The Ecology Consultancy

Bishopsgate Goodsyard, London / Bat Hibernation Survey / Report for Bishopsgate Goodsyard Regeneration Ltd.

The Ecology Consultancy

Bishopsgate Goodsyard

Bat Hibernation Survey

Bishopsgate Goodsyard Regeneration Ltd.

Author	Verity Heard MSc BSc (Hons) MCIEEM		
Job No	7725.2		
	Date	**Checked by**	**Approved by**
Initial	14/02/2020	Toni Cohen BSc MSc MCIEEM	Natalie Hughes BSc (Hons) ACIEEM

The Ecology Consultancy, Tempus Wharf, 33a Bermondsey Wall West, London. SE16 4TQ
T. 02073781914 **E**. enquiries@ecologyconsultancy.co.uk **W**. www.ecologyconsultancy.co.uk

Contents

Summary of Key Issues

The Ecology Consultancy was commissioned by Temple on behalf of Bishopsgate Goodsyard Regeneration Ltd. to determine the status of hibernating bats and any likely constraints to development arising at the Bishopsgate Goodsyard site located in Shoreditch, London.

This report details the findings of the bat hibernation survey conducted for the railway arches/tunnels on site. The main findings are as follows:

- No bats or evidence of hibernating bats were recorded during the inspection of the railway arches / tunnels. However, features were present on the structures with potential to support hibernating bats.
- Two static detectors were deployed in two areas of the site, Area A and Area B. Bat activity was recorded during the survey by the static detectors for Area B only, with common pipistrelle bats recorded on four nights in January.
- The microclimatic conditions of the structures were reviewed to assess the suitability of the features to support roosting bats during hibernation. The temperature and relative humidity readings indicated that the railway arches / tunnels and their features were suitable to support hibernating bats.
- The nature and scale of the works is varied and specific to each area and the archways / tunnels within them. There is potential for the works to result in both direct and indirect impacts to roosting bats. In light of the findings, a precautionary approach is recommended, and the mitigation hierarchy must be implemented and any potentially disturbing works should be avoided in the first instance.
- **Pre-construction check** - Where the works proposed have potential to impact the potential roost features of a structure, a precautionary method of works should be undertaken in accordance with a method statement, whereby the potential roost features are checked by a bat licenced ecologist immediately prior to the works and a toolbox talk completed by a suitably qualified ecologist with regards to roosting bats should be completed to inform all contractors working on the structure.
- **Timings -** it is recommended that works are undertaken under ecological supervision outside the sensitive hibernation season i.e. completed during April - end October.
- **Lighting strategy -** In accordance with the EcIA and Bat Survey report (The Ecology Consultancy, 2019b & AECOM, 2017) a lighting strategy should be designed to avoid directly illuminating commuting routes and habitats suitable for foraging bats. See Appendix 5 for lighting recommendations.

- Recommendations as to ways in which the value of the site can be enhanced for bats such as through the provision of planting and bat boxes should also be provided in accordance with national and local planning policies. Further information is provided in Appendix 5 of this report.

1 Introduction

1.1 The Ecology Consultancy was commissioned by Temple on behalf of Bishopsgate Goodsyard Regeneration Ltd in January 2020 to carry out a Preliminary Roost Assessment followed by a bat hibernation survey (if required) of Railway Arches / Tunnels at the site known as Bishopsgate Goodsyard in Shoreditch, London.

1.2 This assessment follows summer bat activity surveys conducted by AECOM during 2017 (AECOM, 2017) and an update Preliminary Ecological Appraisal and Ecological Impact Assessment by the Ecology Consultancy in 2019 (the Ecology Consultancy, 2019a & 2019b). In 2019, an EIA Scoping Opinion was received which determined that evidence was required to assess the importance of the site for hibernating bats and any impacts of the proposed development (LUC, 2019).

SCOPE OF REPORT

1.3 The primary aims are, through a process of investigation and assessment, to determine if any hibernation bat roosts are present, the species using them, their status and relative conservation importance and any likely impacts that could occur as a result of the proposals. Where impact is identified, appropriate mitigation and compensation measures are provided as supporting information to inform the planning application.

DEVELOPMENT PROPOSALS

1.4 The development proposal is for a multiphase development with a mix of office, retail and residential space. The station and listed railway arches will be retained. A new park is proposed in the south-east of the site above the railway arches. Biodiverse roofs are proposed throughout the development.

SITE CONTEXT

1.5 The site is approximately 4.16 hectares (ha) in size and is centred on Ordnance Survey National Grid reference TQ 33659 82207. The northern boundary of the site is formed by Bethnal Green Road and Sclater Street, the eastern boundary is formed by Brick Lane, the southern boundary by the Bethnal Green to Liverpool Street Railway Sidings and the western boundary by Shoreditch High Street and Commercial Street. The wider surrounding area is predominantly urban and largely made up of residential and commercial areas. The nearest significant areas of green space comprise Spitalfields City Farm and Allen Gardens 100 metres (m) to the south-east of the site, which is a Site of Borough Importance for Nature Conservation (SBINC).

RELEVANT LEGISLATION AND PLANNING POLICY

1.6 The following key pieces of nature conservation legislation are relevant to this assessment, with a more detailed description of this legislation provided in Appendix 2:

- The Conservation of Habitats and Species Regulations 2017 (as amended);
- The Wildlife and Countryside Act 1981 (as amended); and
- Natural Environment and Rural Communities Act 2006.

