Senior Living Urban Epsom Limited

Land at Epsom Hospital

Ecological Impact Assessment

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Executive Summary

Ove Arup and Partners Limited (Arup) was commissioned by Senior Living Urban Epsom Limited to undertake an Ecological Impact Assessment (EcIA) in support of a planning application for the redevelopment of the southern part of Epsom Hospital in Epsom, Surrey, KT18 7EG (approximate central grid reference TQ 20377 59754), hereafter referred to as the 'site'. The Proposed Development involves the demolition of all the buildings at the site, as well as the removal of some of the trees, as well as areas of scrub and amenity grassland. These removal works are required to accommodate the construction of two new buildings of between four and nine storeys to provide a new care community for older people.

Along the western boundary of the site, mature trees bordering private gardens provide important habitat for foraging, commuting and roosting bats. Three artificial bat boxes would be present within these trees at the time of construction. To avoid adverse effects to bats, the majority of trees along the western boundary of the site would be retained and protected during construction, and additional planting in this area is included in the landscape design to enhance the area for wildlife.

The Proposed Development would introduce new landscaping, including the greening of a pedestrian route through the centre of the site running north to south, a roof garden, biodiverse green roofs, wildflower meadows, tree and shrub planting and landscaping throughout. This habitat creation would provide an overall increase in habitat for bats, birds, invertebrates, reptiles and amphibians. The provision of hibernacula and bird and bat boxes have also been included within the landscaping design to provide habitat enhancement for birds, bats, invertebrates, reptiles and amphibians.

Noise and lighting during construction has potential to cause disturbance to roosting, commuting and foraging bats, however the residual effect is not considered to be significant. The implementation of mitigation, including surveys on buildings and soft felling of a tree with low bat potential, would ensure that effects on roosting bats are not significant. A lighting strategy has been developed that follows the BCT Guidance Note on Bats and Artificial Lighting[16] and minimises lighting along the western boundary, which would result in a permanent reduction in disturbance to foraging, commuting and roosting bats throughout the operation of the Proposed Development, although the effect is not significant. Bird, bat, reptile, amphibian and invertebrate populations are expected to benefit due to enhancements included in the Proposed Development design.

1 Introduction

1.1 Background

Ove Arup and Partners Limited (Arup) was commissioned by Senior Living Urban Epsom Limited to undertake an Ecological Impact Assessment (EcIA) in support of a planning application for the redevelopment of the southern part of Epsom Hospital in Epsom, Surrey, KT18 7EG (approximate central grid reference TQ 20377 59754) hereafter referred to as the 'site'.

1.2 The Site

The site is 0.48 hectares (ha) in size, shown in Figure 1. The site is bound by suburban housing with scattered trees to the west, Woodcote Green Road to the southeast, with a large pond and woodland beyond, and Epsom Hospital to the north and east. The Proposed Development includes the construction of two new buildings of between four and nine storeys and the creation of a public green corridor, roof garden, and includes landscaping throughout.

Figure 1 The Site

1.3 Aims and Objectives

The purpose of this report is to assess the likely significant environmental effects of the Proposed Development on the ecology of the site during preparation, construction and operational stages. The assessment aims:

- To identify and describe all potentially significant ecological effects associated with the Proposed Development;

- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- To identify how mitigation measures will/could be secured;
- To provide an assessment of the significance of any residual effects;
- To identify appropriate enhancement measures; and,
- To set out the requirements for post-construction monitoring.

1.4 Proposed Development

The Proposed Development would require the removal of all buildings, as well as the removal of some of the trees, as well as areas of scrub and amenity grassland, to accommodate the construction of two new buildings of between four and nine storeys. These would provide a new care community for older people arranged in two buildings comprising 307 care residences and ancillary communal and support services - including a restaurant, café, shop, wellness centre, gym, library, craft room, therapy and treatment rooms, 40 transitional care suites, 24 key worker units, children's nursery together with associated back of house and service areas, car and cycle parking, altered vehicular and pedestrian access, landscaping, private amenity space and public open space.

The Proposed Development would introduce new landscaping, including greening of a pedestrian route through the centre of the site running north to south, and a central community plaza, private roof garden, biodiverse green roofs and landscaping throughout.

Construction is due to take place in July 2021, with completion achieved by December 2023.

1.5 Legislation, Planning Policy and Guidance

Details of the relevance of this legislation, planning policy and guidance is given in Appendix A.

1.5.1 Legislation

The interpretation of the survey findings and subsequent recommendations are in accordance with the following relevant legislation:

- Wildlife and Countryside Act 1981 (as amended);
- Natural Environment and Rural Communities (NERC) Act 2006;
- The Conservation of Habitats and Species Regulations 2017;
- Countryside and Rights of Way (CROW) Act 2000; and
- Wild Mammals (Protection) Act 1996.

1.5.2 Planning Policy

The planning policies relevant to this assessment comprise:

- National Planning Policy Framework (NPPF)[1];
- The England 2020 Biodiversity Strategy[2]; and
- Epsom and Ewell Core Strategy (2007)[3].

1.5.3 Guidance

The guidance documents that are relevant to this assessment comprise:

- UK Post 2010 Biodiversity Framework[4];
- Section 41 List;
- Birds of Conservation Concern;
- Biodiversity Planning in Surrey; and
- Epsom and Ewell Biodiversity Action Plan (BAP).

[1] Ministry of Housing, Communities and Local Government, (2019); 'National Planning Policy Framework.'
[2] Defra, 2011; 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services.'
[3] Epsom and Ewell Borough Council (2007); 'The Epsom and Ewell Core Strategy.'
[4] Joint Nature Conservation Committee and Defra, (2012); 'UK Post-2010 Biodiversity Framework Published by JNCC and Defra on behalf of the Four Countries' Biodiversity Group.'

2 Methodology

This section sets out the ecological issues to be addressed in this assessment. It sets out the methods and resources to be used and establishes the spatial and temporal limits for surveys and assessments.

2.1 Scope of the Assessment

The 'Zone of Influence' (ZoL) for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities.

For the purposes of this assessment, the features considered and their ZoI were:

- Designated sites – on a precautionary basis, those up to 2km of the site were considered in the assessment. This takes into account the potential for direct disturbance to interest features of designated sites associated with vegetation clearance, earthworks, construction and landscaping operations both within and up to approximately 100m from the site;
- Habitats – within the site, due to vegetation clearance and earthworks, as well as effects from operation; and
- Legally protected and notable species – there is potential for bats roosting, commuting and foraging within and up to approximately 100m from the site to be impacted by habitat loss, lighting and obstruction by tall buildings.

2.2 Desk Study

A desk study was undertaken in August 2018 by Arcadis[5] which identified existing ecological information relating to the site and its surroundings. The Multi-Agency Geographical Information System (MAGIC) website and Surrey Biodiversity Information Centre (SBIC)[6] were consulted for recent records of protected species or species of conservation concern and protected or designated sites within 2 kilometres (km) of the site.

Only records of species from the last 10 years were used as it was considered that records older than this would not accurately reflect the distribution of species currently present within the study area.

Surrey Bat Group was also consulted for data relating to bats within a 2km radius of the site. This included records of bats, bat roosts and European Protected Species (EPS) Mitigation licence applications for bats.

[5] Arcadis 2018; 'Epsom Hospital – Ecological and Arboricultural Constraints Report.'
[6] Surrey Wildlife Trust 2019; Available: ttps://www.surreywildlifetrust.org/what-we-do/professional-services/records-centre Accessed: 07/10/2019.

2.3 Field Survey

2.3.1 Extended Phase 1 Habitat Surveys

Extended Phase 1 habitat surveys were undertaken on 26 July 2019 and 11 September 2019 following the standard methods as described in the Guidelines for Preliminary Ecological Appraisal (PEA) and the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 Habitat Survey[7]. Full details of the survey and its recommendations are in the PEA report, attached in Appendix B.

The extended Phase 1 habitat survey included a walkover survey of all land within the Proposed Development site to identify habitat features suitable for supporting protected species, including roosting bats in buildings and trees following criteria from the Bat Conservation Trust (BCT) Good Practice Guidelines[8]. Buildings and trees were then categorised into one of the following levels of roost potential for bats: negligible; low; moderate; and high.

2.3.2 Bat Surveys

Following the identification of features with the potential to support roosting bats, surveys were undertaken to determine their use by bats. These bat surveys were designed in accordance with current guidance where possible[8] (notwithstanding constraints regarding survey timings, refer to Section 2.6) and comprised the following:

- Emergence and re-entry surveys in August and September 2019;
- Tree climbing surveys in November 2019; and
- External and internal building inspections in December 2019.

Detailed methodology, including survey timings and weather conditions of all bat surveys can be found in the Bat Species Report[9], attached in Appendix C.

2.4 Identifying Ecological Features

Ecological features that will be subject to an EcIA are identified and valued within a defined geographical context:

- International and European – Statutory sites designated or classified under international conventions or European legislation. Sites supporting a species or species' assemblage important in an international context. This includes those listed on Annexes I II, IV and V of the Habitats Directive and Annex I of the Birds Directive.
- National – Statutory sites designated under national legislation, for example Sites of Special Scientific Interest (SSSI). Sites supporting a species or

[7] Joint Nature Conservation Committee JNCC 2010; 'Handbook for Phase 1 Habitat Survey.'
[8] Collins, J. ed. 2016; 'Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition.' The Bat Conservation Trust, London.
[9] Arup, (2019); 'Land at Epsom Hospital. Bat Species Report.'

species' assemblage important in a national context. Habitats and species of principal importance under Section 41 of the NERC Act 2006.

- Regional - Sites supporting a population of a species or species' assemblage important in a regional context.
- Site - A regularly occurring native species or habitat that is widespread and common throughout the UK.

2.5 Impact Assessment

This EcIA has been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) best practice guidance[10]. The impact assessment process involves:

1. Identifying and characterising impacts (see Section 2.5.1);
2. Incorporating measures to avoid and mitigate reduce these impacts;
3. Identifying appropriate compensation measures to offset significant residual effects;
4. Assessing the significance of any residual effects after mitigation (see 2.5.2);
5. Assessing cumulative impacts and effects, if any (see 2.5.3); and
6. Identifying opportunities for ecological enhancement.

2.5.1 Characterising Impacts

Impacts are actions resulting in changes to an ecological feature. Both positive and negative impacts of the Proposed Development are identified within this assessment, and described with reference to their extent, magnitude, duration, timing, frequency and reversibility.

2.5.2 Significance of Effects

Effects are the outcomes to an ecological feature, resulting from an impact. The assessment determines the significance of potential effects on ecological features identified within their respective ZoIs. For the purpose of this EcIA, a significant effect is defined as an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy or more wide-ranging enhancement of biodiversity).

Significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its

[10] Chartered Institute for Ecology and Environmental Management CIEEM 2019; 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.' Version 1.1. CIEEM, Winchester.

extent, structure and functions as well as its distribution and its typical species within a given geographical area. For species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Effects can be considered significant at a wide range of scales from international to local. As features of less than local importance would not be a material consideration for the Proposed Development, only features of local or higher importance have been considered in this assessment.

2.5.3 Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location.

A cumulative impact assessment has been undertaken which considers whether impacts from any of the following developments will collectively result in a significant effect:

- Proposals for which consent has been applied which are awaiting determination in any regulatory process;
- Projects which have been granted consent, but which have not yet been started or which have been started but are not yet completed i.e. under construction;
- Proposals which have been refused permission, but which are subject to appeal, and the appeal is undetermined; and
- To the extent that their details are in the public domain, proposed projects that will be implemented by a public body but for which no consent is needed from a competent authority.

2.6 Assumptions and Limitations

The emergence/re-entry bat surveys were carried out in the later part of the bat survey season, between August and September 2019, due to restricted project timescales. Furthermore, B4 (Woodcote House) was not subject to emergence and re-entry surveys until 12 September 2019, with coverage of only one façade. Refer to the Phase 1 Habitat map in Appendix B for building locations. As such, further surveys are recommended between May and July 2020 to provide baseline information across the active bat season, including the maternity period.

All other assumptions and limitations for the extended Phase 1 habitat survey and bat surveys undertaken can be found in Appendix B and Appendix C, respectively.

No account can be made of the presence or absence of a species on any single survey visit, as animals regularly move between different sites used for breeding, foraging and shelter. Professional review of past records and habitat suitability, together with the level of survey effort employed, allows for sufficient certainty about the use of the site by species of conservation concern.

3 Baseline Ecological Conditions

The ecological baseline conditions described in this section, are those conditions existing in the absence of the proposed activities and attributes a value to the ecological features in accordance with Section 2.4.

Full details regarding the results of the surveys that were used to inform the following information are contained in the PEA and Species Report in Appendix B and Appendix C respectively. Features of site value or less have not been considered further in the assessment.

3.1 Designated Sites

The site is within a 2km proximity to five statutory designated sites: two Local Nature Reserves (LNRs); two Sites of Special Scientific Interest (SSSI); and one National Nature Reserve (NNR). There are also 16 non-statutory designated sites within 2 km of the site. These are described in detail in the PEA Report in Appendix A. It is unlikely that designated sites within the surrounding area would pose any ecological constraints given their distance from the site, the urban context of the site, the lack of ecological connectivity and the nature and scale of the works proposed. These designated sites do not have potential to be impacted by the Proposed Development and are not considered further.

3.2 Habitats

3.2.1 Dense Scrub

Patches of dense scrub were recorded south of Rowan House and in the western part of the site. These stands were largely unmanaged and may provide foraging opportunities for reptiles and amphibians, which have been recorded within 2km of the site. Given the low the ecological value of these areas and since they are of limited extent, the habitat will not be assessed further.

3.2.2 Scattered Trees

Most scattered trees are located around the periphery of the site, including some mature and semi-mature. A hybrid poplar *Robusta Populus x canadensis 'Robusta'* along the western boundary of the site (T27) supports roosting bats and two other trees within the site have low bat potential (T25 and T33). Refer to Section 3.3.1.1 for further details regarding the baseline conditions with respect to bats and Appendix C for tree locations. Scattered trees also provide nesting and foraging habitat for birds and habitat for invertebrates. However, they provide limited ground cover and foraging opportunities for amphibians, reptiles and invertebrates. As this habitat enhances connectivity along the site boundary and provides habitat for bats, birds and invertebrates, they are considered to be of local value and will be assessed further.

The baseline conditions with respect to bat roost potential (BRP) is expected to change prior to the commencement of the Proposed Development. See Section 3.4 Future Baseline for this information.

3.2.3 Amenity Grassland

Patches of amenity grassland were scattered in small areas around some of the buildings. These small patches are managed and provide limited value to ecology and therefore will not be assessed further.

3.2.4 Introduced Shrub

Stands of introduced scrub were recorded along the eastern side of Rowan House and south and east of Woodcote Lodge, which were generally unmanaged. Species includes some native plants and offer habitat for invertebrates, and limited foraging opportunities for birds and bats. Given the limited ecological value and limited extent of this habitat, it will not be assessed further.

3.2.5 Buildings and Hardstanding

The site is primarily composed of buildings and hardstanding. These buildings are predominantly red brick and were both occupied and unoccupied. Four of the buildings, B1, B3, B4 and B9, have potential to support roosting bats and as such, are considered of local value and will be assessed further.

3.3 Protected and Notable Species

3.3.1.1 Bats

A roost was recorded in T27, which is located along the western boundary of the site (approximate grid reference TQ 20300 59762). The tree has been topped, has some new growth at the top and is decaying internally. The survey results indicate the presence of a low number of roosting bats, either common pipistrelle or *Myotis* sp. T27 is unlikely to be used as a maternity or hibernation roost given the high level of exposure to disturbance and noise and the lack of evidence indicating high usage by bats, such as clean and smooth internal walls. The results indicate that the tree supports a day roost for a low number of bats during the summer. Two trees were found to have low BRP: T25; and T33. The baseline conditions with respect to roosting bats is expected to change prior to the commencement of the Proposed Development. See 3.4 Future Baseline for this information.

No bat roosts were confirmed in any of the surveyed buildings. However, it is considered that B1 has moderate potential to support roosting bats and B3 and B4 have low potential. They have features such as slipped tiles and gaps in soffit boxes that provide opportunities for bats to access the roof voids. No signs of roosting bats were observed during the internal inspections, meaning that it is unlikely that these buildings support a maternity roost or other significant roost, although they do have low potential to support hibernating bats.

