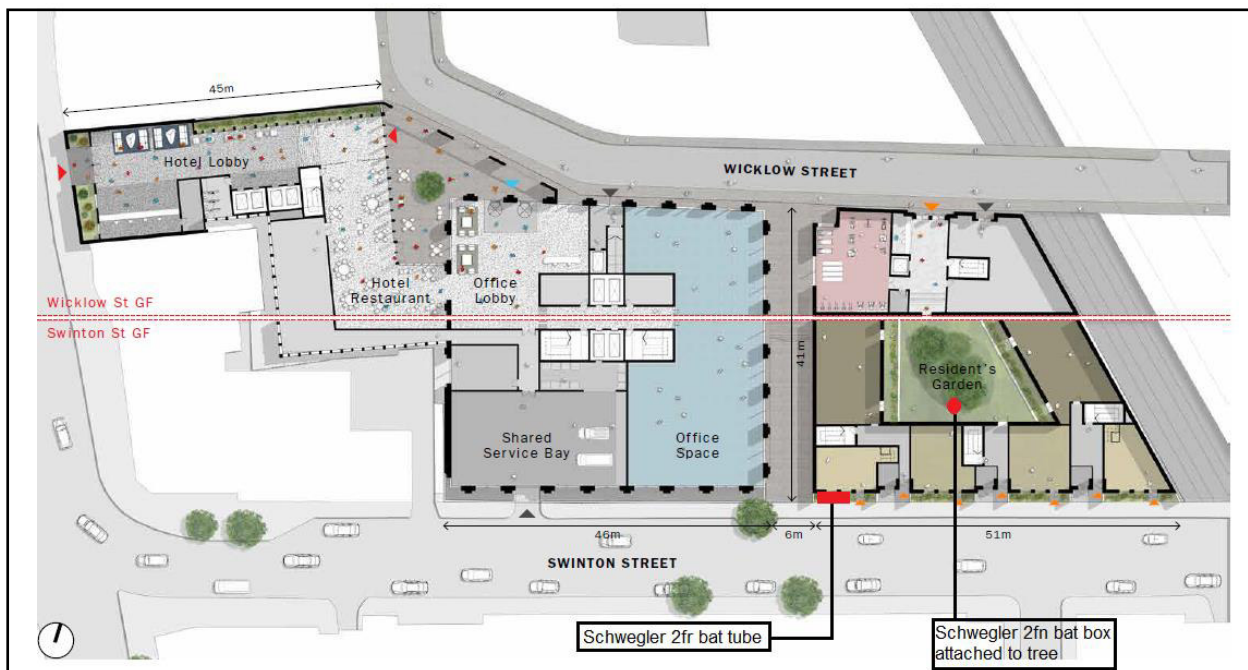
Surveyor at Position 1: Walnut Tree (west)

No Bats Recorded

Surveyor at Position 4: Walnut Tree (east)

No Bats Recorded

Appendix 3: Bat Roost Features



2FR Schwegler bat tube

Built for crevice-roosting bat species which typically inhabit the exterior of houses and other buildings. The 2FR bat tube is designed to be built into the masonry or brickwork. Can be connected to three other tubes set side-by-side.

Integrated wooden cladding for bats to cling on to. No maintenance required as droppings and urine fall out through entrance hole.

Source: <https://www.nhbs.com/2fr-schwegler-bat-tube>



Schwegler 2fn bat box

Made from Woodcrete and able to last between 20-25 years. Two entrances, one at the front and rear facing the tree. The Woodcrete maintains a stable temperature within the tree.

Should ideally be positioned in open sunny positions between 3 to 6 metres above ground.



Appendix 4: Planning Policy and Biodiversity Legislation

National Planning policy

The UK Post-2010 Biodiversity Framework forms the government response to the 2010 Convention on Biological Diversity, and replaces the UK Biodiversity Action Plan with five internationally agreed strategic goals and targets, including reducing pressures on biodiversity and safeguarding ecosystems, species and genetic diversity. The government's Biodiversity 2020 strategy aims to halt the loss of biodiversity and the degradation of ecosystem services by 2020, to include restoration where feasible. These are used as a guide for decision makers such as local authorities to fulfil their obligations under sections 40 and 41 of the Natural Environment and Rural Communities Act 2006 to have regard to the purpose of conserving biodiversity in carrying out their duties.

The National Planning Policy Framework (NPPF) 2018 states *the 'planning system should contribute to and enhance the natural and local environment by...minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.'* Further, the NPPF states *'when determining planning applications, local planning authorities should apply....development whose primary objective is to conserve or enhance biodiversity; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity'.*

Protected Species Legislation

The Wildlife and Countryside Act 1981 (as amended), the Conservation of Habitats & Species Regulations 2010 (as amended) and the Protection of Badgers Act 1992 (as amended) confer various degrees of legal protection on species including bats and birds. (A full list of protected species and their specific legal protection is provided within the schedules of the legislation.) This legal protection overrides all planning decisions. The level of protection afforded to protected species varies dependent on the associated legislation.