1.7 The actions that could result in an offence occurring under the above legislation include: the disturbance of bats within a roost; loss or damage of a roost; blocking a roost entrance; or modification of a roost. If development proposals are likely to result in an offence then a European Protected Species Mitigation (EPSM) licence must be obtained from Natural England prior to works to provide a derogation from the legislation. Alternatively, where no more than three low conservation significance roosts are present and are used by low numbers of bats of no more than three of the (qualifying) species that EPSM licences are most commonly applied for, it may be possible to register the site under the Bat Mitigation Class Licence (BMCL) scheme. No like for like bat compensation is required for the majority of the species covered by BMCL.

1.8 The National Planning Policy Framework (Department of Communities and Local Government, 2019) requires local authorities to avoid and minimise impacts on biodiversity and to provide net gains in biodiversity when taking planning decisions. In addition, in England, under Section 40 of the Natural Environment and Rural Communities Act 2006, all public bodies are required to have regard to biodiversity conservation when carrying out their functions. This is commonly referred to as the 'biodiversity duty'.

2 Methodology

BAT SURVEY

Personnel

2.1 The hibernation survey was carried out by Verity Heard BSc MSc MCIEEM, a Senior Ecologist with over six years commercial bat survey experience (Natural England Level 2 Class Licence). Verity was assisted by Gemma Watkinson MBiolSci ACIEEM, an Ecologist with over four years' consultancy experience.

Equipment

2.2 The surveys made use of the following equipment:

- a handheld LED torch;
- a high-powered torch for illuminating features at height;
- close focussing binoculars;
- an endoscope; and
- bat dropping (DNA) collection kit.

Aims and Objectives

2.3 The aim of the survey methodologies outlined below was to determine if the site had potential to support roosting bats and if so to establish the presence/likely absence of hibernation bat roosts within structures. Once presence has been established the secondary aim is to obtain sufficient information to characterise the type of roost according to criteria set out in the current guidelines (Collins, 2016). This includes determining the function/s of the site to bats. The gathered information is then used to inform an assessment of the potential impacts of the development proposals and to devise an appropriate and proportionate mitigation strategy.

Desk study

2.4 A desk study was conducted to obtain data relating to bats within a 2 kilometre (km) radius of the site, as made available by the London Bat Group.

2.5 Additional contextual information was compiled from publicly available data sources:

- MAGIC (http://www.magic.gov.uk) the Government's on-line mapping service. Information was sought concerning: the presence of ancient semi-natural

woodland (ASNW); statutory designated nature conservation sites1; and extant or historic European Protected Species Mitigation licences for bats; and

- Ordnance Survey mapping and publicly available aerial photography to determine any features such as: running and standing water; woodland; tree lines; hedgerows; railway corridors; and the surrounding landscape uses.

Preliminary Roost Assessment

2.6 A Preliminary Roost Assessment (PRA) of the site was conducted on 14 January 2020 to internally and externally inspect all accessible railway arches/tunnels on site. The inspection involved a detailed search of all accessible architectural features for bat droppings, urine staining, scratch marks, staining around suitable crevices and feeding remains. A high powered torch was used to illuminate recesses and crevices at height and these were inspected using focusing binoculars and an endoscope if required.

2.7 During the internal inspection the surveyor worked through the underground/subterranean rooms in logical progression searching each in turn as well as all small storage areas. The ceiling, walls and floor were inspected and any potential access points noted.

Hibernation survey

2.8 On completion of the Preliminary Roost Assessment the site was considered to have potential to support hibernating bats. As such, a hibernation survey was completed.

2.9 The hibernation survey comprised an internal and external inspection of all archways/tunnels assessed as having potential during the Preliminary Roost Assessment.

2.10 In accordance with best practice (Collins, 2016) hibernation surveys are to comprise two visits during mid-January and mid-February to inspect potential roost features as described above under the PRA methodology.

2.11 Winter bat activity within the structures were also undertaken for a minimum of two weeks in each month from mid-January to mid-February. Two Anabat Express static bat detectors were placed within tunnels which had features that could not be fully visually inspected on 14 January 2020. Each was placed parallel to the tunnel to capture any foraging and commuting activity from each end of the tunnel. The weather was monitored prior to conducting the surveys and where possible carried out when it was at its coldest

[1] Statutory designations include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).

and therefore when numbers of roosting bats are likely to be their highest if present. During the site visits temperature and relative humidity readings were also taken in each area with potential to support roosting bats using Tinytag Plus 2 devices.

2.12 Visits were limited to the minimum necessary to gain required information due to the inherent risk of disturbing hibernating bats during hibernation surveys (if present). As such, the Preliminary Roost Assessment undertaken in Mid-January (14 January) formed the first hibernation survey. In order to provide an update at the earliest possible opportunity, a memo report was completed following the completion of a visit between the first visit on 14 January and a second inspection 10 days following this, at the end of January (The Ecology Consultancy, 2020). A final visit was completed on 12 February 2020 during which a final inspection of the features took place and the static bat detectors were removed and data analysed.

EVALUATION AND IMPACT ASSESSMENT

Evaluation

2.13 The conservation status of any bat species found to be roosting within the site or for which the site provides a measurable supporting function is drawn from published sources with the conservation significance of any roost provided according to accepted criteria[2].

2.14 The ecological importance of the site for bats has been assessed broadly following guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2016) which ranks nature conservation importance according to a geographic scale of reference: international and European; national; regional; metropolitan, county vice-county or other local authority-wide area; local or of value at the site scale. The following factors are considered when making this evaluation: nature conservation designations; rarity; vulnerability; distribution; and the conservation significance of any roosts.