The western edge of the site with private gardens beyond, where T25 and T27 are located, was found to provide important foraging, commuting and socialising habitat for common pipistrelle. This activity may in part be associated with the roost in T27.

Noctule was recorded commuting across the site on most survey occasions. Soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus* and Nathusius' pipistrelle *Pipistrellus nathusii* were each recorded once during the surveys, likely commuting across the site. While Daubenton's bat, serotine and Natterer's bat were not confirmed during the surveys, these species have been recorded within 2 km of the site. Furthermore, a *Myotis* sp. was recorded on one occasion during the surveys, potentially returning to T27, which could have been Daubenton's bat.

All bat species are EPS that are fully protected under the Wildlife and Countryside Act 1981 as amended (WCA) and the Conservation of Habitats and Species Regulations 2017 (Habitats and Species Regulations). Soprano pipistrelle, brown long-eared bat and noctule are listed under the former UK BAP and Section 41 list, meaning they are priority species and must be considered by public authorities.

Roosting, foraging and commuting bats are considered to be of local importance to bats and will be assessed further.

3.3.2 Amphibians

The pond within Woodcote Millennium Green, to the southeast of the site, has potential to support great crested newt and other locally recorded amphibians. Great crested newt is a EPS that is fully protected under the WCA and Habitats and Species Regulations. It is also listed under the former UK BAP and Section 41 list. No waterbodies were recorded on site. The patches of trees, scrub and grassland within the site may offer shelter for amphibians outside the breeding season; however, these habitats are isolated from the pond by the expanse of roads and buildings, so the site is unlikely to support large numbers of amphibians. The temporary loss of this isolated terrestrial habitat is not considered to have potential to impact amphibians and will not be assessed further.

3.3.3 Reptiles

Species records indicate the local presence of grass snake *Natrix natrix*, common lizard *Zootoca vivipara* and slow worm *Anguis fragilis* within 2km of the site. All UK reptiles are protected under Schedule 5 of the WCA and listed under the former UK BAP and Section 41 list. Grass snake are commonly found in wetland habitats, which could potentially include the pond at Woodcote Millennium Green. The narrow strips of scattered trees, scrub and grassland provide limited habitat for reptiles. However, suitable habitat is restricted and isolated by the expanse of roads and buildings, so the site is unlikely to support large numbers of reptiles and will therefore not be assessed further.

3.3.4 Birds

Common species of birds, such as blackbird *Turdus merula* and feral pigeon *Columba livia*, were recorded incidentally at the site, which are on the green list of Birds of Conservation Concern. There are also records of protected species within 2km of the site including kestrel *Falco tinnuculus*, kingfisher *Alcedo atthis*, barn owl *Tyto aba* and green woodpecker *Picus viridis*, which may utilise the woodland and pond just outside the site.

The scattered trees, scrub and grassland may provide nesting opportunities and foraging habitat for a range of bird species. Some of the buildings may provide suitable nesting sites for common birds, such as feral pigeon. However, the site provides limited nesting and foraging opportunities to common birds and as such will not be assessed further.

3.3.5 Invertebrates

Some protected species of invertebrate have been recorded within 2km of the site, however the site does not contain habitats or features which could support these species. Due to the limited areas of managed habitats on site, the site is of limited potential value to invertebrates and will therefore not be assessed further.

3.3.6 Plants

No notable, rare or protected species of plant were recorded on site. However, cotoneaster and rhododendron were recorded at the site, of which some species are listed as invasive under Schedule 9 of the WCA. Japanese knotweed *Fallopia japonica* and Virginia creeper *Parthenocissus quinquefolia* could also spread onto the site from nearby areas. Butterfly bush *Buddleia davidii*, was recorded at the site and is an invasive species but is not listed under Schedule 9. Mitigation would be required to ensure legal compliance, but as invasive plants are not of ecological value, they will not be assessed further.

3.3.7 Other Mammals

The site provides very limited foraging opportunities for mammals such as European hedgehog *Erinaceus europaeus* and red fox *Vulpes vulpes*. There is potential for common mammal burrows to occur within areas of dense vegetation at the site. Red fox is a common species of low ecological value and will therefore not be assessed further. It is unlikely that the site provides important habitat for European hedgehog, considering the lack of suitable habitat and since the site is highly disturbed. As a result, impacts to other mammals will not be assessed further.

3.4 Future Baseline

T27 (which supports roosting bats) was tested for its structural integrity in December 2019 and was deemed unsafe. The results of the structural testing are appended to the Bat Species Report (Appendix C). Given its location at the edge of a busy hospital car park, it presents a danger to public health and safety and its

removal has been recommended within three months. It is intended that T27 would be removed under a EPS Mitigation Licence prior to the commencement of works. The mitigation measures required for the EPS Mitigation Licence are laid out in the Bat Species Report (Appendix C). This includes the installation of three artificial bat boxes on trees near to T27, along the western boundary of the site. Following this, T27 would be inspected by a licensed bat worker and felled sensitively under an ecological watching brief. This work is planned to be undertaken by March 2020 and as such, the assessment will be undertaken on this future baseline, following removal of T27 and installation of three artificial bat boxes.

There is potential for existing buildings to become increasingly derelict with time, potentially providing additional opportunities for bats to gain access to roost. The other habitats on site consist of small areas of scrub, amenity grassland and introduced shrubs. It is presumed that existing management of these areas would continue and are therefore not anticipated to change in value to wildlife within the next two years, prior to the commencement of works.

3.5 Summary of Baseline

This section provides a summary of the baseline being assessed for impacts and details their existing geographical level of importance.

Table 1 Geographic levels of importance of each ecological feature considered in this assessment

Ecological Feature	Geographic Level of Importance	Justification
Scattered Trees	Local	Two trees along the western boundary have low BRP and three trees contain artificial bat boxes. Several mature trees along the western boundary and adjacent private gardens provide important foraging and commuting habitat for common pipistrelle.
Buildings	Local	B1 has moderate potential and B3 and B4 has low potential to support roosting bats in the summer and all have a low potential to support hibernating bats.
Bats	Local	Trees and buildings within the site have BRP. It has been assumed that three artificial bat boxes have been erected on trees along the western boundary of the site, following the planned removal of T27 that supports roosting bats in early 2020. The mature trees bordering private gardens provide important foraging and commuting habitat for common pipistrelle.

Small areas of habitat with limited ecological value may provide refugia for reptiles and amphibians outside the breeding season, and nesting opportunities for birds. Invasive species have been recorded at the site and there is potential for mammal burrows to be present. The removal of these habitats and potential impacts on these features fall below the threshold for assessment, but precautionary mitigation would be required during vegetation clearance to ensure legal compliance.

4 Assessment of Effects and Mitigation

This section of the assessment identifies and characterises impacts, incorporating measures to avoid and mitigate these impacts, and assesses the significance of any residual effects after mitigation. Appropriate measures would be adopted during construction to protect the ecology of the area, with special attention to specified areas of ecological value.

4.1 Environmental Design

The Proposed Development has been designed to avoid and minimise ecological effects, mitigate impacts and provide ecological enhancements in line with the NPPF. These include:

- Landscape designed to integrate with existing features within and surrounding the site with the purpose of improving habitat connectivity.
- The inclusion of native species where feasible to provide foraging opportunities for local wildlife, such as bats, birds, amphibians and reptiles.
- Retention of most of the trees along the western boundary of the site to protect the foraging and commuting corridor for bats and replacement of trees that need to be removed with native species.
- Biodiverse roofs on the fourth storey roof above the key worker apartments close to the western boundary and fifth storey roof of the southern part of west block adjacent to Woodcote Green Road to provide habitat for invertebrates and further foraging opportunities for birds and bats.
- Native shrub planting and wildflower meadow along the western boundary to widen and enhance the existing ecological corridor to enhance the value of this boundary for bats and other wildlife.
- The installation of bat and bird boxes on retained trees. Three bat boxes are due to be installed in early 2020 and would be located to minimise disturbance associated with the Proposed Development. It is intended that these are located along the western boundary, close to the existing roost.
- The inclusion of hibernacula, comprising log piles from trees felled on site and ‘insect hotels’ to provide habitat for invertebrates, amphibians and reptiles.

4.2 Embedded Ecological Measures

4.2.1 CEMP

A Construction Environmental Malmanagement Plan (CEMP) has been produced which specifies management measures required during construction to prevent ecological impacts[11]. This includes measures regarding the protection of trees and control of dust, water quality and flow, noise and vibration and lighting.

[11] Morgan Sindall (2019); ‘Guild Living, Epsom Construction Environmental Management Plan.’

4.2.2 Amphibians and Reptiles

Precautionary mitigation is required to avoid a legal offence as there is a low risk of reptiles and amphibians being present within vegetated areas of the site. During ground preparation, sensitive clearance should be undertaken under an ecological watching brief. Any potential hibernacula (log piles, fallen trees, rubble) should be subject to a destructive search by a suitably qualified ecologist and the vegetation cleared in stages to allow any reptiles and amphibians that may be present to be captured or to leave the area. This work should ideally be carried out in September and October (weather conditions permitting), when reptiles and amphibians are generally active and dispersing and outside the main breeding bird season (March to August). If not possible, this work would need to be undertaken between March and August, with the suitably qualified ecologist ensuring that no impacts to nesting birds result. Any individual reptiles found should be placed in a suitable receptor site.

4.2.3 Birds

Clearance and demolition should ideally be undertaken outside the main breeding season (March to August inclusive). If this is not possible, pre-clearance nesting checks would be required no more than 48 hours prior to the start of clearance and demolition works.

4.2.4 Common Mammals

Any deep holes and trenches should be covered overnight and planked escape routes provided for any wildlife that may fall in. In addition, any hazardous liquids that are held on site should be stored in a secure lock-up. To avoid unnecessary harm to wild mammals, any burrows that are encountered during site clearance works should be excavated sensitively, using hand tools where possible. Excavation would also ideally not occur between March and May inclusive, when female red fox and cubs may be below ground.

4.2.5 Tree Protection

Retained trees should be protected in accordance with the recommendations of the arboricultural report[12] and BS 5837:2012 Trees in relation to design, demolition and construction[13].

4.2.6 Invasive Species

Invasive plant species should be removed and appropriately disposed of to prevent the spread of these species outside the site[14].

[12] Bartlett Consulting, (2019); 'BS:5837 Tree Survey & Tree Constraints Plan.'
[13] British Standards Institution (2012), BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations
[14] Her Majesty's Government (2014); 'Stop invasive non-native plants from spreading. How to identify, control and dispose of invasive non-native plants that can harm the environment.

4.2.7 Pollution Prevention

Standard pollution prevention measures should be implemented in accordance with Pollution prevention for businesses[15].

4.3 Construction

4.3.1 Bats

The three artificial bat boxes (due to be installed in early 2020), would be located on trees along the western boundary of the site and therefore may be subject to temporary noise and disturbance during construction from workers and site activities. Construction lighting may also disturb bats utilising the site as lit conditions can pose a barrier to movement[16]. Given that the bat boxes would be in the least disturbed part of the site and works in this area comprise the removal of a car park and replacement with soft landscaping, disturbance from construction noise and site workers would be limited and therefore disturbance effects on roosting bats are considered to be not significant.

Three buildings have potential to support roosting bats that are due to be demolished to accommodate the Proposed Development (B1, B3 and B4). It is unlikely that these buildings support a maternity or hibernation roost, or other significant roost, given the lack of evidence to indicate the presence of roosting bats during surveys undertaken to date. As such, the potential effect on roosting bats is significant at a local scale.

The loss of small areas of trees, scrub and amenity grassland within the site may impact insect availability and the suitability of the site for foraging and commuting bats. The Proposed Development incorporates new landscaping, including trees, ornamental and native planting and green roofs. The landscape strategy is expected to provide an improved foraging resource for bats, particularly the biodiverse roofs, shrub planting and wildflower meadow along the western boundary. It is considered that the Proposed Development would increase the value of the site for foraging and commuting bats, although the effect is not significant.

4.3.2 Scattered Trees

The Proposed Development would require the removal of 29 trees/tree groups. This includes T25, which would result in a loss of potential roosting habitat for bats. T33, the other tree with bat potential, would be retained. However, the landscape strategy would increase the number of scattered trees at the site,

Available at: https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants

[15] Department for Environment, Food & Rural Affairs and Environment Agency (2016); 'Guidance - Pollution prevention for businesses.

[16] Bat Conservation Trust and the Institution of Lighting Professionals, 2018; 'Bat Guidance Note 08/18 Bats and artificial lighting in the UK. Bats and the Built Environment series.'

although the majority of these would be non-native. On balance, it is considered that the potential effect on scattered trees is not significant.

4.3.3 Buildings

The loss of buildings on site has potential to lead to a loss of roosting habitat for bats and nesting habitat for birds. Effects of building demolition on bats are discussed in Section 4.3.1. The implementation of embedded ecology measures (refer to Section 4.2.3) would ensure compliance with legislation with respect to nesting birds. As such, the potential effect is not significant.

4.4 Operation

Disturbance to foraging and commuting bats along the western boundary and adjacent private gardens and roosting bats associated with bat boxes is anticipated to reduce during the operation of the Proposed Development, given that the existing car park would be replaced with landscaping and footpaths. Lighting for the Proposed Development has been designed to minimise adverse effects on bats, following the BCT Guidance Note on Bats and Artificial Lighting[16]. This includes the utilisation of low-level, glare-free lighting along the footpaths to enable wayfinding, as well as low level lighting to the landscaping. The effect on bats would be beneficial, although not significant.

4.5 Mitigation

Lighting during construction should be sensitive bats in accordance with current guidance[16]. This is particularly pertinent with respect to the bat boxes in the western part of the site.

The lighting strategy for the operation of the Proposed Development should continue to be developed in accordance with current guidance[16], including specifying warm white spectrum (ideally <2700Kelvin) LED luminaires which have a peak wavelength of 550nm.

Further bat emergence and re-entry surveys are required on B1, B3 and B4 between May and July 2019, to assess the presence or likely absence of roosting bats in these buildings and inform requirements for mitigation. Mitigation measures identified following these surveys need to be implemented, which may include obtaining an EPS Mitigation Licence and soft stripping of the buildings under the guidance of a licensed bat worker.

T25 has low potential to support roosting bats and needs to be removed on grounds of public health and safety. This tree should be soft felled, whereby the tree is cut in sections and lowered to the ground to allow any bats to escape, under the guidance of a licensed bat worker. This is required to ensure compliance with legislation.

4.6 Residual Effects

Residual effects on bats, scattered trees and buildings due to habitat loss and disturbance are not significant, considering the implementation of mitigation.

4.7 Cumulative Effects

Four developments were identified within 1 km of the site that were considered to have potential to lead to cumulative effects, as shown in Table 2.

Table 2 Cumulative Developments

Application Reference	Development Description	Distance from Site	Conclusion
19/01591/TPO	Selective thinning of semi mature native species such as Birch, Beech, Cherry and Hazel to encourage more lateral growth and allow light to penetrate to the woodland floor, increasing biodiversity. The proposed project is currently awaiting decision from the council.	Approx. 0.45km	The tree survey did not assess the potential of the trees for bats. All trees due for removal were planted in 1987 and therefore it is unlikely that significant bat roost features would be present.
19/00998/LBA	Demolition of existing office buildings and redevelopment of Application Site to provide 115 apartments/dwellings, including conversion of the Grade II* Listed Woodcote Grove and Grade II Listed Stable Block, with parking, access, landscaping and other associated works (Listed Building Consent).	Approx. 0.37km	Two buildings were identified with bat potential. Old bat droppings were recorded in one of the buildings, indicating that the building was entered by a prospecting bat or used as a feeding perch on a single occasion only and it was concluded that no mitigation would be required.
19/00921/FUL	Erection of two storey four-bedroom detached dwelling to the rear of Downshill.	Approx. 0.77km	One tree was identified with low potential to support roosting bats. The tree would be soft-felled in sections outside the core hibernation period under the guidance and watching brief of a suitably licenced ecologist.
19/01021/FUL	Demolition of existing building and construction of a new part 9, part 11 and part 13 storey building containing ground floor commercial/retail (A1, A2 and B1 uses) and 29 residential units (C3 Use) on upper levels and associated development.	Approx. 0.99km	There was no evidence of bats found and the building was assessed as not in use by roosting bats.