In general, European Protected Species (EPS) (e.g. bats) are afforded the highest level of protection. Any person who deliberately captures, injures or kills an EPS, deliberately disturbs an EPS or who damages or destroys a breeding site or resting place is guilty of an offence. Furthermore, any person who intentionally or recklessly disturbs an animal whilst it is occupying a structure/place used for shelter/protection and who obstructs access to any structure or place that an animal uses for shelter or protection is also guilty of an offence.

The level of protection afforded to species listed on the Wildlife and Countryside Act 1981 (as amended) varies considerably. 'Fully protected species,' are afforded the highest level of protection. Any person who intentionally kills, injures, or takes 'fully protected species,' or who intentionally or recklessly damages or destroys a structure or place used for shelter/protection, disturbs the animal whilst occupying a structure/place used for shelter and protection or obstructs access to any structure/place used for shelter or protection is likely to have committed an offence. Other species are afforded less protection and for these species it may only be an offence to intentionally or recklessly kill or injure animals. All active bird nests, eggs and young are protected from destruction and Schedule 1 listed birds are also protected from disturbance whilst breeding.

Under certain circumstances licences can be granted by the Statutory Nature Conservation Organisation (Natural England in England) to permit actions that would otherwise be unlawful under The Wildlife and Countryside Act 1981 (as amended), and the Conservation of Habitats & Species Regulations 2010 (as amended).

In addition to the above legislation, the Wild Mammals (Protection) Act (1996) provides protection for all wild mammals from certain cruel acts including crushing and asphyxiation, which can have relevance for methods employed during site clearance works. Further, there is a requirement for local planning authorities to consider Species (and Habitats) of Principal Importance listed under Section 41 of the Natural Environment and Rural Communities Act 2006 when making planning decisions.

Appendix 5: Lighting for Bats

Lighting Recommendations

Most bat species find artificial lighting very disturbing as they are adapted to low light conditions (Gunnell *et al.*, 2012). To avoid increasing predation risk and loss of suitable foraging and commuting habitats for bats, both on and immediately adjacent to the site, consider the following lighting recommendations (Gunnell *et al.*, 2012):

- Use the minimum amount of lighting for safety and minimise light spill. Eliminate bare bulbs and upward pointing light. It is recommended that artificial lighting does not directly illuminate any features or habitats of value to foraging bats such as hedgerows or treelines, waterbodies etc. Bat roosting sites should not be lit.
- Limit the height of lighting columns. Occasionally a higher lighting column may be preferred to reduce horizontal spill or number of columns required.
- Use as steep a downward angle of light as possible and/or use a shield, hood, cowl, louvre that directs the light below the horizontal plane. Avoid lighting above 90° and 100° (e.g. with horizontal cut off units) and keep ideally under 70° above the horizontal. Directional accessories can be installed post-installation.
- Planting (e.g. hedgerows/trees) can minimise light spill, or man-made features can block light from certain directions. The effectiveness will depend on pre-development light surveys/modelling to understand the extent and level of light around the site. Use temporary close boarded fencing until vegetation matures to shield sensitive areas from lighting.
- Limit the times lights are on to provide dark periods using modern lighting control methods e.g. during peak bat activity periods (0 to 1.5 hours after sunset and 1.5 hours before sunrise) where this does not conflict with health and safety and security requirements.
- Use narrow spectrum light sources to lower the range of species affected by lighting and light sources should emit minimal ultra-violet (UV) light. Metal halide or mercury light sources emit high UV light. Low pressure sodium lights are a preferred option to high pressure sodium or mercury lamps.
- Avoid white and blue wavelengths. Warm-white wavelength lights are a good alternative. White LED lights do not emit UV but can affect bats. LED lamps allow for directional lighting and most luminaires are full cut-off. Altering the spacing can allow for dark areas and reduce the impacts on bats.
- Lights should peak at over 550nm or use glass lantern covers to filter UV light.
- Lighting required for security/safety should use sensor activated lamps of no more than 2000 lumens (150 Watts). Low wattage lamps are preferable (<70W). 'Variable aim' luminaires can allow the angle of the beam to be altered to reduce impacts.
- Reduce light intensity as far as possible. Light levels post-development should be considered in the context of light levels pre-development.
- Lighting for pedestrians should be low level, directional and below 3 lux at ground level (preferably below 1 lux).

- Use asymmetric beam floodlights, orientated so the glass is parallel to the ground to avoid horizontal spill. See http://www.nationaltrust.org.uk/main/w-bat05_events.pdf for further information.
- Where appropriate, use lighting design software and professional lighting designers to predict light spill. Post-installation checks ensure the lighting installation is in accordance with the design and predictions were accurate, and mitigations successful.