Impact Assessment

2.15 An assessment is provided on the likely impacts of the development proposals on any bat roosts located within or immediately adjacent to the site boundary. This assessment is made with reference to Section 6[3] of the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004) and Natural England's standing advice[4] and includes a summary of the scale of impact according to roost type and development effect. This section considers

[2] Figure 4. *Guidelines for proportionate mitigation*, the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004) which assigns conservation significance to different types of bat roost on a sliding scale from Low to High
[3] *Predicting the Impact of Development*, the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004), assigns scale of impact to the favourable conservation status of bats according to type and extent of construction effect
[4] *Bats: surveys and mitigation for development projects*, first published 28 March 2015

types of construction impact to bats and their roosts including; disturbance, loss, modification and fragmentation in relation to duration and timing. For the site as a whole, a statement is made on the geographic scale at which impact is deemed to be significant, following CIEEM guidance (CIEEM, 2018).

DATA VALIDITY AND LIMITATIONS

2.16 Bats are highly mobile animals and can move roost sites both within and between years. Where surveys are not spread throughout the bat hibernation season, it is possible that they could miss roosts that are occupied earlier or later in the year. However, where undisturbed, secondary evidence of bats inside a structure is likely to be detectable throughout the year. The detection of small numbers of crevice dwelling species may remain problematic in some cases, such as where droppings accumulate within an inaccessible void.

2.17 The easternmost tunnels in Area B had a height of approximately 10m constructed of brick. A large linear crevice was present where there were two joins; one, in the entrance of the tunnel and the other mid-way along the tunnel. Both crevices were present along the entire transverse section of the tunnel. Binoculars were used with torches to inspect for roosting bats however, at ground level it was not possible to determine if the features extended further into the structure.

2.18 In Area A, an underground section was found and could only be visually inspected from a hole in the ground at a safe distance. It was not possible to inspect this area fully for the presence of hibernating bats.

2.19 In Area D, the tunnels were partially bricked up and it was not possible to visually inspect the structure. Access to the external areas of these tunnels could also not be gained.

2.20 The Tinytag Plus 2 relative humidity and temperature records could not be deployed in situ due to the lack of suitable locations to deploy the devices and risk of theft therefore measurements were taken during the visits only.

2.21 In light of these constraints, professional judgement and a precautionary approach has been taken when assigning the level of potential to the tunnels and when providing recommendations.

3 Results

DESK STUDY

Data search

3.1 The data search returned seven records for three species of bats from 1985 to 2018 and four historic or extant EPSM licences for two species within a 2km radius of the site. A summary of the most pertinent results is present in Table 3.1 and 3.2 below.

Table 3.1: Summary of most pertinent data search results from the local environmental records centre

Species	Distance & Orientation	Date	Roost type	Notes
Unknown/Vespertilionidae	220m SE	1985	NA	Field Record
Noctule	330m S	August 2012	NA	Field Record
Pipistrellus Sp	550m SE	22 August 2018	NA	Field Record
Common pipistrelle	760m NW	1 August 2018	Type Unknown	
Nathusius' pipistrelle	750m SW	12 March 2007	NA	Casualty
Nathusius' pipistrelle	900m W	17 September 2013	NA	Field Record
Nathusius' pipistrelle	980m SW	29 September 1989	NA	Casualty

Table 3.2: EPSM Licences within 2km of the site

Species	Distance & Orientation	Date	Roost type	Notes
Common pipistrelle	790m NW	2014-2018	Non breeding	2014-4889-EPS-MIT
Soprano pipistrelle and common pipistrelle	1.17km NE	2011-2014	Non breeding	EPSM2011-2908
Common pipistrelle	1.26km SE	2013 -2014	Non breeding	EPSM2012-5264
Common pipistrelle	1.30km SW	2015-2018	Non breeding	2015-14984-EPS-MIT

Previous survey data

3.2 During the surveys undertaken by URS in 2013 (URS, 2013) it is understood that no bats were recorded emerging or returning to the structures during the summer months; however, the upper levels of the site was found to support at least three species of bat, which used the Site for foraging purposes. These were common pipistrelle, soprano pipistrelle, and Nathusius' pipistrelle. Update surveys in 2017 had similar results, with no bats recorded emerging or re-entering the structures. As well as the species previously recorded, three Myotis calls were also identified during the static activity surveys (The Ecology Consultancy, 2019b).

HIBERNATION SURVEY

Inspections

3.3 The hibernation surveys were carried out during January and February 2020. During the inspections of the railway archways/tunnels, suitable features with potential to support hibernating bats were present however, no bats or evidence of hibernating bats was recorded during the survey. See Preliminary Roost Assessment Report for a description of all tunnels/railway arches and their features, (The Ecology Consultancy, 2020).

Activity – Static Detectors

3.4 The static detectors returned records of bats at Area B only during the hibernation survey. One species of bat, common pipistrelle was recorded at Area B on four nights with a total of 11 recordings. A summary is presented in Table 3.3 below. The greatest number of recordings was on 25 January 2020, when common pipistrelle was recorded five times.

Table 3.3: Summary of bat activity on static detectors

Species	Species	Month recorded
Area A	None recorded	-
Area B	Common pipistrelle	January

Surrounding habitat

3.5 The land immediately adjacent to all four railway tunnel/archway areas (A-D) was varied with both disused brownfield land, areas in use as sports grounds and railway lines. The largest area of disused brownfield land was present above Areas A and B. Habitats comprised continuous scrub and scattered scrub with trees. In the centre was a tree line which led to two holes in the ground that led to the tunnels in Area A. No artificial lighting units were present in this area. However, it was likely to be subject to levels of artificial

lighting given the surrounding offsite high rise commercial buildings and adjacent sport pitches with floodlights.