A review of the planning documents indicates that none of these developments would result in adverse or beneficial effects on bats and therefore no cumulative effects have been identified.

4.7.1 Summary of Impacts and Residual Effects

Table 3 provides a summary of the impacts and the significance of any residual effects for each feature, the mitigation measures required and the means by which mitigation measures can be secured.

Table 3 Summary of impacts and significance of any residual effects

Feature	Impact	Significance of Effect without Mitigation	Mitigation	Significance of Residual Effects	Significance of Cumulative Effects
Construction					
Bats	Loss of potential roosting habitat – B1, B3 and B4 and T25	Significant at a local scale	Further emergence and re-entry surveys on buildings and implementation of any recommended mitigation Soft felling of T25	Not significant	Not significant
	Disturbance to foraging and commuting bats	Not significant	Bat sensitive lighting	Not significant	Not significant
	Disturbance to bats roosting in bat boxes	Not significant	Bat sensitive lighting	Not significant	Not significant
Buildings	Habitat loss	Not significant	N/A	Not significant	Not significant
Scattered trees	Habitat loss and creation	Not significant	N/A	Not significant	Not significant
Operation					
Bats	Lighting may disturb foraging, commuting and roosting bats	Not significant	Bat sensitive lighting	Not significant	Not significant

4.8 Enhancement and Monitoring

Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures. It is important that development is sustainable and that projects produce a net gain for biodiversity and nature conservation. The NPPF promotes the inclusion of measures to enhance biodiversity within development proposals.

The proposed green roofs represent an ecological enhancement, particularly the biodiverse roofs that would provide additional habitat for birds and invertebrates. The hibernacula, comprising log piles from trees felled on site and 'insect hotels' would provide potential hibernation and summer refuge for invertebrates and local populations of reptiles and amphibians. The bird and bat boxes would be installed in suitable locations under direction of a suitably qualified ecologist, providing additional nesting and roosting opportunities for birds and bats. Monitoring of these features should be undertaken to contribute to and benefit biodiversity records and inform research into the success of mitigation and enhancement measures for development.

5 Conclusions

No significant effects to the features assessed, comprising bats, buildings and scattered trees, are anticipated during construction or operation. Many of the trees along the western boundary of the site are being retained and protected, and those that are being removed would be replaced with native species, maintaining this roosting, commuting and foraging habitat for bats. Lighting for the Proposed Development has been designed to minimise impacts to bats, following the BCT Guidance Note on Bats and Artificial Lighting[16]. This is expected to result in a beneficial effect during operation, although not significant.

Landscaping designs would enhance the ecological value of the site; ornamental and native planting, green roofs, hibernacula, bat and bird boxes would increase habitat on site for birds, bats, invertebrates, amphibians and reptiles. Hibernacula would provide potential hibernation and summer refuge for invertebrates and local populations of reptiles and amphibians. The bird and bat boxes would provide additional nesting and roosting opportunities for birds and bats.

The embedded ecological measures, avoidance, mitigation and enhancements provided by the Proposed Development would result in a longer-term increase in biodiverse habitats and opportunities for a range of local wildlife, including birds, bat, reptile, amphibians and invertebrates.

Appendix A

Legislation, Planning Policy and Guidance

A1 Legislation

- Wildlife and Countryside Act 1981 (as amended) (WCA) – this legislation comprises the primary means of protecting wildlife in the UK and provides the mechanism by which a number of international directives are implemented in the UK;
- Countryside and Rights of Way (CROW) Act 2000 – this act strengthens the details of the Wildlife and Countryside Act in relation to Sites of Special Scientific Interest (SSSI) and threatened species;
- The Conservation of Habitats and Species Regulations 2017 (Habitats and Species Regulations) – these regulations provide protection for European Protected Species and their habitats, such as bats and great crested newts;
- Natural Environment and Rural Communities (NERC) Act 2006 – the NERC Act puts an obligation on public authorities to have regard for the conservation of species and habitats of principal importance for the purpose of conserving biodiversity; and
- Wild Mammals (Protection) Act 1996 –makes it an offence to intentionally cause wild mammals any unnecessary suffering by certain methods, including crushing and asphyxiation.

A1.1 Bats

All bat species are fully protected under the WCA and the Habitats and Species Regulations, which together make it an offence to:

- Intentionally or recklessly capture, kill or injure bats;
- Deliberately disturb bats (including when they are outside their roosts) or intentionally or recklessly disturb roosting bats; or
- Damage or destroy their roosts or intentionally or recklessly obstruct access to their roosts (whether bats are present or not).

Under the Habitats and Species Regulations, disturbance includes any disturbance which is likely to impair their ability to survive, breed, reproduce, rear or nurture their young, hibernate, or to significantly affect the local distribution or abundance of the species.

A1.2 Great Created Newt

Great crested newt is fully protected under the WCA and Habitats and Species Regulations, which together make it an offence to:

- Intentionally or recklessly capture, kill, injure or disturb great crested newts; and

- Damage or destroy a breeding site or resting place for great crested newt or intentionally or recklessly obstruct access to any structure or place used for shelter or protection.

Under the Habitats and Species Regulations, disturbance includes in particular any disturbance which is likely to impair their ability to survive; breed or reproduce; rear or nurture their young; or hibernate or to affect significantly the local distribution or abundance of the species.

A1.3 Birds

All birds, their active nests and eggs are protected under the WCA. This legislation makes it an offence to kill, injure or take any wild bird or to take, damage or destroy the nest of any wild bird while that nest is in use or being built.

Special penalties are given for these offences when related to birds listed on Schedule 1. The WCA makes it illegal to intentionally disturb any wild bird listed in Schedule 1 of the Act while it is building a nest or is in or near a nest containing eggs or young, or to disturb the dependent young.

A1.4 Common Reptiles

Common lizard, slow worm and grass snake, are listed on Schedule 5 of the WCA, which makes it illegal to deliberately or recklessly injure or kill these species. These species are also listed under the former UK BAP and are on the Section 41 list of species of principal importance in conserving biodiversity.

A1.5 Common Amphibians

Common amphibians, including common toad, common frog and smooth newt, are only protected from sale under the WCA. Common toad is also listed under the former UK BAP and is on the Section 41 list of species of principal importance in conserving biodiversity.

A1.6 Invasive Plants

The WCA makes it an offence to cause plant species listed on Schedule 9 to grow in the wild.

Appendix B

Preliminary Ecological Appraisal

Senior Living Urban (Epsom) Limited

Epsom Hospital

Preliminary Ecological Appraisal

Final Issue | 15 December 2019

Job number 270352-00

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1 Executive Summary

This report was written by Ove Arup & Partners Ltd (Arup) on behalf of Senior Living Urban (Epsom) Limited to provide a Preliminary Ecological Appraisal (PEA) of the development at Epsom General Hospital, Dorking Road, Epsom, Surrey, KT18 7EG. The Proposed Development involves the demolition of the buildings at the site and the construction of two buildings providing care facilities and associated landscaping.

The objectives of this report are to identify key ecological constraints to the Proposed Development and determine mitigation requirements and further ecological surveys needed to inform master-planning and minimize ecological damage. Baseline information about the site was acquired through a desk study, conducted by Arcadis Design and Consultancy, which includes an ecological data search within a 2km radius of the site and a review of planning documents. An extended Phase 1 habitat survey of the site was also conducted.

The site was predominantly composed of buildings and hardstanding with patches of amenity grassland, scattered broadleaved and coniferous trees, dense scrub and introduced shrub. The site has potential to support protected and notable species, including roosting, foraging and commuting bat. There is limited potential for the site to support reptiles and amphibians, including great crested newt. There are also opportunities for birds to nest at the site.

Key ecological constraints relate to the scattered trees and buildings at the site, particularly the mature trees along the western boundary, and the potential presence of bats on site. The nearest designed site is Epsom Common South Site of Nature Conservation Importance and Local Nature Reserve, located approximately 330m west of the site. It is unlikely that designated sites within the surrounding area will pose any ecological constraints given their distance from the site, the urban context of the site, the lack of ecological connectivity and the nature and scale of the works proposed.

Bat emergence and re-entry and bat inspection surveys should be conducted to inform an assessment of the ecological impacts of the Proposed Development and requirements for mitigation and compensation. Mitigation measures are provided to ensure compliance with legislation and guidance with respect to bats, amphibians, reptiles, birds, common mammals, tree protection, invasive species and pollution prevention. Recommendations for ecological enhancement include providing a green corridor connecting Woodcote Millennium Green with private gardens to the west, appropriate ground floor landscaping and provision of a green wall and green roofs.

2 Introduction

2.1 Overview

Ove Arup & Partners Ltd (Arup) was commissioned by Senior Living Urban (Epsom) Limited to undertake a Preliminary Ecological Appraisal at Epsom General Hospital, Dorking Road, Epsom, Surrey, KT18 7EG (the site).

The site, centred at approximate Ordnance Survey (OS) grid reference TQ 20399 59752, occupies 1.48 ha of the southern portion of Epsom General Hospital, to the south of Epsom town centre. It is currently occupied by redundant healthcare buildings and associated infrastructure. Surrounding the site is suburban housing to the west, hospital buildings and parking to the north and east and Woodcote Millennium Green in the south. A plan of the site is shown in Figure 1.

The Proposed Development involves the demolition of the buildings on site and the removal of existing vegetation, including some of the scattered trees, and the construction of three new buildings of between four and 15 storeys. The proposals include landscaping at the site and Woodcote Millennium Green. The former includes greening of a pedestrian route through the centre of the site running north-south and a central community plaza, a private roof garden and green walls.

An Ecological and Arboricultural Constraints Report[1] prepared by Arcadis Design and Consultancy (Arcadis) has been reviewed to inform this report. This included an extended Phase 1 habitat survey and tree survey.

2.2 Purpose of this Appraisal

The objectives of this report are to:

- Identify key ecological constraints to the Proposed Development;
- Identify any requirements for mitigation following the “Mitigation Hierarchy”;
- Enable any further ecological surveys, needed to inform an Ecological Impact Assessment (EcIA), to be identified and appropriately designed; and
- Inform master-planning to enable significant ecological effects to be avoided or minimized wherever possible.

This report has been prepared with reference to current guidelines for Preliminary Ecological Appraisal (PEA)[2] and in accordance with BS42020:2013: Biodiversity – Code of Practice for Planning and Development[3].

[1] Arcadis Design and Consultancy, (2018); ‘Epsom Hospital – Ecological and Arboricultural Constraints Report.’
[2] Chartered Institute of Ecology and Environmental Management (CIEEM) (2017); ‘Guidelines for Preliminary Ecological Assessment Second Edition.’
[3] British Standards Institute (BSI) (2013); ‘BS42020 – Biodiversity Code of Practice for Planning and Development.’

2.3 Legislation

The interpretation of the survey findings and subsequent recommendations are in accordance with the following relevant legislation:

- Wildlife and Countryside Act 1981 (as amended);
- Natural Environment and Rural Communities Act 2006;
- The Conservation of Habitats and Species Regulations 2017;
- Countryside and Rights of Way (CROW) Act 2000; and
- Wild Mammals (Protection) Act 1996.

2.4 Planning Policy

The planning policies relevant to this assessment comprise:

- National Planning Policy Framework (NPPF)[4];
- The England 2020 Biodiversity Strategy[5]; and
- Epsom and Ewell Core Strategy (2007)[6].

2.5 Guidance

The guidance documents that are relevant to this assessment comprise:

- UK Post 2010 Biodiversity Framework[7];
- Section 41 List;
- Birds of Conservation Concern;
- Biodiversity Planning in Surrey; and
- Epsom and Ewell Biodiversity Action Plan

Details on the relevance of the above legislation, planning policies and guidance is given in Appendix A.

[4] Ministry of Housing, Communities and Local Government, (2019); 'National Planning Policy Framework.'
[5] Defra, (2011); 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services.'
[6] Epsom and Ewell Borough Council (2007); 'The Epsom and Ewell Core Strategy.'
[7] Joint Nature Conservation Committee and Defra, (2012); 'UK Post-2010 Biodiversity Framework Published by JNCC and Defra on behalf of the Four Countries' Biodiversity Group.'

3 Methodology

Baseline information about the site was gathered through a desk study, conducted by Arcadis, and an extended Phase 1 habitat survey of the site.

3.1 Desk Study

An ecological data search was conducted by Arcadis in August 2018 to determine existing information regarding the ecology of the site and its surroundings. The ecological data search gathered information from two main sources: The Multi-Agency Geographical Information System (MAGIC) website, to identify statutory designated sites of nature conservation value, and the Surrey Biodiversity Information Centre (SBIC), for recent records of protected species, species of conservation concern and non-statutory designated sites of nature conservation value. Both data searches were conducted within a 2km radius of the approximate Ordnance Survey grid reference for the site (TQ203599).

3.2 Field Survey

An extended Phase 1 habitat survey was conducted on 26th July 2019 and 11th September 2019 in accordance with the standard methods as described in the Guidelines for PEA[2] and the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 Habitat Survey[8]. Access was obtained to all external areas on the site.

Habitats on the site were mapped and characteristic plant species were recorded, including any invasive species. Target notes were included to identify areas of interest or concern.

Consideration was given towards the potential for features to support protected and/or notable species, including the suitability of the site to for foraging, commuting and roosting bats, in accordance with Table 1[9].

Table 1 Classification criteria for bat roosting and commuting and foraging potential

Suitability	Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.

[8] Joint Nature Conservation Committee (JNCC) (2010); 'Handbook for Phase 1 Habitat Survey.'
[9] Collins, J. (ed.), (2016); 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).' The Bat Conservation Trust, London.

Suitability	Roosting habitats	Commuting and foraging habitats
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roosting features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only - the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourses and grazed parkland. Site is close to and connected to known roosts.

3.3 Assumptions and Limitations

The findings presented in this study represent those at the time of the survey. Results are highly dependent on factors such as seasonal conditions and the land use of surrounding areas.

It should also be noted that some fauna have large home ranges and disperse over long distances so may be overlooked during surveys. Species that are absent at the time of survey may also return to or colonize a site at any future time.

4 Baseline Ecological Conditions

4.1 Designated Sites

The site is within a 2km proximity to five statutory designated sites: two Local Nature Reserves (LNRs); two Sites of Special Scientific Interest (SSSI); and one National Nature Reserve (NNR). Details can be found in Table 2.

Table 2 Statutory designated sites within 2km of the site

Site Name	Approximate Location Relative to the Site	Reason for Designation
Epsom Common LNR	330 m west	The 177.4 common supports a variety of habitats: woodland; grassland; scrub and remnant heathland. There are more than 400 species of trees and plants, which provide habitats for a range of mammal, bird and insect species.
Epsom and Ashtead Commons SSSI	680 m northwest	These two commons cover 360 ha and support a wide diversity of habitat types on the undulating terrain of the London clay. The site carries four nationally rare invertebrates and several others which are uncommon in Surrey. The range of habitats present promotes a rich community of breeding birds.
Ashtead Common NNR	1.1 km west	The NNR covers 182 ha of land composed primarily of woodland, with areas dominated by bracken, scrub grassland and semi-improved neutral grassland. It is designated as a NNR since 1995 due to the decaying wood of ancient trees and the rare invertebrates that they support.
Ashtead Park LNR	1.3 km south west	This 24 ha LNR is composed primarily of oak woodland, with areas of redwood trees, bracken (*Pteridium aquilinum*), scrub grassland, mosaic grassland and semi-improved neutral grassland. There are also two ponds within the LNR.
Stones Road Pond SSSI	1.6 km north east	The SSSI contains a 0.5 ha-deep pond within an urban area that supports one of the largest colonies of great crested newts *Triturus cristatus* in south east England (exceeding 400-500 individuals during breeding season).

There are 16 non-statutory designated sites within 2 km of the site: eight Sites of Nature Conservation Interest (SNCI); six sites listed on the Ancient Woodland Inventory; and two Conservation Verges. The six ancient woodland sites are located between approximately 530m and 1.9km from the site. Details regarding the SNCIs and Conservation Verges can be found in Table 3.