3.6 The railway lines immediately south of the site lacked vegetation with only a small section of scrub. However, they were well linked to suitable bat foraging and commuting habitats within the surrounding area including parks, church grounds, gardens and tree lines.

Microclimatic conditions

3.7 Humidity levels were relatively similar within each area with an average relative humidity of 74.8 % and average temperature of 13ºC.

Table 3.3: Summary of microclimatic readings for each area

Area	Relative Humidity (%)	Temperature (ºC)
A	78.7	12.7
B	71.6	12.3
C	74.1	14.1
D	NA	NA

4 Evaluation and Impacts

EVALUATION

4.1 The hibernation survey indicated the presence of bat hibernation roosts within Area B of the site, however no bats or evidence of bat roosting was recorded during the hibernation survey. A number of limitations were associated with the surveys and as such the presence of hibernating bats cannot be discounted.

4.2 During hibernation, bats need roosts that are cool and remain at a constant temperature (BCT, 2020). Studies have concluded no matter where, bat species hibernate where temperatures do not fall below 0ºC (Dietz & Kiefer, 2016). During the survey the microclimatic readings from the TinyTag Plus 2 devices indicated that the areas with features suitable for hibernating bats had relatively high humidity levels and suitable temperatures. However, readings were only a small snapshot of time and not taken within all potential roost features that may extend further into the tunnels. Readings could not be taken for the underground sections that were inaccessible in Area A. It is also unclear from the limited data whether these temperatures would remain suitable throughout the bat hibernation season. Different species and individuals select the location which best suits their needs and, as such, the different and varied potential roost features within the tunnels may be suitable at various times during the hibernation season.

4.3 Auto remote static bat detectors that recorded bat activity within Area B during January recorded common pipistrelle only. The railway arches/tunnels in this area are located within an undisturbed location, subject to limited levels of artificial light. There is a small area of potential bat foraging habitat located above the tunnels and the railway line may act as a commuting route connecting the site to the wider landscape.

4.4 A small number of records of bats were received from the local bat group. In total, three species of bat, common pipistrelle, Nathusius' pipistrelle and noctule bat, were recorded within a 2km radius and the closest record was 220m south-east of the site. During the summer activity survey undertaken by URS and AECOM in 2013 and 2017 respectively, four species (soprano pipistrelle, Nathusius' pipistrelle, common pipistrelle and Myotis species) were recorded foraging intermittently in low numbers on the site (URS 2013 & AECOM, 2017). These species are considered of local importance due to their relatively common and widespread status within London.

4.5 All but one data search record was a field record. One roost site was recorded during 2018 located 550m south-east of the site and four EPSM licences were granted within 2km of the site. Research suggests the three bat species recorded utilise a Core Sustenance Zone (CSZ) of 2.5km (Collins, 2016), this radius would include the site. Therefore, bats associated with roosts in the surrounding area could utilise the site and the small numbers recorded in 2017 could have been associated with these roosts.

4.6 Given the urban context of the site with levels of artificial lighting, limited connectivity and patches of suitable habitats, the likelihood of bats finding and utilising the potential roost features identified on site for hibernating is significantly reduced. However, it must be noted that whilst the majority of tunnels / railway aches were inspected during the two visits, not all areas could be inspected. The static detector survey indicated that the site may be utilised by a small number of common pipistrelle bats, and as such, a precautionary approach to the works must be applied.

IMPACT ASSESSMENT

4.7 All British species of bat are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). Under this legislation it is an offence to deliberately capture, kill, disturb a bat and to damage, obstruct or destroy a bat roost.

Construction Phase

4.8 The nature and scale of the works is varied and specific to each area. It is understood that works may comprise the following:

- vegetation removal immediately adjacent to the structures;
- breaking out/removal and repointing/resurfacing of sections;
- widening of existing structures with the potential use of piling; and
- night working and associated lighting.

4.9 The following impacts could result from the proposed works:

- death, injury or disturbance to roosting bats;
- loss of potential roosting features;
- disturbance of a roost during the construction works via physical obstruction, lighting, noise and vibration, and
- fragmentation of flight lines.

Operational Phase

4.10 Long term impacts could include increased lighting, which could result in disturbance and could obstruct and disturb commuting and foraging activity.

5 Summary and Recommendations

SUMMARY

5.1 This section summarises the data gathered during the surveys and the likely impacts on bats, bat roosts and supporting habitats that are present on the site, as described in previous sections of this report.

- No bats or evidence of hibernating bats were recorded during the inspection survey of the site. However, features with moderate potential for hibernating bats were present within certain railway arches/tunnels in areas A-D;
- The land immediately adjacent to all four railway tunnel / archway areas (A-D) was varied with both disused brownfield land, areas in use as sports grounds and railway lines. Whist, within each area there were features that were not subject to artificial lighting, the areas surrounding the site are highly likely to be subject to levels of artificial lighting given the proximity of the offsite high rise commercial buildings and adjacent sport pitches with floodlights.
- Activity by common pipistrelle bats was recorded during the survey by the static bat detectors in Area B. No bat activity was recorded at Area A;
- The temperature and relative humidity readings indicated that the structures are suitable to support hibernating bats;
- The nature and scale of the works is varied and specific to each area and the archways / tunnels within them. There is potential for the works to result in both direct and indirect impacts to roosting bats. It is recommended that the mitigation hierarchy is implemented and any potentially disturbing works avoided. As such, a precautionary method of working is advised and detailed below.

RECOMMENDATIONS

5.2 Owing to the phased and varied nature of the works, coupled with the findings of the Preliminary Roost Assessment and hibernation surveys completed to date, recommendations have been tailored accordingly and are detailed below:

Mitigation

Preconstruction check

5.3 In line with best practice (Collins (ed)., 2016), a precautionary method of works is recommended, whereby the potential roost features are checked by a bat licenced ecologist prior to the works commencing. In addition, a toolbox talk with regards to

roosting bats is recommended to be provided by a suitably qualified ecologist to inform all contractors about potential constraints and bats associated with the structures.

Timing of works

5.4 In light of the proposed works and potential roost features present, it is recommended that works to the railway arches / tunnels on site are undertaken under ecological supervision outside sensitive hibernation period (i.e. completed during April – end Oct). If roosting bats are found to be present, a licence will be required.

Provision of bat roosts

5.5 In accordance with the recommendations described below and within the PEA (The Ecology Consultancy, 2019a), bat roosting boxes should also be installed on site prior to the works commencing.

Planting of wildlife value

5.6 In accordance with the PEA (The Ecology Consultancy, 2019a) it is recommended that wildlife planting should be integral to any soft landscape plans and should be included within a Landscape and Ecological Management Plan (LEMP) to include native species and/or species of recognised wildlife value. The use of nectar rich and berry producing plants will attract a wider range of insects, birds and mammals and continue to accommodate those already utilising the site. Where possible, vertical habitats should also be created and large shrubs/trees should be under planted to create greater structure and cover for wildlife. The use of block planting of single species should be avoided in favour of a higher diversity of plant types per square metre.

Lighting strategy

5.7 In accordance with the EcIA and Bat Survey report (The Ecology Consultancy, 2019b & AECOM, 2017) a lighting strategy should be designed to avoid directly illuminating commuting routes and habitats suitable for foraging bats. See Appendix 5 for lighting recommendations.

Data validity / update survey

5.8 In line with best practice guidelines (Collins (ed)., 2016), an update hibernation survey is recommended to inform any works that are proposed more than 18 months following this assessment due to the highly mobile nature of bat species and any changes that may occur to the potential roost features on the site.

References

AECOM (2017). Bishopsgate Goodsyard – report of Updated Ecological Surveys Conducted During 2017. Memo report. Reference 604699910.

Altringham (2011) Bats from evolution to conservation, OUP Oxford: Second edition

Arcadis Jacobs (2018) DF5 Pre-Construction Ecological report

Bat Conservation Trust (2011) *Statement on the impact and design of artificial light on bats*. Bat Conservation Trust, London.

Bat Conservation Trust (2009) Encouraging Bats. Bat Conservation Trust, London. Available at: http://www.bats.org.uk/pages/encouraging_bats.html

Bat Conservation Trust (2020) Hibernation Roosts. Available at: https://www.bats.org.uk/about-bats/where-do-bats-live/bat-roosts/hibernation-roosts

CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal, and Marine 2nd edition*. Chartered Institute of Ecology and Environmental Management, Winchester

Cowan, A. (2006) *Assessment of trees with consideration to their value for use by bats*. ArborEcology, Kent.

Collins. (2016) *Bat Surveys - Good Practice Guidelines* 3rd Edition. Bat Conservation Trust, London Fure, A. (2006) *Bats and lighting*. The London Naturalist 85.

Department of Communities and Local Government (2019). *National Planning Policy Framework*. DCLG. London.

Dietz,C., Kiefer, A., (2016) Bats of Britain and Europe. Bloomsbury Publishing, London.

Highways Agency (2015) M4 Junctions 3 to 12 Smart Motorway. TR010019. Development Consent Order Application. Volume 6: Environmental Statement and Related Documents (specifically Chapter 9: Ecology and Nature Conservation).

ILP, BCT (2018) Bats and artificial lighting in the UK: Built Environmental Series. Guidance note 08/18

Jones, J. (2000) *Impact of lighting on bats*. Bat Conservation Trust, London. http://www.bats.org.uk/downloads/Helpline/lighting.pdf [accessed 12 January 2020].

LUC (2019) Review of Chapter 17: Ecology. Review of the ES Addendum for Bishopsgate Goodsyard

MAGIC (2016). *Multi-Agency Geographic Information for the Countryside*. http://www.magic.gov.uk/ [accessed 12 January 2020].

Mitchell-Jones, A.J. & McLeish, A.P. (2004) *The Bat Workers' Manual* 3rd Edition. Joint Nature Conservation Committee, Peterborough.

Mitchell-Jones (2004) *Bat Mitigation Guidelines.* English Nature.

The Ecology Consultancy (2019a). Preliminary Ecological Appraisal – Bishopsgate Goodsyard, Shoreditch. Report for Temple. Report number 7725.5. Issued 29/05/2019.

The Ecology Consultancy (2019b). Environmental Statement Addendum Volume 2. Chapter 17 of 21 – Ecology.

The Ecology Consultancy (2020) Bat Preliminary Roost Assessment & Hibernation Survey Memo Report, Bishopsgate Goodsyard. Reference 7725.2

URS (2013) Bishopsgate Goodsyard. Bat Survey Report

Appendix 1: Photographs

Photograph 1
Area A main tunnel/viaduct with nine tunnels on the right.

Photograph 2:
Area A raised section (circled in red) with hole leading to underground archways/cellar

Photograph 3:
Area A underground cellar/archway seen through a hole beneath raised section within a tunnel.

Photograph 4:
Area A gaps between pipework and brickwork.