Table 3 Non-statutory designated sites within 2km of the site

Site Name	Location Relative to Site	Reason for Designation
Epsom Common South SNCI	330 m west	Secondary native broadleaved woodland, scrub, underscrub and rough, unimproved mesotrophic and acid grassland. Also present are areas of wet grassland, bracken and mesotrophic ponds.
Epsom Cemetery SNCI	880 m south east	Unimproved calcareous grassland and associated unimproved calcareous grassland species.
Ashtead Park SNCI	1.3 km south east	Secondary woodland, semi-improved neutral grassland and two ponds.
Epsom Downs Langley Vale Road Conservation Verge	1.5 km north west	Supports autumn lady's-tresses *Spiranthis spiralis*.
Livingstone Park SNCI	1.6 km south east	Predominantly grassland with woodland, scrub and scattered trees. The site was selected because of the presence of veteran trees and an old undisturbed meadow.
Epsom Downs Covered Reservoir SNCI	1.6 km south east	Calcareous grassland habitat which supports at least 20 species typical of grassland of conservation interest in Surrey, including man orchid *Orchis anthropophera* and small blue butterfly *Cupido minimus*.
Christ Church Road Conservation Verge	1.6 km north west	Supports a population of common toad *Bufo bufo*.
Epsom Downs SNCI	1.65 km south	Contains secondary woodland, scrub and species-rich chalk grassland.
Epsom Downs Golf Course SNCI	1.7 km south east	Comprises 43 ha of unimproved and semi improved calcareous grassland and 12 ha of species-rich semi-natural woodland and scrub.
Langley Bottom Farm SNCI	1.9 km south	Contains fragments of chalk grassland and is a site of interest for arable plants. It contains ten nationally rare plant species and seven of the rare or scarce species in Surrey. The site also supports areas of Ancient Semi-natural Woodland (ASNW) and potentially ancient shaws and hedgerows.

4.2 Habitats

The site is situated in an urban setting, with Epsom General Hospital buildings and associated infrastructure at the northern and eastern borders and residential areas to the west. Woodcote Millennium Green is adjacent to the site to the south across Woodcote Green Road, which contains a small pond surrounded by undeveloped green open space and woodland.

The habitat types recorded within the site are listed below with their alphanumeric reference codes, as detailed in the JNCC Phase 1 Habitat Survey Guidelines:

- Dense scrub (A.2.1);

- Broadleaved scattered trees (A3.1);
- Coniferous scattered trees (A3.2);
- Amenity grassland (J1.2);
- Introduced shrub (J1.4);
- Buildings (J3.6); and
- Hardstanding.

These habitats are described below. A Phase 1 Habitat map can be found in Figure 1 and a plant species list in Appendix B.

4.2.1 Dense Scrub

Patches of dense scrub were recorded south of Rowan House and in the western part of the site. These were comprised of dog rose (*Rosa canina)*, ash (*(Fraxinus excelsior)*, sycamore (*Acer pseudoplatanus*), creeping thistle (*Cirsium arvense*), dogwood (*Cornus sp.*), field maple (*Acer campestre*), copper beech (*Fagus sylvatica*) and hazel (*Corylus sp.*). These stands were largely unmanaged.

4.2.2 Scattered Trees

Most scattered trees are located around the periphery of the site, including some mature and semi-mature. Species included pear (*Pyrus sp.*), apple (*Malus domestica*) and yew trees (*Taxus baccata*) alongside Rowan House and Woodcote Lodge and hybrid poplar (*Robusta Populus x canadensis* 'Robusta'), common lime (*Tilia europaea*) and horse chestnut (*Aesculus hippocastanum*) along the western boundary. A line of five Leyland cypress (*Cupressocyparis leylandii*) as well as a mature copper beech (*Fagus sylvatica 'Purpurea'*) were recorded in the central parts of the site. A silver birch (*Betula pendula*) was also recorded in the north east periphery of the site. Several trees were also noted just outside of the western and north-western boundaries, including ash.

4.2.3 Amenity Grassland

Patches of amenity grassland were scattered in small areas around some of the buildings. These areas appeared largely unmanaged and consequently supported a variety of species including Yorkshire fog (*Holcus lanatus*), false oat grass (*Arrhenatherum elatius*), cock's-foot (*Dactylis sp.*), yarrow (*Achillea millefolium*), ribwort plantain (*Plantago major*) and white clover (*Trifolium repens*). Occasional species included dandelion (*Taraxacum officinale*) and daisy (*Bellis perennis*), with broad-leaved dock (*Rumex obtusifolius*) and hoary plantain (*Plantago media*) among species rarely encountered within the grassland.

4.2.4 Introduced Shrub

Stands of introduced scrub were noted along the eastern side of Rowan House and south and east of Woodcote Lodge, which were generally unmanaged. Species

included butterfly bush (*Buddleja davidii*), cotoneaster (*Cotoneaster sp.*), snowberry (*Symphoricarpos albus*), holly (*Ilex aquifolium*), laburnum (*Laburnum anagyroides*), rhododendron (*Rhododendron ferrugineum*) and roses (*Rosa* sp.). Some self-seeded ruderal and perennial species were also recorded, including mallow (*Malva sylvestris*), cat's ear (*Hypochaeris radicata*), herb Robert (*Geranium robertianum*), broadleaved willowherb (*Epilobium montanum*), black medick (*Medicago lupulina*) and spear thistle (*Cirsium vulgare*).

4.2.5 Buildings and Hardstanding

The site is primarily composed of buildings and hardstanding. These buildings are predominantly red brick and were both occupied and unoccupied.

Two buildings were recorded along Woodcote Green Road. Constructed in 1938, Rowan House (B1) is a four-storey, red brick building, with a more recent single storey extension to the north and three storey extensions to the east. The main body of the building has a pitched, clay tiled roof. The single storey extension has a flat roof and three-storey wings have pitched slate or slate-effect tiled roofs. This building was partially occupied. B2, adjacent to B1 to the north, is a portacabin. Woodcote Lodge (B3) is an occupied three storey brick building, with a pitched slate or slate-effect tiled roof.

York House (B4) is a two-storey unoccupied brick building with pitched clay-tiled roof in the western part of the site.

A range of other small buildings were recorded in the eastern and central part of the site. B5 is a single-storey portacabin with wooden barge boards. B6 and B11 are metal portacabins. B7 is a brick chimney, which was in use. B8 is a single storey brick building with a flat concrete roof. B9 is a two-storey brick building with a pitched, tiled roof, which was in use. B10 is a smaller two-storey red brick building with a flat roof.

4.3 Protected and Notable Species

4.3.1 Bats

There are records of common and soprano pipistrelle (*Pipistrellus pipistrellus* and *P. pygmaeus*), Daubenton's bat (*Myotis daubentonii*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*) and brown long-eared bat (*Plecotus auritus*) within 2 km of the site.

The row of trees along the western boundary could provide foraging and commuting habitat for bats. However, the site is generally of low suitability for foraging and commuting bats with reference to Table 1, due to the predominance of hardstanding and high levels of artificial lighting. The site is situated adjacent to private gardens to the west and the pond and plantation woodland to the south, which increase the potential value of these areas for bats.

Buildings and trees at the site have potential to support roosting bats, as shown in Table 4. Most of these trees are located along the western and north-western boundaries of the site. Tree references align with the Tree Constraints Plan in

Appendix C and building references as shown on Figure 1. All other buildings and trees at the site were considered to be of negligible potential to support roosting bats.

Table 4 Buildings and trees with potential to support roosting bats

Reference	Description	Potential for Roosting Bats
T2	Yew covered in dense ivy that may conceal features	Moderate
G9 (western-most)	Sycamore covered in ivy that may conceal features	Low
T12	Sycamore covered in ivy that may conceal features	Low
T23	Horse chestnut covered in ivy that may conceal features	Moderate
T25	Hybrid poplar with cavity at the base of the branch where the trunk splits in two, which could provide access into a cavity.	Moderate
T27	Hybrid poplar with a large cavity at approximately 6m from the ground facing north at the top of the topped trunk. Hole approximately 3m from the ground also on the north side. Third hole on the southside of the trunk approximately 5m from the ground.	High
T29	Common lime covered in ivy that may conceal features	Low
T30	Common lime covered in ivy that may conceal features	Low
T33	Ash with a west-facing hole at approximately 4m from the ground on the west side.	Moderate
B1 – Rowan House	Gaps under clay roof tiles on the southern, western and northern facades. Gaps around a damaged vent on the east facade and around loose fitted pipes in the roof on the south and north sides. Damaged or missing bricks on the northern and western facades. Loose flashing around the chimneys on the northern facade. Potential access into the soffit boxes on the eastern, southern and northern facades. A hole beneath the pitched roof at the north western corner. Many of these features provide potential access for bats into the roof void. Artificial lighting in this part of the site limits roosting potential.	Moderate
B3 – Woodcote Lodge	Slipped and missing tiles in various locations on both sides of the roof.	Low
B4 – York House	Missing roof tile on the western side of the pitched roof. Gaps between the soffit boards and between these and the brick walls that could provide access into the roof void. Gaps between the window frames and the brick walls. Located	Moderate

	near to private gardens and mature trees to the west.	
B8	Gaps were noted between the bricks and concrete roof. Artificial lighting in this part of the site limits roosting potential.	Low
B9	Two missing bricks on the north-west face with a hole in the soffit board and vent. Artificial lighting in this part of the site limits roosting potential.	Low

All bat species are European Protected Species (EPS) that are fully protected under the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats and Species Regulations 2017 (Habitats and Species Regulations). Soprano pipistrelle, brown long-eared bat and noctule are listed under the former UK BAP and Section 41 list meaning they are priority species and must be considered by public authorities.

4.3.2 Badgers

The survey found no evidence of badgers (*Meles meles*) within the site, such as latrines, snuffle holes and sett entrances. Badgers are unlikely to be present on site due to the lack of suitable habitat on site, such as woodland and open grassland. However, there is suitable habitat to the south, within Woodcote Millennium Green, and private gardens to the west. Badgers and occupied badger setts are protected under the Protection of Badgers Act 1992.

4.3.3 Hazel Dormice

Despite records of hazel dormice (*Muscardinus avellanarius*) within 2 km of the site, there is limited potential for the site to support the species. This species is commonly found in deciduous woodland, hedgerows and dense scrub. Hazel dormice also forage on buds, hazelnuts, berries and insects, of which there is limited supply within the site. It is therefore unlikely that populations of hazel dormice are present on site.

4.3.4 Water Vole

While water voles (*Arvicola amphibius*) have been recorded within 2km of the site, there is no potential for this species to be present at the site to the lack of waterbodies. This species occurs along waterways and forage on grasses and waterside vegetation.

4.3.5 Other Mammals

European hedgehogs (*Erinaceus europaeus*) have been recorded within 2km of the site. While they prefer hedgerows, meadows and woodlands, hedgehogs are also commonly found in suburban areas. Hedgehogs are unlikely to find suitable refuge within the site, but they may use it to forage. While they are not protected under legislation, they are listed on the former UK BAP and Section 41 list of species of principal importance in conserving biodiversity.

4.3.6 Amphibians

Located approximately 1.6 km from the site is Stones Pond SSSI, which supports the largest breeding population of great crested newts in south east England. Other amphibians within 2km include: common toad (*Bufo bufo*), common frog (*Rana temporaria*), palmate newt (*Lissotriton helveticus*) and smoot newt (*Lissotriton vulgaris*). No waterbodies were recorded on site and the patches of trees, scrub and grassland offer limited shelter for amphibians outside the breeding season. The pond within Woodcote Millennium Green has potential to support great crested newt and other amphibians. However, the large expanses of urban habitat and Woodcote Green Road reduce the potential for amphibians to occur at the site. Great crested newt is a EPS that is fully protected under the WCA and Habitats and Species Regulations. It is also listed under the former UK BAP and Section 41 list.

4.3.7 Reptiles

Species records indicate the presence of grass snake (*Natrix natrix*), common lizard (*Zootoca vivipara*) and adder (*Vipera berus*) within 2km of the site. Adders are found predominantly in woodland, heathland and moorland habitats and are therefore unlikely to occupy the site. Grass snakes are commonly found in wetlands where their preferred prey is found, which could potentially include the pond at Woodcote Millennium Green. The narrow strips of scattered trees, scrub and grassland provide limited habitat for common reptiles such as grass snake, common lizard and slow-worm (*Anguis fragilis*) to bask, take shelter and forage.

4.3.8 Birds

Blackbird *Turdus merula* and feral pigeon *Columba livia* were recorded incidentally at the site, which are on the green list of Birds of Conservation Concern. There are also records of protected species within 2km of the site including kestrel (*Falco tinnuculus*), kingfisher (*Alcedo atthis*), barn owl (*Tyto aba*), fieldfare (*Turdus pilaris*), hobby (*Falco subbuteo*), redwing (*Turdus iliacus*) and green woodpecker (*Picus viridis*).

The scattered trees, scrub and grassland provides nesting sites and foraging habitat for a range of bird species. Many of the buildings provide suitable nesting sites for birds. The chimney (B7) could provide a vantage point for foraging peregrine falcon (*Falco peregrinus*) but is not currently suitable for nesting as it is in use. This species is listed on Schedule 1 of the WCA and has been recorded within a 2 km radius of the site. There are no records of black redstart (*Phoenicurus ochruros*) within 2km of the site and there was a lack of suitable foraging habitat for this species, typically areas of sparsely vegetated wasteland.

4.3.9 Protected and Invasive Plants

Species records indicate the presence of the following protected species within 2 km of the site: bluebell (*Hyacinhoides non-scripta*), butcher's-broom (*Ruscus aculeatus*), pennyroyal (*Mentha pulegium*), meadow clary (*Salvia pratensis*), and greater yellow-rattle *(Rhinanthus angustifolius*). The survey found no protected

plant species within the site. Bluebell and butcher's-broom are typically found within broadleaved (often ancient) woodland and are thus unsuited to the habitat of the site. The other species typically grow in open grassland habitats on disturbed ground and are therefore unlikely to occur at the site.

Cotoneaster and rhododendron were recorded at the site, of which some species are listed as invasive under Schedule 9 of the WCA. This makes it an offence to causes these species to grow in the wild. Although not recorded within the site, Japanese knotweed (*Fallopia japonica)* has been noted within the wider Epsom Hospital outside of the northern boundary of the site. Virginia creeper (*Parthenocissus quinquefolia*) has also been recorded within the area of the Hospital, outside of Ebbisham ward. Their proximity means there is potential for these species to occur at the site. Butterfly bush, which has also been recorded at the site, is an invasive species but is not listed under Schedule 9.

4.3.10 Invertebrates

Protected invertebrate species that have been recorded within a 2km radius include stag beetle (*Lucanus cervus*) and butterflies, including the purple emperor (*Apatura iris*), white letter hairstreak (*Satyrium w-album*), brown hairstreak (*Thecla betulae*), chalkhill blue (*Polyommatus coridon*) and small blue (*Cupido minimus*) butterflies.

Stag beetles require buried dead wood to lay their eggs, which was not recorded at the site. It is therefore unlikely that the site supports a population of breeding stag beetles. Chalkhill blue and small blue butterflies are found in short grassland habitats and feed on legumes, which are not present on site. Small blue butterflies can also be found in man-made areas such as gravel pits, road embankment and disused railways and thus, are more likely to be found on site. Purple emperor butterflies feed in woodlands on carrion or animal excrement. White letter hairstreak breed in the shelter of elm trees, hedgerows and scrub, and brown hairstreak are dependent on blackthorn, ash and oak habitats for larval development and adult survival. The narrow strip of trees along the southern and western boundaries are unlikely to provide suitable habitat for these species.

Cinnabar moth (*Tyria jacobaeae)* caterpillars were observed feeding on ragwort in the amenity grassland located by B6. This species is listed on the former UK BAP priority species (research only) and on the Section 41 list of species of principal importance in conserving biodiversity. However, due to the lack of vegetation at the site and connectivity to adjacent areas of greenspace, the site is of limited potential value to invertebrates.

5 Evaluation and Recommendations

5.1 Further Surveys

5.1.1 Bats

Further bat surveys are required to assess the presence or likely absence of roosting bats in the buildings and trees and inform the requirements for mitigation and compensation. This work should be completed in accordance with current guidance[9] and should comprise:

- Emergence and re-entry surveys between May and September;
- Climbing surveys on trees due to be impacted by the Proposed Development, whether through arboricultural works or lighting. This work can be undertaken at any time of the year, although evidence of roosting bats is most likely to be recorded while bats are most active, between May and September; and
- Detailed external and internal inspection surveys of Rowan House (B1), Woodcote Lodge (B3) and York House (B4).

This work should be completed prior to submitting the planning application, to ensure that the local planning authority has sufficient information to determine the application.

5.2 Constraints

It is unlikely that designated sites within the wider surrounding area will pose any constraints to the Proposed Development given their distance from the site, the urban context of the site and the nature and scale of the works proposed.

The vegetation and certain buildings have potential to support protected and species, which could pose constraints to the development including restrictions on the timings for clearance and demolition work and on how this work should be undertaken. There is also potential for the recommended further surveys to identify a need to include replacement habitat in the scheme design. Most notable is the potential presence of bats in the trees and buildings, with specific requirements to be defined following completion of the recommended surveys.

5.3 Mitigation

5.3.1 Bats

The recommended bat surveys will identify requirements for mitigation for bats. Should a roost be discovered that would be lost to facilitate the Proposed Development, this would include obtaining a European Protected Species Mitigation Licence for bats. This would require compensation for the loss of a bat roost, for example through the integration of crevices for bats within the buildings

and bat boxes on retained trees. Lighting design should also minimise disturbance to foraging and commuting bats in accordance with current guidelines[10].

5.3.2 Amphibians and Reptiles

Precautionary mitigation is recommended to avoid a legal offence as there is a low risk of reptiles and amphibians being present within vegetated areas of the site. During ground preparation, sensitive clearance should be undertaken under an ecological watching brief. Any potential hibernacula (log piles, fallen trees, rubble) should be subject to a destructive search by a suitably qualified ecologist and the vegetation cleared in stages to allow any reptiles and amphibians that may be present to be captured or to leave the area. This work should ideally be carried out in September and October (weather conditions permitting), when reptiles and amphibians are generally active and dispersing and outside the main breeding bird season (March to August). If not possible, this work would need to be undertaken between March and August. Any individuals found should be placed in a suitable receptor site.

5.3.3 Birds

Clearance and demolition should ideally be undertaken outside the main breeding season (March to August inclusive). If this is not possible, pre-clearance nesting checks will be required no more than 48 hours prior to the start of clearance works to areas which may support nesting birds. The results of the recommended bat surveys may also influence appropriate timings for the removal of trees and buildings with bat potential (refer to Table 4).

5.3.4 Common Mammals

Any deep holes and trenches would be covered overnight and planked escape routes provided for any wildlife that may fall in. In addition, any hazardous liquids that are held on site would be stored in a secure lock-up. To avoid unnecessary harm to wild mammals, any burrows that are encountered during site clearance works would be excavated sensitively, using hand tools where possible. Excavation would also ideally not occur between March and May inclusive, when female red fox (*Vulpes vulpes*) and cubs may be below ground.

5.3.5 Tree Protection and Replacement

It is recommended that mature trees are retained where feasible, particularly those along the western boundary of the site, which provide potential roosting, foraging and commuting habitat for bats.

Retained trees should be protected in accordance with the recommendations of an arboricultural report[11] and BS 5837:2012 Trees in relation to design, demolition

[10] Bat Conservation Trust and the Institution of Lighting Professionals, (2018); 'Bat Guidance Note 08/18 Bats and artificial lighting in the UK. Bats and the Built Environment series.'
[11] Bartlett Consulting, (2019); 'BS:5837 Tree Survey & Tree Constraints Plan.'

and construction[12]. Furthermore, any tree removal required to facilitate the development should be mitigated through appropriate native tree planting within the site.

5.3.6 Invasive Species

Invasive plant species should be removed and appropriately disposed of to prevent the spread of these species outside the site[13].

5.3.7 Pollution Prevention

Standard pollution prevention measures should be implemented in accordance with Pollution prevention for businesses[14].

5.4 Recommendations

In accordance with the NPPF, the Proposed Development should avoid adverse impact to the biodiversity interest of this site and deliver ecological enhancements to ensure no net loss in biodiversity. Furthermore, the forthcoming Environment Bill will mandate the delivery of biodiversity net gain in development.

The following enhancements are recommended to ensure that the Proposed Development enhances the ecology of the site and the local area, aligning with planning policy and relevant conservation priorities. These measures are targeted towards species that have potential to occur at the site:

- Native species should be incorporated within the proposed landscaping, as these support higher levels of biodiversity;
- The landscape strategy should seek to maximise ecological connectivity across the site, connecting Woodcote Millennium Green with private gardens to the west. The proposals involve the creation of a public plaza and link through the site, which should be complemented with landscaping to provide a green corridor;
- Areas of ground floor landscaping should incorporate features such as species-rich hedgerows, dense shrubs and lines of trees to provide habitat for wildlife, including nesting opportunities for birds and foraging habitat for bats. Wildflower grassland is recommended, for example in peripheral areas of the site where the habitats can be less frequently managed, alongside more well-managed amenity grassland in formal areas. Dead wood or log piles could be created in these areas from trees felled at the site to provide habitat for invertebrates, reptiles and amphibians;

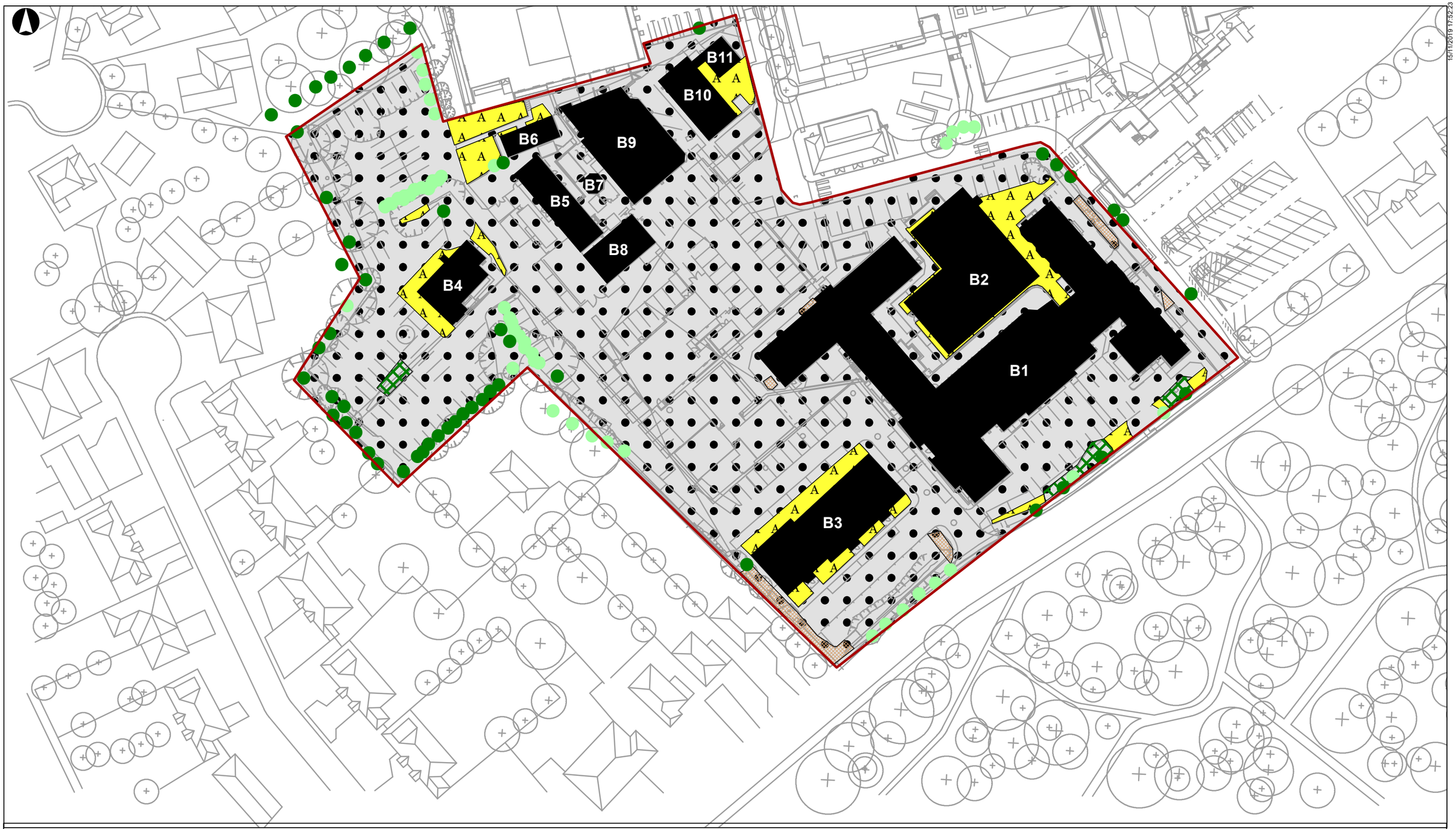
[12] British Standards Institution (2012), BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations
[13] Her Majesty's Government (2014); 'Stop invasive non-native plants from spreading. How to identify, control and dispose of invasive non-native plants that can harm the environment. Available at: https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants
[14] Department for Environment, Food & Rural Affairs and Environment Agency (2016); 'Guidance - Pollution prevention for businesses'.

- The façade design includes a hexagonal grid used to develop a leaf pattern to integrate the buildings into the surroundings and mimic the green space at Woodcote Millennium Green. It is recommended that this incorporates a green wall or climbers to provide habitat for wildlife, including birds and invertebrates. This would also contribute towards the objective of integrating the proposed buildings and improve views;
- A sensory garden is proposed at roof level. Wildflower green roofs that are not accessible to residents are also recommended to provide habitat for wildlife;
- The local planning authority has recommended enhancements to Woodcote Millennium Green[15]. All mitigation should be provided within the site, however enhancements to this local green space could provide a valuable enhancement to the ecology of the local area and potentially improve access for occupants of the Proposed Development. Consultation with Woodcote Millennium Green Trust would be recommended to identify appropriate enhancements to the biodiversity of this area.

[15] Epsom and Ewell Borough Council, (2019); 'Letter to Mr Kearly, QED Planning Ref. 19/00460/PREAPP. RE: Epsom General Hospital, Dorking Road, Epsom, Surrey, KT18 7EG. PROPOSAL: Redevelopment of site (including demolition of existing structures) to provide a new care community including assisted living units, a transitional care unit, communal and wellbeing facilities, occupational therapy centre, key worker accommodation and children's nursery.'

Figures

A3



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Legend

- Redline Boundary
- A3.1 - Broadleaved parkland/scattered trees
- A3.2 - Coniferous parkland/scattered trees
- A2.1 - Scrub - dense/continuous
- J1.2 - Cultivated/disturbed land - amenity grassland
- J1.4 - Introduced shrub
- J3.6 - Buildings
- Hardstanding

Metres
0 5 10 20

Coordinate System: British National Grid

Rev	Date	By	Chkd	Appd
D1	28.08.19	RH	GT	GT

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Client
Senior Living Urban (Epsom) Limited

Project Title
Epsom Hospital

Drawing Title
Phase 1 Habitat Map

Scale at A3
1:769

Role

Suitability
Draft

Arup Job No
270352

Rev
Draft

Name
Drawing 1

\\global\london\PTG\ICL-JOBS\270000\270352-00 Epsom Hospital\Internal Project Work\0_GIS\mxd\Ecology\EPHL_ARP_A1_E_O_Phase1HabitatMap_R190827_20191411.mxd

Appendix A

Legislation, Planning Policy and Guidance

A1 Legislation

- Wildlife and Countryside Act 1981 (as amended) (WCA) – this legislation comprises the primary means of protecting wildlife in the UK and provides the mechanism by which a number of international directives are implemented in the UK;
- Countryside and Rights of Way (CROW) Act 2000 – this act strengthens the details of the Wildlife and Countryside Act in relation to Sites of Special Scientific Interest (SSSI) and threatened species;
- The Conservation of Habitats and Species Regulations 2017 (Habitats and Species Regulations) – these regulations provide protection for European Protected Species and their habitats, such as bats and great crested newts;
- Natural Environment and Rural Communities (NERC) Act 2006 – the NERC Act puts an obligation on public authorities to have regard for the conservation of species and habitats of principal importance for the purpose of conserving biodiversity; and
- Wild Mammals (Protection) Act 1996 –makes it an offence to intentionally cause wild mammals any unnecessary suffering by certain methods, including crushing and asphyxiation.

A1.1 Bats

All bat species are fully protected under the WCA and the Habitats and Species Regulations, which together make it an offence to:

- Intentionally or recklessly capture, kill or injure bats;
- Deliberately disturb bats (including when they are outside their roosts) or intentionally or recklessly disturb roosting bats; or
- Damage or destroy their roosts or intentionally or recklessly obstruct access to their roosts (whether bats are present or not).

Under the Habitats and Species Regulations, disturbance includes any disturbance which is likely to impair their ability to survive, breed, reproduce, rear or nurture their young, hibernate, or to significantly affect the local distribution or abundance of the species.

A1.2 Great Created Newt

Great crested newt is fully protected under the WCA and Habitats and Species Regulations, which together make it an offence to:

- Intentionally or recklessly capture, kill, injure or disturb great crested newts; and

- Damage or destroy a breeding site or resting place for great crested newt or intentionally or recklessly obstruct access to any structure or place used for shelter or protection.

Under the Habitats and Species Regulations, disturbance includes in particular any disturbance which is likely to impair their ability to survive; breed or reproduce; rear or nurture their young; or hibernate or to affect significantly the local distribution or abundance of the species.

A1.3 Badger

The Protection of Badgers Act 1992 makes it an offence to intentionally capture, injure or kill a badger, cause any unnecessary cruelty or disturb badger setts.

A1.4 Birds

All birds, their active nests and eggs are protected under the WCA. This legislation makes it an offence to kill, injure or take any wild bird or to take, damage or destroy the nest of any wild bird while that nest is in use or being built.

Special penalties are given for these offences when related to birds listed on Schedule 1. The WCA makes it illegal to intentionally disturb any wild bird listed in Schedule 1 of the Act while it is building a nest or is in or near a nest containing eggs or young, or to disturb the dependent young.

A1.5 Common Reptiles

Common lizard, slow worm and grass snake, are listed on Schedule 5 of the WCA, which makes it illegal to deliberately or recklessly injure or kill these species. These species are also listed under the former UK BAP and are on the Section 41 list of species of principal importance in conserving biodiversity.

A1.6 Common Amphibians

Common amphibians, including common toad, common frog and smooth newt, are only protected from sale under the WCA. Common toad is also listed under the former UK BAP and is on the Section 41 list of species of principal importance in conserving biodiversity.

GCN

A2 Planning Policy

A2.1 The National Planning Policy Framework

The environmental objectives of the National Planning Policy Framework (NPPF) are to “contribute to protecting and enhancing our natural, built and historic

environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy". Local planning authorities have been given responsibility to set the strategic approach to achieve these aims.

A2.2 The England 2020 Biodiversity Strategy

The England Biodiversity Strategy 2020 was published by Defra in response to the National Environment White Paper. It sets the Government's objectives for halting net loss of biodiversity by 2020 and promotes the recognition of the intrinsic value of the benefits of biodiversity to society.

A2.3 Epsom and Ewell Core Strategy (2007)

A2.3.1 Policy CS 3

This policy promotes the conservation of local biodiversity through measures that meet the objectives of local and national biodiversity action plans. Sites that are important areas for nature conservation will be afforded protection where appropriate. Sites of Special Scientific Interest and Ancient Woodland have the highest level of protection. Development that harms these sites is not permitted. Developments that harm Grade 2, Grade 3 SNCIs or Local Nature Reserves are only permitted if suitable mitigation measures are applied and as long as the benefits of development outweigh the costs. Elsewhere, damage to biodiversity should be minimised, and where damage is unavoidable, adequate mitigating measures should be applied. New developments should aim to enhance the biodiversity of the borough where possible.

A2.4 Epsom and Ewell Development Management Policies Document (2015)

A2.4.1 Policy DM4 Biodiversity and New development

Policy DM4 sets out that development affecting any site or building that supports species protected by law, including their habitats, will only be permitted if appropriate mitigation and compensatory measures are agreed to facilitate the survival of the identified species, keep disturbance to a minimum and provide adequate alternative habitats to ensure no net loss of biodiversity. Whether or not there are any species or habitats that enjoy statutory protection, every opportunity should be taken to secure net benefit to the Borough's biodiversity. To this end, an assessment of the existing nature conservation assets on a development site should be undertaken at the application stage and suitable biodiversity enhancements proposed.