Photograph 5:
Area A southern elevation of the tunnels in the south of the site adjacent to railway lines.

Photograph 6:
Western section of Area B

Photograph 7:
Swimming pool in a tunnel in the eastern section of Area B

Photograph 8:
Eastern section of Area B.

Photograph 9:
Small dark voids in the piers of the tunnels of Area B which had a metal grill.

Photograph 10:
Large gaps between tunnel section joins in Area B.

Photograph 11: Subterranean rooms located in Area C.

Photograph 12:
Tunnels located in Area D (not accessed)

Appendix 2: Legislation and Planning Policy

Important Notice: This section contains details of legislation applicable in Britain only (i.e. not including the Isle of Man, Northern Ireland, the Republic of Ireland or the Channel Islands) and is provided for general guidance only. While every effort has been made to ensure accuracy, this section should not be relied upon as a definitive statement of the law.

A NATIONAL LEGISLATION AFFORDED TO SPECIES

The objective of the EC Habitats Directive[5] is to conserve the various species of plant and animal which are considered rare across Europe. The Directive is transposed into UK law by The Conservation of Habitats and Species Regulations 2017 (formerly The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended).

The Wildlife and Countryside Act 1981 (as amended) is a key piece of national legislation which implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and implements the species protection obligations of Council Directive 2009/147/EC (formerly 79/409/EEC) on the Conservation of Wild Birds (EC Birds Directive) in Great Britain.

Since the passing of the Wildlife and Countryside Act 1981, various amendments have been made, details of which can be found on www.opsi.gov.uk. Key amendments have been made through the Countryside and Rights of Way (CRoW) Act 2000 (as amended).

Other legislative Acts affording protection to wildlife and their habitats include:

- Deer Act 1991
- Countryside and Rights of Way Act 2000
- Natural Environment and Rural Communities (NERC) Act 2006
- Protection of Badgers Act 1992
- Wild Mammals (Protection) Act 1996

Species and species groups that are protected or otherwise regulated under the aforementioned domestic and European legislation, and that are most likely to be affected by development activities, include herpetofauna (amphibians and reptiles), badger, bats, birds, hazel dormouse, invasive plant species, otter, plants, red squirrel, water vole and white clawed crayfish.

Explanatory notes relating to species protected under The Conservation of Habitats and Species Regulations 2017 (which includes smooth snake, sand lizard, great crested newt and

[5] Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora

natterjack toad), all bat species, otter, hazel dormouse and some plant species) are given below. **These should be read in conjunction with the relevant species sections that follow.**

- In the Directive, the term 'deliberate' is interpreted as being somewhat wider than intentional and may be thought of as including an element of recklessness.
- The Conservation of Habitats and Species Regulations 2017 does not define the act of 'migration' and therefore, as a precaution, it is recommended that short distance movement of animals for e.g. foraging, breeding or dispersal purposes are also considered.
- In order to obtain a European Protected Species Mitigation (EPSM) licence, the application must demonstrate that it meets all of the following three 'tests': i) the action(s) are necessary for the purpose of preserving public health or safety, or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment; ii) that there is no satisfactory alternative and iii) that the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

Bats

All species of bat are fully protected under The Conservation of Habitats and Species Regulations 2017 through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (all bats)
- Deliberate disturbance of bat species as:

  a) to impair their ability:

  (i) to survive, breed, or reproduce, or to rear or nurture young;

  (ii) to hibernate or migrate[3]

  b) to affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also currently protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)

- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

How is the legislation pertaining to bats liable to affect development works?

A European Protected Species Mitigation licence issued by the relevant countryside agency (e.g. Natural England) will be required for works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (survive, breed, rear young and hibernate). The licence is to allow derogation from the relevant legislation but also to ensure appropriate mitigation measures be put in place and their efficacy to be monitored.

Though there is no case law to date, the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded *de facto* protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost[6].

B LOCAL PLANNING POLICY

London Borough of Tower Hamlets Adopted Core Strategy (2010)

DM11 Living buildings and biodiversity

- *Development will be required to provide elements of a 'living building'.*
- *Existing elements of biodiversity value should be protected or replaced within the development and additional habitat provision made to increase biodiversity value.*
- *Developments which will cause damage to a Site of Importance for Nature Conservation, or significantly harm the population or conservation status of a protected or priority species, will not be supported unless the social or economic benefits of the development clearly outweigh the loss of biodiversity.*
- *Major development will need to submit an Ecology Assessment demonstrating biodiversity enhancement in accordance with the Council's Local Biodiversity Action Plan.*

[6] Garland & Markham (2008) Is important bat foraging and commuting habitat legally protected? Mammal News, No. **150**. The Mammal Society, Southampton.

London Borough of Hackney Adopted Core Strategy (2010)

Core Strategy Policy 27: Biodiversity

The Council will protect, conserve and enhance nature conservation areas, in particular in and around Dalston and Shoreditch for their biodiversity value, and develop a local habitat network contributing to the wider Green Grid.

Development will be encouraged to include measures that contribute to the borough's natural environment and biodiversity. Where appropriate, a biodiversity survey of the site must be carried out, with actions to enhance the biodiversity value, mitigate or compensate for any harm to habitats and / or species.

C REGIONAL AND LOCAL BAPS

Many local authorities in the UK have also produced a local Biodiversity Action Plan (LBAP) at the County or District level. The London BAP is based on the UK list of Species and Habitats of Principal Importance and contains 214 species and 15 habitats.