A2.4.2 Policy DM5 Trees and Landscape

Policy DM5 sets out that the Borough's trees, hedgerows and other landscape features will be protected and enhanced by (inter alia) requiring landscape proposals in submissions for new development, which retain existing trees and other important landscape features where practicable and include the planting of new semi-mature trees and other planting.

A3 Guidance

A3.1 UK Post-2010 Biodiversity Framework

The UK Post-2010 Biodiversity Framework sets out a structure for action across the UK between now and 2020, to help deliver the Aichi targets and the EU Biodiversity Strategy. A major commitment is to produce a National Biodiversity Strategy and/or Action Plan (NBSAP). Although the Biodiversity Framework superseded the UK BAP, the lists of priority species and habitats continue to provide valuable reference sources with respect to national priorities for conservation.

A3.2 Section 41 List

The Section 41 list is a list of living organisms and habitats of principal importance for the purpose of conserving biodiversity, as required under Section 41 of the NERC Act 2006. The list includes the priority species and habitats listed under the former UK BAP. Protecting and enhancing England's Section 41 list is key to delivering outcome 3 of the UK's Biodiversity 2020 strategy, which states that *'by 2020, we will see an overall improvement in the status of our wildlife and will have prevented further human-induced extinctions of known threatened species.*

A3.3 Birds of Conservation Concern

A total of 246 bird species have been assessed against a set of objective criteria to place them each on one of three lists indicating an increasing level of conservation concern. In the UK, there are 52 species on the red list, 126 on the amber list and 68 on the green list.

Two red list species have been recorded within 2km of the site: red wing (*Turdidae iliacus*) and fieldfare (*Turdus pilaris*). An amber list species, the Kingfisher (*Alcedo athis*), has also been recorded within 2km of the site.

A3.4 Surrey Biodiversity Partnership

Prior to 2012, the Surrey Biodiversity Partnership implemented the Surrey Biodiversity Action Plan. The Partnership has now become the Biodiversity Working Group of the Surrey Nature Partnership and it is producing Biodiversity Opportunity Area Policy statements to align with the outcomes in Biodiversity

2020. The Surrey Nature Partnership has produced a 'Biodiversity Planning in Surrey' document which offers advice to those involved in planning to ensure that development within the county protects and enhances the biodiversity which underpins our Natural Capital[16]. This document identifies former UK BAP priority species and habitats as being key priorities for conservation in Surrey, as discussed above.

A3.5 Epsom and Ewell Biodiversity Action Plan

Epsom & Ewell BAP a long-term plan aimed at protecting, maintaining and where possible enhancing biodiversity at a local level taking into account both local, regional, national and sometimes international priorities[17]. It includes urban habitats that are of relevance to the Proposed Development, including managed greenspace (including hospital grounds). This document also cites priority species listed in the former UK BAP, including stag beetle which has a stronghold in Epsom and Ewell.

[16] Surrey Nature Partnership, (2019); 'Biodiversity & Planning in Surrey.'
[17] Epsom & Ewell Biodiversity Working Group, (2012); 'Epsom & Ewell Biodiversity Action Plan.'

Appendix B

Plant Species List

Common name	Latin name	Dense scrub	Broadleaved scattered trees	Coniferous scattered trees	Amenity grassland	Introduced shrub
Common pear	*Pyrus communis*		Y			
Apple	*Malus domestica*		Y			
Yew	*Taxus baccata*			Y		Y
Silver birch	*Betula pendula*		Y			
Leyland cypress	*Cupressus × leylandii*			Y		
Lawson cypress	*Chamaecyparis lawsoniana*			Y		
Hybrid poplar	*Robusta Populus x canadensis 'Robusta'*		Y			
Common lime	*Tilia europaea*		Y			
Horse chestnut	*Aesculus hippocastanum*		Y			
Holm oak	*Quercus ilex*		Y			
Rowan	*Sorbus aucuparia*		Y			
Bird cherry	*Prunus padus*		Y			
Austrian pine	*Pinus nigra ssp. Nigra*		Y			
Copper beech	*Fagus sylvatica f. purpurea*	Y	Y			
Dog rose	*Rosa canina*	Y				
Ash	*Fraxinus excelsior*	Y	Y			Y
Sycamore	*Acer pseudoplatanus*	Y	Y			
Creeping thistle	*Cirsium arvense*	Y				

Dogwood	*Cornus sp.*	Y				
Field maple	*Acer campestre*	Y	Y			
Hazel	*Corylus sp.*	Y				
Ivy	*Hedera helix*					Y
Pissards plum	*Prunus atropurpura*		Y			
Cotoneaster	*Cotoneaster sp.*					Y
Elder	*Sambucus nigra*					Y
Snowberry	*Symphoricarpos albus*					Y
Holly	*Ilex aquifolium*					Y
Laburnum	*Laburnum anagyroides*					Y
Mallow	*Malva sylvestris*					Y
Cat's ear	*Hypochaeris radicata*				Y	Y
Herb Robert	*Geranium robertianum*					Y
Broadleaved willowherb	*Epilobium montanum*					Y
Black medick	*Medicago lupulina*					Y
Spear thistle	*Cirsium vulgare*					Y
Rhododendron	*Rhododendron ferrugineum*					Y
Rose	*Rosa sp.*					Y
Cherry laurel	*Prunus laurocerasus*					Y
Barbery	*Berberis sp.*					Y
Red valerian	*Centranthus ruber*					Y

Hedge bindweed	*Calystegia sepium*					Y
Goat willow	*Salix caprea*					Y
English elm	*Ulmus procera*					Y
Butterfly bush	*Buddleja davidii*					Y
Hedge mustard	*Sisymbrium officinale*					Y
Pedunculate oak	*Quercus robur*					Y
Yarrow	*Achillea millefolium*				Y	
Ribwort plantain	*Plantago major*				Y	Y
Dandelion	*Taraxacum officinale*				Y	
White clover	*Trifolium repens*				Y	
Daisy	*Bellis perennis*				Y	
Broadleaved dock	*Rumex obtusifolius*				Y	
Yorkshire fog	*Holcus lanatus*				Y	
False oat-grass	*Arrhenatherum elatius*				Y	
Ragwort	*Jacobaea vulgaris*				Y	
Cocksfoot	*Dactylis glomerata*				Y	
Creeping cinquefoil	*Potentilla reptans*				Y	
Self-heal	*Prunella vulgaris*				Y	
Perennial rye grass	*Lolium perenne*				Y	
Wall barley	*Hordeum murinum*				Y	
Wood avens	*Geum urbanum*				Y	
Hoary plantain	*Plantago media*				Y	

Hogweed	*Heracleum sphondylium*				Y	
Small-flowered cranesbill	*Geranium pusillum*				Y	

Appendix C

Tree Constraints Plan

Bartlett Consultancy

Coursers Farm, Coursers Road, Colney Heath
St Albans Herts, AL4 0PG
Tel: 01727 825090 (option 2) Email consultancy@Bartlettuk.com

Tree Constraints Plan

SCALE :	DATE :	N
1 : 600 @ A3	6/6/2019	
Epsom Hospital, Dorking Road, Epsom, Surrey GD/190110/TCP		

T38 U
T33 B
G32 B
G34 U
T31 B
T30 B
T29 B
T28 C
T27 U
T26 A
T25 U
G24 C
T23 B
T20 C
T19 C
T22 U
T21 U
T18 C
T17 U
T16 C
T15 A
G14 B
T13 U
T12 C
T11 C
G10 C
G9 B
G8 C
G37 C
G35 C
T36 A
G39 U
T41 C
T40 C
T42 C
T43 C
T44 C
T45 C
T1 C
T2 C
G3 U
T4 U
T5 U
T6 C
T7 B

Legend

Crown Spread

Root Protection Area

Category 'A' | Category 'B' | Category 'C' | Category 'U'

0 50m

Appendix C

Bat Report

Senior Living Urban (Epsom) Limited

Land at Epsom Hospital

Bat Survey Report

Issue | 19 December 2019

Job number 270352-00

Ove Arup & Partners Ltd
13 Fitzroy Street
London
W1T 4BQ
United Kingdom
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ARUP

Document Verification

ARUP

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		Name			
		Signature			
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Contents

Executive Summary

Ove Arup and Partners Limited (Arup) was commissioned by Senior Living Urban (Epsom) Limited to undertake a suite of bat surveys at a site in the southern part of Epsom General Hospital, Surrey (approximate central grid reference TQ 20377 59754) (hereafter referred to as the 'site'). This report presents baseline information relating to bats in accordance with recommendations made in a Preliminary Ecological Appraisal Report[1] produced by Arup.

The Proposed Development is for extra-care and later living facilities consisting of two new buildings of between two and nine storeys and a car park. The site is bound by suburban housing with scattered trees to the west, Epsom Hospital to the north and east and Woodcote Green Road to the southeast, with a pond and woodland beyond.

This report provides the results of the bat surveys undertaken on trees and buildings with bat roost potential: emergence/re-entry surveys in August and September 2019; a climbing survey in November 2019; and internal inspections of buildings in December 2019.

No roosts were recorded within the buildings, although there is a potential for bats to access to the lofts. A roost supporting a low number of bats, either *Myotis* sp. or common pipistrelle, was identified in T27, located along the western boundary of the site (approximate grid reference TQ 20300 59762). This tree will be need to be removed on the grounds of public health and safety. The western edge of the site with private gardens beyond, where T25 and T27 are located, was found to provide important foraging, commuting and socialising habitat for common pipistrelle *Pipistrellus pipistrellus*. Furthermore, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, brown long-eared bat and Nathusius' pipistrelle *Pipistrellus nathusii* were recorded on occasion.

A European Protected Species (EPS) Mitigation Licence is required prior to the removal of T27. A mitigation strategy must be provided along with the licence application, including the installation of artificial bat roosts and an inspection prior to the sensitive removal of the tree. Measures to avoid impacts to the artificial bat roosts and important foraging area along the western boundary have also been recommended.

Further bat emergence and re-entry surveys are recommended on B1, B3 and B4 in May to July 2020 to provide baseline information during the breeding season. These surveys are required ahead of the commencement of demolition of these buildings. In line with national planning policy, which seeks a net gain in biodiversity, additional mitigation and enhancement measures have been recommended to enhance the Proposed Development for bats and other wildlife.

[1] Ove Arup and Partners Limited (2019); 'Preliminary Ecological Appraisal'.

1 Introduction

1.1 Overview

This report presents details of baseline information relating to bats for the Proposed Development on the southern part of Epsom General Hospital. Ove Arup and Partners Limited (Arup) was commissioned by Senior Living Urban (Epsom) Limited to undertake a suite of bat surveys at site in Epsom, Surrey (approximate central grid reference TQ 20377 59754) (hereafter referred to as the 'site'). This report is written in response to recommendations made in the Preliminary Ecological Appraisal Report[2] produced by Arup. Trees and buildings at the site were identified to have potential to support roosting bats

1.2 The Site

The site comprises mainly buildings and hardstanding, with areas of ornamental planting and scattered trees, mainly along the western boundary. It is bound by suburban housing with scattered trees to the west, Woodcote Green Road to the southeast with a pond and woodland beyond, and Epsom Hospital to the north and east. The redline boundary of the site is shown in Appendix A.

1.3 The Proposed Development

The Proposed Development comprises the demolition of all of the buildings within the site and the construction of two new buildings between two and nine storeys, providing extra care accommodation (use class C2) and supporting uses including children's day care (use class D1), restaurants and gym. The proposals also include a two-storey car park and landscaping across the site, with greening of a central pedestrian route.

1.4 Purpose of this Report

The aims of this document are to:

- Report the baseline ecological features of relevance to bats;
- Report the survey methodology used and detail the results of these surveys; and,
- Provide any recommendations for further work required (if any) in relation to bats, to facilitate activities within the site, and mitigation measures required to ensure compliance with nature conservation legislation.

[2] Ove Arup and Partners Limited (2019); 'Preliminary Ecological Appraisal'.

1.5 Use of this Report

This report may be submitted as part of a planning application, when accompanied by a form of assessment report, such as an Ecological Impact Assessment (EcIA).

1.6 Legislation and Guidance

All UK bat species are fully protected under the Wildlife and Countryside Act 1981 (as amended)[3] and the Conservation of Habitats and Species Regulations 2017[4], which provides protection for European Protected Species (EPS) and their habitats, including bats. Together, this legislation makes it an offence to:

- Intentionally or recklessly capture, kill or injure bats;
- Deliberately disturb bats (including when they are outside their roosts) or intentionally or recklessly disturb roosting bats; or
- Damage or destroy their roosts or intentionally or recklessly obstruct access to their roosts (whether bats are present or not).

Under the Habitats and Species Regulations, disturbance includes any disturbance which is likely to impair their ability to survive, breed, reproduce, rear or nurture their young, hibernate, or to significantly affect the local distribution or abundance of the species.

Some bat species are also listed under relevant Biodiversity Action Plans (BAP), which identify priorities for conservation as required under the Convention on Biological Diversity in 1992[5]. The former UK BAP[6] is relevant in the context of Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006[7], meaning that Priority Species and Habitats are material considerations in planning. Priority Species under the former UK BAP of relevance to this report are noctule *Nyctalus noctule*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared bat *Plecotus auritus*. Guidance relevant to this assessment comprises 'Biodiversity & Planning in Surrey'[8] and the Epsom and Ewell BAP[9] which puts BAPs into place at a local level.

Further details of relevant legislation and guidance can be found in Appendix B.

[3] HMSO (1981); 'Wildlife & Countryside Act 1981'. http://www.legislation.gov.uk/ukpga/1981/69 Accessed 30/09/2019.
[4] HMSO (2017); 'The Conservation of Habitats and Species Regulations'. http://www.legislation.gov.uk/uksi/2017/1012/contents/made Accessed 30/09/2019.
[5] United Nations (UN), (1992); 'Convention on Biological Diversity.'
[6] UK Biodiversity Partnership (2011); 'UK Biodiversity Action Plan.'
[7] HMSO (2006); 'Natural Environment and Rural Communities Act.'
[8] Surrey Nature Partnership, (2019); 'Biodiversity & Planning in Surrey.'
[9] Epsom & Ewell Biodiversity Working Group, (2012); 'Epsom & Ewell Biodiversity Action Plan.'https://www.epsom-ewell.gov.uk/sites/default/files/documents/residents/planning/planning-policy/BiodiversityActionPlan.pdf Accessed 30/09/2019.

2 Methodology

2.1 Desk Study

A desk study was undertaken in August 2018 by Arcadis[10], which identified existing ecological information relating to the site and its surroundings. Surrey Biodiversity Information Centre (SBIC)[11] was consulted for recent records of protected species or species of conservation concern within 2 kilometres (km) of the site.

Only records of bats from the last 10 years were used as it was considered that records older than this would not accurately reflect the distribution of species currently present within the study area.

2.2 Field Survey

The bat survey approach aligns with the recommendations set out in the PEA[2]. Bat surveys were targeted to assess the presence or likely absence of bat roosts in buildings or trees identified with bat roost potential (BRP) in accordance with guidance set out by the BCT[12].

2.2.1 Emergence and Re-entry Surveys

Trees and buildings with potential to support roosting bats that are due to be impacted by the Proposed Development were subject to emergence/re-entry surveys. Where features were assessed as having high BRP, three emergence/re-entry surveys were undertaken, including at least one re-entry survey. Where features were assessed as having moderate BRP, one emergence and one re-entry survey was undertaken. Where buildings were assessed as having low BRP, one emergence or re-entry survey was undertaken. In accordance with current guidance[12], trees with low BRP were not subject to emergence/re-entry surveys.

Bats will generally leave their roost within 90 minutes of sunset and will return to their roosts within 90 minutes of sunrise, so surveys were undertaken at dawn and/or dusk at each potential roosting site. For emergence surveys, surveyors were present at each roosting feature approximately 15 minutes before sunset, remaining in place for at least 90 minutes after sunset. For re-entry surveys, surveyors were present at each roosting feature at least 90 minutes before sunrise, remaining at the feature until 15 minutes after sunrise, or longer if bat activity was observed at sunrise.