Specific HAPs and SAPs listed in the London BAP which are of potential relevance to this site include:

- Parks & urban green spaces
- Bats

Specific HAPs and SAPs listed in the Tower Hamlets and Hackney BAPs which are of potential relevance to this site include:

- Bats

Appendix 3: Assessment Criteria for Preliminary Roost Assessments

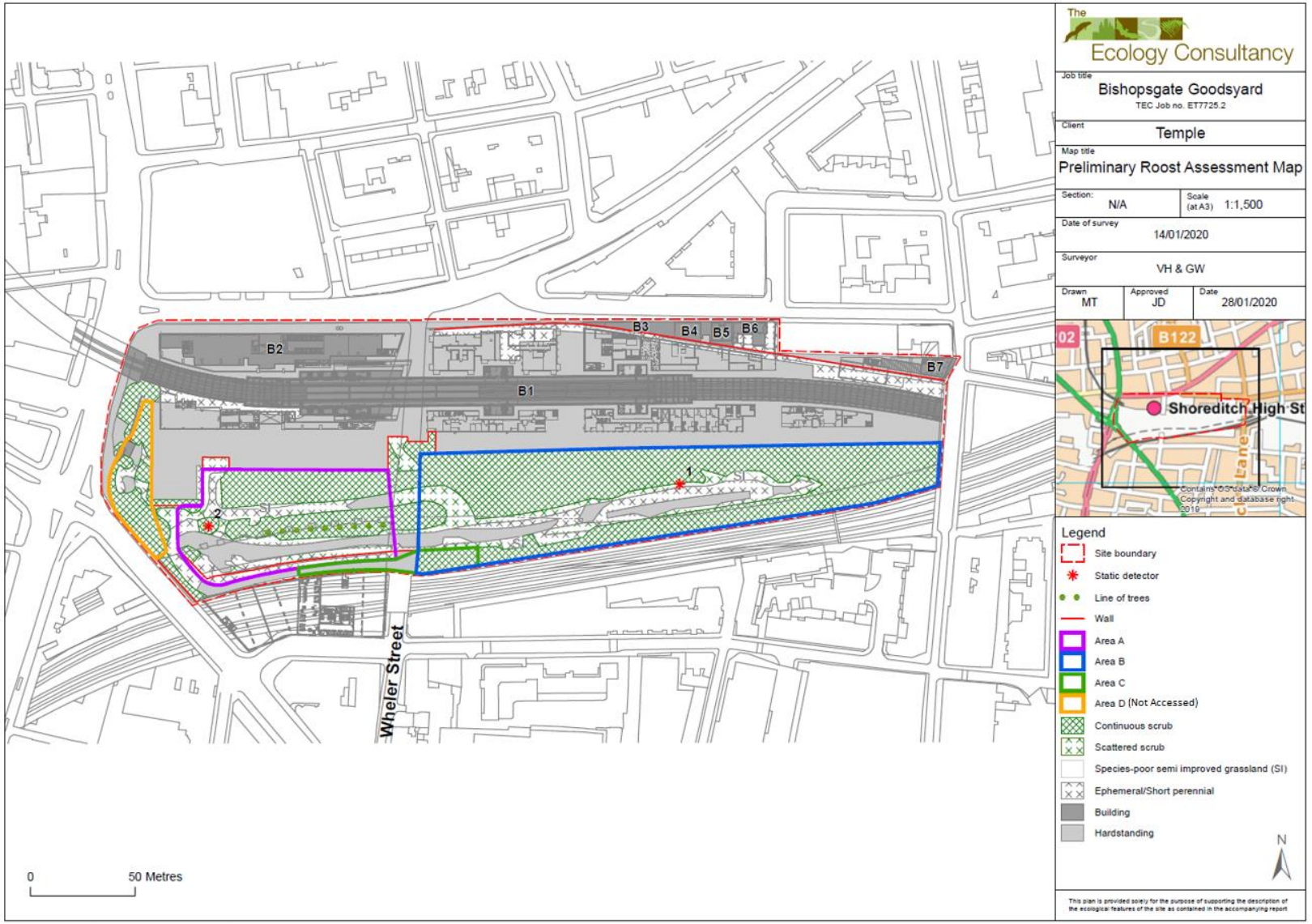
ASSESSMENT CRITERIA – PRELIMINARY ROOST ASSESSMENT – STRUCTURES

The potential for structures to support roosting bats, ranging from negligible to the presence of a confirmed roost, is assessed using the findings of the survey and the desk study. The following criteria were used to determine the level of potential of the buildings for roosting bats:

- **Negligible potential** – While presence cannot be absolutely discounted there were no significant visible features that could be used by bats for roosting.
- **Low** – Small number of potential roosting features such as could be utilised by individual opportunistic roosting bats. Site situated within isolated habitat that could be used by foraging bats but which is not connected by prominent linear features such as woodland edge, hedgerows and tree lines.
- **Moderate** – Several potential roosting features in the buildings or other structures. There is surrounding habitat such as woodland, scattered trees, hedgerows suitable to support foraging and roosting bats. The site is connected with the wider landscape by linear features such as woodland edge, hedgerows and tree lines that could be used by commuting bats.
- **High** – Buildings or other structures, such as mines, caves, tunnels, ice houses and cellars, with numerous features of potential significance for roosting bats. Surrounding landscape has high value habitat for roosting, foraging and commuting that is contiguous with on-site habitats. The site is connected with the wider landscape by strong linear features and may be close to known roosts or other potentially valuable habitat resources.
- **Confirmed roost** – Evidence indicates a building or other structure is used by bats, for example:
    - bats seen roosting or observed flying from a roost or freely in the habitat;
    - droppings, carcasses, feeding remains;
    - bats heard ‘chattering’ inside on a warm day or at dusk.