[10] Arcadis (2018); 'Epsom Hospital – Ecological and Arboricultural Constraints Report.'
[11] Surrey Wildlife Trust (2019); Available: ttps://www.surreywildlifetrust.org/what-we-do/professional-services/records-centre Accessed: 07/10/2019.
[12] Collins, J. (ed.), (2016); 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).' The Bat Conservation Trust, London.

Table 1. Details of emergence and re-entry surveys undertaken in August and September 2019.

Date	Features Surveyed	Survey Type	Sunset/ Sunrise	Survey Timings	Temperature Range (˚C)	Weather Conditions
28/08/2019	B1 (Rowan House) T2	Dusk emergence	19:54	Start: 19:43 Finish: 21:30	18-20	Cloudy, slight breeze and dry. Temperature 19°C to 18°C.
29/08/2019	B4 (York House) B8 and B9 (Boiler House) T27	Dawn re-entry	06:07	Start: 04:09 Finish: 06:09	12-14	Still, dry and slight breeze. Temperature 14°C to 12°C.
11/09/2019	T25 T27	Dusk emergence	19:25	Start: 19:10 Finish: 20:55	15-18	Broken cloud cover, dry but damp due to rain 1 hr before start, sunny intervals, light breeze. Temperature 18°C to 15°C.
12/09/2019	B1 (Rowan House) T2 B3	Dawn re-entry	06:29	Start: 04:30 Finish: 06:31	13-14	Warm, dry, slight breeze and mostly clear skies. Temperature 14°C to 13°C.
19/09/2019	T25 T27	Dawn re-entry	06:41	Start: 04:41 Finish: 06:41	8-10	Cool and clear. Temperature 10°C to 8°C.

During these surveys, surveyors concentrated on the specific feature of interest (e.g. a crack in the trunk of a tree) and recorded bats emerging from or returning to the feature. At the same time, the surveyors also recorded general bat activity nearby. In place of a surveyor, an infra-red (IR) camera was used to film one aspect of B1 during the survey on 12 September, which was later analysed for any bat activity by an ecologist. Bat calls were recorded using a Batlogger A+ which was positioned next to the IR camera.

Surveyors used BatBox Duet hand-held ultrasonic devices to detect bats, and Batlogger A+ devices to record the calls. Calls were analysed using specialist software, BatExplorer, to identify species (where possible), the type of bat call and the time of that call.

2.2.2 Tree Climbing Surveys

Sylvatica Ecology Limited carried out climb and inspect surveys on T2, T23, T25, T27 and T33 on 29 November 2019. These are all high and moderate potential trees that have potential to be impacted, either by removal or due to disturbance. The methodology followed the BCT good practice guidance[12]. Licenced bat surveyors climbed each tree with ropes and harnesses to inspect each PRF using torches, mirrors or endoscopes to assess the presence of roosting bats and their potential to support roosting bats.

2.2.3 Internal Building Inspections

Internal building inspections were carried out by Ecology Consultancy on 4 December 2019 on B1, B3, B4 and B9. These inspections were undertaken following the BCT good practice guidance**Error! Bookmark not defined.** and involved an inspection of the roof spaces to identify any signs of roosting bats and their suitability for roosting.

2.3 Assumptions and Limitations

B4 (Woodcote House) was not initially within the site boundary and therefore it was not identified that this building has potential to support roosting bats until an update extended Phase 1 habitat survey and bat scoping survey was conducted in this part of the site on 11 September 2019. As a result, this building was not subject to emergence and re-entry surveys until 12 September 2019, with coverage of only one façade. Low levels of bat activity were recorded in their part of the site by the surveyor located to the west of B1 (and north of B3) and no bat activity was recorded during the survey on 28 August or 12 September that would indicate the presence of a roost in this building. However, as a precautionary measure and in line with best practice guideance[12], it is recommended that further surveys are carried out on B3 in May and July 2020.

The emergence/re-entry surveys were carried out in the later part of the bat survey season, between August and September 2019 due to restricted project timescales. As such, further surveys are recommended between May and July 2020 to provide baseline information across the active bat season, including the maternity period.

3 Results

3.1 Emergence and Re-entry Surveys

The following species were recorded:

- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle *Pipistrellus nathusii*;
- Noctule;
- Brown long-eared bat; and
- *Myotis* sp.

3.1.1 Roosts

No bats were recorded emerging or re-entering any of the buildings surveyed, nor was any activity recorded that would indicate the presence of a roost. The same applies to T2.

One *Myotis* sp. or common pipistrelle was recorded re-entering T27 during the dawn re-entry survey on 29 August 2019. Both species were recorded at the time of the return and therefore it cannot be confirmed which species returned to the tree. One unidentified bat was recorded emerging from T27 during the dusk emergence survey on 11 September 2019. This bat was observed emerging from the tree through review of IR camera footage, but it did not echolocate. During the dusk emergence survey on 11 September 2019, on four occasions, a common pipistrelle bat was recorded flying towards and around the large cavity in the trunk of T27, but did not return to roost in the tree. High levels of common pipistrelle bat activity were recorded around T25, but none was confirmed as being associated with bats roosting in the tree. This was likely associated with activity in the adjacent private gardens and T27.

3.1.2 Activity

Low levels of bat activity were recorded during surveys on B1, B3, B9 and T2. These areas of the were well-lit, lacking suitable commuting corridors or foraging habitat, which likely limits the value of these areas for foraging and commuting bats.

The highest levels of bat activity were recorded in the western part of the site, comprising common pipistrelle foraging and commuting activity, including some social calls. Common pipistrelles were foraging around artificial lights in the car park south west of B4.

Soprano pipistrelle, noctule, *Myotis* sp., brown long-eared bat and Nathusius' pipistrelle bats were also recorded:

- Soprano pipistrelle was only recorded during the re-entry survey on 29 August at 05:17, 50 minutes before sunrise, by the surveyor located to the west of B4. This bat was not seen.
- Noctule was recorded commuting across the site during the majority of these surveys but were not seen by surveyors.
- One Nathusius' pipistrelle call was recorded during the emergence survey on B1 on 28 August 2019, though this species was not seen by surveyors. This species was recorded by two surveyors at 21:09, approximately 1 hour and 15 minutes after sunset. The surveyors were located to the west of B1 and north of B3; and north of B1.
- One brown long-eared bat call was recorded on 29 August 2019 but was also not seen by surveyors. This call was recorded at 04:33 by the surveyor located to the southwest of B4, approximately 1 hour and 34 minutes prior to sunrise.
- One *Myotis* sp. bat call was recorded during the re-entry survey on 29 August 2019, which could be associated with the roost in T27, as described in Section 3.1.

3.2 Tree Climbing Survey

The results of the survey are displayed in Table 2, with the results of the bat scoping survey as described in the PEA for reference.

Table 2. Results of the tree climbing surveys and updated BRP

Tree Number	Scoping Assessment Notes	Scoping BRP	Climbing Assessment Notes	Climbing BRP
T2	Yew *Taxus baccata* covered in dense ivy that may conceal features	Moderate	The ivy cover of this tree becomes relatively thin beyond the height of 2m from the ground. There are no suitable features for bats within this tree.	Negligible
T23	Horse chestnut *Aesculus hippocastanum* covered in ivy that may conceal features	Moderate	The ivy covering was relatively light, even from the base of the tree, so it was possible to see that there were no features present within the tree that would be suitable for roosting bats.	Negligible
T25	Hybrid poplar hybrid poplar *Robusta Populus x canadensis* 'Robusta' with cavity at the base of the	Moderate	The trunk cavity was open with little in the way of shelter for any bats to utilise.	Low

	branch where the trunk splits in two, which could provide access into a cavity.			
T27	Hybrid poplar with a large cavity at approximately 6m from the ground facing north at the top of the topped trunk. Hole approximately 3m from the ground also on the north side. Third hole on the southside of the trunk approximately 5m from the ground.	High	No evidence of bats seen but there is potential for low numbers of bats to be present. Unlikely to be used as a maternity roost due to exposure to disturbance and noise and lack of evidence indicating high usage such as clean and smooth internal walls.	High
T33	Ash *Fraxinus excelsior* with a west-facing hole at approximately 4m from the ground on the west side.	Moderate	There is a large cavity within this tree but it is open to the top, which would enable rain to penetrate into the cavity.	Low

3.2.1 Internal Building Inspections

Internal roof inspections were carried out on B1, B3, B4 and B9 in December 2019. No visible signs of roosting bats were recorded in any of the roof spaces. All of the buildings had PRFs, including slipped tiles, holes in soffit boxes and missing mortar, that provide opportunities for bats to access these areas. B3, B4 and B9 were assessed as having low BRP. B1 was assessed as having moderate BRP as surveyors also found crevices between roofing tiles and Strammit board, and soffit boxes which could be utilised by crevice dwelling bat species. In addition, light spillage from the outside was recorded and defunct pigeon nests within the roof of B1 indicate that access to the roof void was possible. Surveyors noted numerous dead pigeons in the roof space of B1. The full report is provided in Appendix C.

4 Discussion

4.1 Bat Roosts

4.1.1 Buildings

The survey results do not indicate the presence of roosting bats within any of the buildings, although there are opportunities for bats to access internal roof cavities. Light levels around the site limit the potential of these buildings to support roosting bats, particularly in the central parts of the site around B1 and B9.

B4 has a roof void that could have potential to support brown long-eared bat and this species was recorded during the re-entry survey on 29 August 2019. This species tends to emerge late and return early and their calls are very quiet and therefore difficult to detect. Further survey work has been recommended in May to July 2020 to further assess the presence or likely absence of roosting bats in this building.

4.1.2 Trees

One confirmed bat roost was found in T27, located along the western boundary of the site. The survey results indicate the presence of a low number of roosting bats, either common pipistrelle or *Myotis* sp. T27 is unlikely to be used as a maternity or hibernation roost given the high level of exposure to disturbance and noise and the lack of evidence indicating high usage by bats, such as clean and smooth internal walls. The results indicate that the tree supports a day roost for a low number of bats during the summer.

Of the four moderate potential trees that were subject to climbing surveys, two have been reduced to negligible BRP (T2 and T23) and two have been reduced to low BRP (T25 and T33). This is supported by the emergence and re-entry survey results, which do not suggest the presence of roosts in T2 and T25.

4.2 Foraging and Commuting Habitats

The western edge of the site with private gardens beyond, where T25 and T27 are located, was found to provide important foraging, commuting and socialising habitat for common pipistrelle. This activity may in part be associated with the roost in T27.

Five other species of bat were recorded during the emergence/re-entry surveys, including a *Myotis* sp. that may be associated with the roost in T27. The site is not considered to provide important habitat for soprano pipistrelle, Nathusius' pipistrelle and noctule. The survey results indicate that these species were commuting over or adjacent to the site.

5 Recommendations

5.1 Further Surveys

Emergence and re-entry surveys on B1, B3 and B4 are recommended in May to July 2020 to assess the check for roosting bats, including during the breeding season. These surveys are required ahead of the commencement of demolition of these buildings. The surveys should be undertaken in accordance with current guidelines[12].

5.2 Mitigation

5.2.1 EPS Mitigation Licence

T27 has been recommended for removal within three months on health and safety grounds following a tree structural integrity test in December 2019 (details in Appendix D). Under the Conservation of Habitats and Species Regulations 2010 (as amended) [13], an EPS Mitigation Licence would need to be acquired from Natural England to allow the removal of T27 without committing an offence.

The licence application will have to provide adequate justification to demonstrate that action is required to alleviate a clear and imminent danger to members of the general public. Such justification is provided in the Tree Structural Integrity Report in Appendix D.

The programme should allow for the implementation of mitigation and compensation prior to demolition and tree removal, which would be detailed further in the EPS Mitigation Licence application.

5.2.2 Bat Boxes

At least three artificial bat boxes should be installed on mature trees within the site that will be retained and protected throughout construction and operation. The recommended artificial roost type is a Miramare Woodstone Bat Box[14] or similar, as this box type is designed to reproduce a natural roost site in a hollow tree, such like the one being lost in T27.

The artificial roosts should be installed on trees along the western boundary, where levels of bat activity were relatively high and in close proximity to T27. They should be positioned ideally facing south-east or south-west, between 3 and 6m high. Some clearance of ivy or branches around the entrance of the roost and below the roost may be required to provide a clear flight path.

[13] Natural England (2010). *European Protected Species: Mitigation Licensing - How to get a licence.* Available http://publications.naturalengland.org.uk/publication/4727870517673984?category=12002. Last accessed 06/12/2019.
[14] Available: https://www.wildcare.co.uk/miramare-woodstone-bat-box-11268.html. Last accessed 06/12/2019.

5.2.3 Artificial Lighting

Lighting in the western part of the site in proximity to the bat boxes should be avoided to reduce disturbance to bats utilising the artificial roosts. Lighting across the site, and especially in this part of the site, should be designed to minimise disturbance to bats[15]. Lighting should face downwards and have minimal light spillage. Hoods and shields should be integrated to direct light where needed and not towards retained and new habitats. Warm white spectrum (ideally <2700Kelvin) LED luminaires should be used which have a peak wavelength of 550nm. These mitigation and avoidance measures must be detailed in a mitigation strategy and submitted alongside the EPS Mitigation Licence application.

5.2.4 Enhancement

In line with the National Planning Policy Framework[16], which seeks a net gain for nature, additional measures should be implemented to enhance the Proposed Development for bats.

Habitat connectivity between the woodland along the western site boundary should be maintained and enhanced as part of the Proposed Development to provide links to the woodland south of the site, and to the surrounding habitats suitable for bats. Such measures to do this include the planting of trees and landscaping throughout the site, which contain a majority of native species. Any landscaping which encourages invertebrates, such as rough grassland, wildflower meadows (including green or biodiverse green roofs) shrubs and ponds, will also provide foraging opportunities for bats. Hibernacula, comprising both 'insect hotels' and log piles from trees felled on site, should be installed within landscaped areas. 'Insect hotels' can also be positioned on green roofs or on walls throughout the site.

5.2.5 Post-construction Monitoring

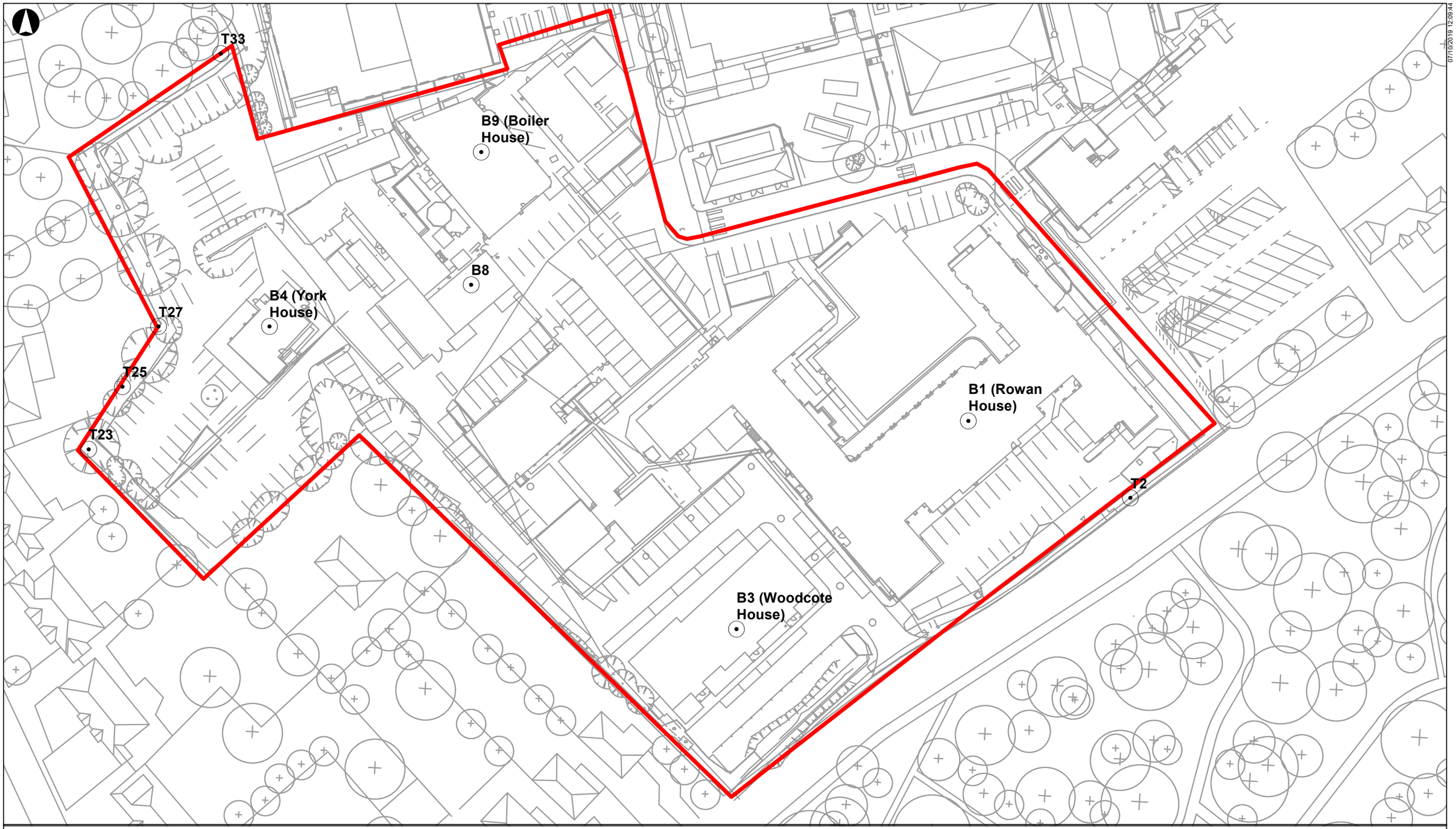
It is recommended that post-construction monitoring of all bat mitigation and compensation measures is undertaken, to determine the success of these measures. Monitoring results can be used to inform the need, or otherwise, for modifications to the operational scheme, such as further consideration of lighting reductions and/or additional planting.