Appendix 4: Site Plan

Figure 1: Site Plan



Appendix 5: Standard Guidance for Mitigation, Compensation and Enhancement

Bat tubes, bat bricks and bat boxes

To compensate for the loss of roosts used by crevice dwelling species or to provide enhancement measures thought should be given to utilising proprietary products from recognised manufacturers such as: Bird Brick Houses, The Nest Box Company, Schwegler, Habibat, Causa and Vincent. Bat tubes and integrated bat bricks are artificial roost features that can be incorporated into building structures. Bat boxes are generally fitted externally to mature trees or structures. The site's value to bats could be enhanced by installing any of these features. Any bat tubes and bat bricks used for enhancement would need to be in addition to any required to compensate for the loss of the roosts.

Bat tubes, bat bricks or bat boxes should be located at least 5m above ground level facing southeast – southwest and to allow for clear flight paths and should not be directly lit by artificial lighting. Bat boxes should be woodcrete designs as they are long lasting compared to wooden boxes and insulate occupants from extremes of temperature and condensation.

Breathable roof membrane

Breathable roof membranes (BRMs) have been shown to entangle roosting bats, leading to mortality, sometimes of entire colonies. Therefore, it is recommended that only bitumen roofing felt that does not contain polypropylene filaments (e.g. bitumen felt type 1F) should be used to reduce the risk of bat mortality.

Bats and lighting

While different species of bat react differently to night time lighting, research has found that bats overall are sensitive to artificial lighting. Excessive and/or poorly directed lighting may delay bats in emerging from their roosts; shortening the time available for foraging, as well as causing bats to move away from suitable foraging grounds, movement corridors or roosting sites, to alternative dark areas (Jones, 2000).

To minimise indirect impacts from lighting associated with the proposed development it is recommended that artificial lighting is only directed where necessary for health and safety reasons. Lighting should not illuminate any trees and hedgerows on site, or suspected or confirmed bat roosting sites. Lighting should only be used for the period of time for which it is

required (Jones, 2000). This can be achieved by following accepted best practice (Fure, 2006; Institute of Lighting Professionals, BCT, 2018;& Jones, 2000):

- Where appropriate, professional lighting designers should be consulted, and the need for quantitative lighting measurements should be considered;
- Lighting mitigation should be based on robust baseline surveys of bat behaviour and existing light levels on site wherever possible;
- The level of artificial lighting including flood lighting should be kept to an absolute minimum;
- Set dark habitat buffers and a 0.5 lux limit of light spillage through the use of spatial design of lighting;
- Building design of the lighting i.e.. recessing lights, specialist bollards and low level down ward lighting to reduce light spillage;
- Select correct luminaire specifications for the project i.e.. LED luminaires used where possible with a warm white spectrum (<2700Kelvin);
- Use narrow-spectrum light sources that peak higher than 550 nanometres, avoiding lights with UV, white and blue wavelengths;
- Lights utilising LED technology are the preferred option as these lights do not emit on the UV spectrum, are easily controllable in terms of direction/spill and can be turned on and off instantly;
- Avoid the use of sodium or metal halide lamps, these gas lamps require a lengthy period in which to turn off and the diffuse nature of the light emitted makes light spillage a significant problem.
- Where this does not conflict with health and safety and/or security requirements, the site should be kept dark during peak bat activity periods (0 to 1.5 hours after sunset and 1.5 hours before sunrise);
- Variable lighting regimes (VLR) can be utilised to lower lighting levels during periods of low human activity (e.g. 00:30-05:30);
- Lighting required for security or safety reasons should use a lamp of no greater than 2000 lumens (150 Watts) and should comprise sensor-activated lamps;
- Lights required for night time deliveries or security patrols could be set to activate with pressure activated sensors set into the ground;
- Lighting should be directed to where it is needed to minimise light spillage. This can be achieved by limiting the height of the lighting columns and by using as steep a downward angle as possible and/or integrated shielding that directs the light below the horizontal plane and restricts the lit area;

- Usually using lower lighting columns and increasing the spacing between them reduces light intensity and spill;
- Plant vegetation to form light barriers and dark corridors. Use close-boarded fencing to screen light until vegetation matures. Dark corridors should be well connected to commuting routes;
- Artificial lighting should not directly illuminate any confirmed or potential bat roosting features or habitats of value to commuting/foraging bats. Similarly, any newly planted linear features or compensatory bat roosting features should not be lit; and
- The use of reflective surfaces under lights should be avoided.

The Ecology Consultancy is part of the Temple Group.

Making places better for people and wildlife

London - Tempus Wharf, 33a Bermondsey Wall West, London, SE16 4TQ
T. 020 7378 1914 **W.** www.ecologyconsultancy.co.uk **E.** enquiries@ecologyconsultancy.co.uk

- **Sussex -** 3 Upper Stalls, Iford, Lewes, East Sussex BN7 3EJ **T.** 01273 813739
- **East Anglia -** 60 Thorpe Road, Norwich, Norfolk NR1 1RY **T.** 01603 628408
- **Midlands -** 1-2 Trent Park, Eastern Avenue, Lichfield, Staffordshire WS13 6RN **T.** 01543 229049
- **North -** The Paine Suite, Nostell Business Park, Doncaster Road, Wakefield, WF4 1AB **T.** 01924 921900
- **Devon -** 3 Drakes Cottages, Milton Combe, Yelverton, Devon, PL20 6HB **T.** 01822 855196