[15] Bat Conservation Trust and the Institution of Lighting Professionals, (2018); 'Bat Guidance Note 08/18 Bats and artificial lighting in the UK. Bats and the Built Environment series.'
[16] Ministry of Housing, Communities and Local Government, (2019); 'National Planning Policy Framework.'

Appendix A

Trees and Buildings with Bat Potential

A3



07/10/2019 12:09:44

Legend

- Features of bat roost potential
- Redline Boundary

Metres
0 5 10 20

Coordinate System: British National Grid

Rev	Date	By	Chkd	Appd
P0	2019-12-13	HG	GT	NH

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Client
Senior Living Urban (Epsom)

Project Title
Epsom Hospital

Drawing Title
Bat Report Map

Scale at A3
1:639

Role

Suitability
Preliminary

Arup Job No
270352-00

Rev
P0

Name
001

\\global\london\PTG\ICL-JOBS\270000\270352-00 Epsom Hospital\Internal Project Work\0_GIS\mxd\Ecology\EPHL_ARP_A1_E_O_Bat Report Map.mxd

Appendix B

Relevant Legislation and Guidance

B1 Relevant Legislation and Guidance

B1.1 Legislation

B1.1.1 The Conservation of Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017[17] consolidated all the various amendments made to The Conservation of Habitats and Species Regulations 2010 and the Conservation (Natural Habitats, &c.) Regulations 1994 in respect of England and Wales. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law.

The Regulations are the British response to the Council Directive issued by the European Community (EC) (which is now the European Union (EU)).

The Regulations offer protection to a number of 'European Protected Species' (EPS), listed in Schedule 2 of the Regulations, including all species of typical and horseshoe bat (*Vespertilionidae and Rhiolophidae*). The Regulations make it an offence [amongst others] to deliberately capture, injure, kill or disturb these species, or to damage or destroy a breeding site or resting place of such an animal.

The Regulations in relation to EPS have been amended and consolidated with key changes including the removal of most of the defences from Regulation 40 and Regulation 43, including the removal of the 'incidental result of an otherwise lawful operation' defence, and the increase in the threshold for the offence of 'deliberately disturbing an EPS'.

Proposals that will affect EPS may require a licence from Natural England to allow an otherwise unlawful act. The species protection provisions of the Habitats Directive, as implemented by the Conservation of Habitats and Species Regulations 2017, contain three 'derogation tests' which must be applied by Natural England when deciding whether to grant a licence to a person carrying out an activity which would harm an EPS.

B1.1.2 Wildlife and Countryside Act 1981 (as amended)

The WCA[18] is the primary legislation covering endangered species in England and sets out the framework for the designation of Sites of Special Scientific Interest (SSSI). It confers differing levels of protection on species themselves, their habitats, or both, depending on their conservation status.

[17] The National Archives: The Conservation of Habitats and Species Regulations 2017 http://www.legislation.gov.uk/uksi/2017/1012/contents/made Accessed 03/12/2019.
[18] The National Archives: Wildlife & Countryside Act 1981 http://www.legislation.gov.uk/ukpga/1981/69 Accessed 3/12/2019.

Species offered protection by the Act are listed in a series of schedules. These Schedules are subject to a rolling review on a five yearly basis. Protected species are listed under Section 1 (birds), Schedules 5 and 6 (animals other than birds and invertebrates) and Schedule 8 (plants).

All species of typical and horseshoe bat are listed on Schedule 5 of the WCA in respect to section 9, parts (4b&c) and (5) of the Act. This makes it an offence to:

(a) Disturb a bat while it is occupying a structure or place which it uses for shelter or protection;

(b) Obstruct access to any structure or place which a bat uses for shelter or protection;

(c) Sells, offer or expose for sale, or have in one's possession or transport for the purpose of sale, any live or dead bat, or any part of, or anything derived from, such an animal; or

(d) Publish or cause to be published any advertisement likely to be understood as conveying that one is selling, or intending to buy or sell, any of those things.

B1.1.3 Natural Environment and Rural Communities (NERC) Act 2006

The NERC Act 2006[19], is designed to help achieve a rich and diverse natural environment and thriving rural communities. Under Section 40 there is a duty to conserve biodiversity; specifically Subsection (1) states "*Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity*."

Section 41 of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The Section 41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006.

Habitats and species of principal importance in England are listed under the provisions of Section 41 of the NERC Act 2006. These include all the habitats and species in England that were identified as requiring action in the now succeeded UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.

Relevant bat species, which are Section 41 Species of Principal Importance, are noctule, brown long-eared bat and soprano pipistrelle.

[19] National Archives: Natural Environment and Rural Communities Act 2006. http://www.legislation.gov.uk/ukpga/2006/16/contents Accessed 03/12/2019.

B1.2 Guidance

B1.2.1 UK Post-2010 Biodiversity Framework

The UK Post-2010 Biodiversity Framework sets out a structure for action across the UK between now and 2020, to help deliver the Aichi targets and the EU Biodiversity Strategy. A major commitment is to produce a National Biodiversity Strategy and/or Action Plan (NBSAP). Although the Biodiversity Framework superseded the UK BAP, the lists of priority species and habitats continue to provide valuable reference sources with respect to national priorities for conservation.

B1.2.2 Section 41 List

The Section 41 list is a list of living organisms and habitats of principal importance for the purpose of conserving biodiversity, as required under Section 41 of the NERC Act 2006. The list includes the priority species and habitats listed under the former UK BAP. Protecting and enhancing England's Section 41 list is key to delivering outcome 3 of the UK's Biodiversity 2020 Strategy, which states that 'by 2020, we will see an overall improvement in the status of our wildlife and will have prevented further human-induced extinctions of known threatened species.'

B1.2.3 Surrey Biodiversity Partnership

Prior to 2012, the Surrey Biodiversity Partnership implemented the Surrey BAP. The Partnership has now become the Biodiversity Working Group of the Surrey Nature Partnership and it is producing Biodiversity Opportunity Area Policy statements to align with the outcomes in Biodiversity 2020.

The Surrey Nature Partnership has produced a 'Biodiversity Planning in Surrey' document which offers advice to those involved in planning to ensure that development within the county protects and enhances the biodiversity which underpins our Natural Capital. This document identifies former UK BAP priority species and habitats as being key priorities for conservation in Surrey.

B1.2.4 Epsom and Ewell Biodiversity Action Plan

Epsom & Ewell BAP is a long-term plan aimed at protecting, maintaining and where possible enhancing biodiversity at a local level taking into account both local, regional, national and sometimes international priorities. It includes urban habitats that are of relevance to the Proposed Development, including managed greenspace (including hospital grounds). This document also cites priority species listed in the former UK BAP.

Appendix C

Detailed Bat Inspection Report

The Ecology Consultancy

Epsom Hospital /Preliminary Roost Assessment /Morgan Sindall

The Ecology Consultancy

Epsom Hospital, Surrey

Preliminary Roost Assessment

Morgan Sindall

Job Number	9324			
Author	George Siskos Bsc (Hons) ACIEEM			
Version	**Checked by**	**Approved by**	**Date**	**Type**
0.1	Wendy McFarlane MA MSc MCIEEM	Sasha Dodsworth BSc MSc MCIEEM	13/12/19	DRAFT

Contents

Summary of Key Issues

The Ecology Consultancy was commissioned by Morgan Sindall to carry out a Preliminary Roost Assessment to determine the status of bats and any likely constraints to re-development arising at, Epsom Hospital, Surrey. The main findings are as follows:

- The proposals for the site are for the demolition of four existing buildings on site to facilitate the construction of new buildings and associated landscaping.
- The site comprised buildings formally part of a hospital and semi-natural habitats comprising introduced shrubs and scattered trees which are connected to the wider peri-urban areas via private gardens and woodlands.
- Preliminary Roost Assessment of the buildings and trees was carried out on 4 December 2019.
- The desk study returned records of at least 7 bat species as well as records of historic roosts and EPSM bat licences within 2km radius of the site.
- **Rowan building** was assessed as having moderate potential to support roosting bats. In line with best practice, it is recommended that at least one dusk emergence survey and one dawn re-entry survey are completed, to assess the presence/ likely absence of bats within these buildings. They should be completed during the active bat season (May-August) and spaced throughout the season as much as possible to gain robust data.
- **Woodcote Lodge, York House and Boiler House** were assessed as having low potential to support roosting bats. In line with best practice, it is recommended that one dusk emergence survey or one dawn re-entry survey is completed, to assess the presence/ likely absence of bats within these buildings, during the active bat season (May-August).
- A single standing dead tree was assessed as having moderate potential to support roosting bats. In line with best practice, it is recommended that at least one dusk emergence survey and one dawn re-entry survey are completed, to assess the presence/ likely absence of bats within these buildings. They should be completed during the active bat season (May-August) and spaced throughout the season as much as possible to gain robust data.
- Recommendations are provided in this report to enhance the site for biodiversity, including a lighting strategy to minimise the impact of the new development on commuting and foraging bats and roosting bats.

1 Introduction

BACKGROUND TO COMMISSION

1.1 The Ecology Consultancy was commissioned by Morgan Sindall in December 2019 to undertake a Preliminary Bat Roost Assessment to assess the status of bats within buildings and trees and any likely constraints to development at Epsom Hospital, Surrey.

1.2 This assessment follows on from a Preliminary Ecological Appraisal carried out by Arcadis in September 2018 (Arcadis, 2018). Potential roosting features were identified during the survey, as such a bat roost assessment and inspection of affected trees and buildings before any works was recommenced.

SCOPE OF REPORT

1.3 The primary aims are, through a process of investigation and assessment, to determine if any bat roosts are present, what the type of roost may be, 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.

1.4 The assessment of a site for bats is based on the following sources of information, including that obtained from third parties and the results of surveys:

- a desk study including:
  - a data search for bat records within a 2km radius of the site;
  - an assessment of the surrounding habitats for their likely importance to bats;
  - the presence of any protected areas cited for their bat populations; and
  - the location and status of any nearby European Protected Species Mitigation licensed sites for bats.
- a Preliminary Roost Assessment comprising a detailed building inspection;
- a Preliminary Ground Level Roost Assessment of any trees scheduled for removal or remedial works;
- DNA analysis of any bat droppings found; and
- emergence and re-entry surveys.

1.5 The elements listed above comprise the individual parts of the process that underlie the assessment. If, at preliminary assessment, the buildings and or trees do not provide any potential for a roost, the assessment can be stopped at this stage. If potential for a roost is identified, a suite of emergence/re-entry surveys will be required to confirm presence or likely absence, to determine the species present, and to characterise any roosts located. In cases where no roosts are identified or suspected during these surveys, the assessment can be halted. Where roosts are found to be present then an evaluation of the conservation value of the species concerned is made and the impacts of the development identified and addressed.

1.6 The survey covers all structures and trees within the planning application site boundary (hereon referred to as 'the site') as indicated on the plan provided by the client Morgan Sindall).

1.7 This assessment has been prepared with reference to best practice guidance published by the Bat Conservation Trust (Collins, 2016) and as detailed in BSI Standards Publication 42020:2013 *Biodiversity – Code of Practice for Biodiversity and Development* (British Standards Institution, 2013) and BSI 8956:2015 *Surveying for Bats in Trees and Woodland* (British Standards Institution, 2015).

1.8 This report provides supporting information in the appendices with a georeferenced map of the survey results in Appendix 1, and cross-referenced photographs in Appendix 2.

SITE CONTEXT AND STATUS

1.9 The proposed development is located on Dorking Road in Epsom, at approximate National Grid reference TQ203 599. The site comprised of four buildings, areas of hard standing, introduced shrub, and scattered trees. The site is bound by Dorking Road to the South, by residential back gardens to the west and by the other hospital buildings and associated hard standing to the north and east.

1.10 Open space, including the grounds of a sports club, were present locally. A small wood and pond were adjacent to the site in the south by Woodcote Green Road. Nearby areas of semi-natural green space include Epsom Common Local Nature Reserve (LNR) and Site of Special Scientific Interest (SSSI) located 400metres (m) west of the site

DEVELOPMENT PROPOSALS

1.11 The proposed development includes the demolition of Rowan House, Woodcote Lodge, York House and the Boiler House to facilitate the construction of a new 'Later Living' complex of residential apartments, care facilities and amenities (Morgan Sindall, 2019).

RELEVANT LEGISLATION AND PLANNING POLICY

1.12 The following key pieces of nature conservation legislation are relevant to this assessment, with a more detailed description of this legislation provided in Appendix 3:

- 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.

1.13 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 most of the species covered by BMCL.

1.14 The National Planning Policy Framework (Department of Communities and Local Government, 2018) 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'.

1.15 Other planning policies at local level which are of relevance to this development include: Epsom and Ewall Borough Council Development Management Policies Document 2015 and Epsom and Ewall Borough Council Biodiversity Action Plan Document 2016.

2 Methodology

DESK STUDY

2.1 A desk study was conducted to obtain data relating to bats within a 2km radius of the site, as made available by the Surrey Bat Group.

2.2 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 sites[1]; 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.

BAT SURVEYS

Personnel

2.3 The survey was led by George Siskos BSc (Hons) ACIEEM, an Ecologist with over five years commercial bat survey experience.

Equipment

2.4 The surveys listed below made use of some or all the following equipment:

- an extendable ladder;
- a video endoscope;
- a handheld LED torch;
- a high-powered torch for illuminating features at height;
- close focussing binoculars;
- bat dropping (DNA) collection kit;
- Bat Box Duet, frequency division and heterodyne detector;
- Canon XA30 Infrared video camera and 500w IR light;
- Elekon Bat Scanner, frequency division detector;

[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).

- Elekon bat logger M, full spectrum detector; and
- Anabat Express, Zero Crossing Analysis.

Aims and Objectives

2.5 The aim of the survey methodologies outlined below is to establish the presence/likely absence of bat roosts within the trees and buildings within the site boundary. Once presence has been established the secondary aim is to obtain enough information to characterise the type of roost according to criteria set out in the current guidelines (Colins, 2016). This includes determining the function/s of the site by bats for maternity or hibernation roosts, transitional roosts, foraging and commuting. 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.

Field surveys

2.6 The survey methodologies below follow best practice guidelines (Mitchell-Jones & McLeish, 2004; Collins, 2016, The British Standards Institution, 2015). A standard recording form was completed for each building within the site boundary and for each tree that is likely to be impacted by the proposals. This included recording the main structural features and layout, any potential access points and roost features and photographs. The criteria used as a framework to assess the potential for structures or trees to support roosting bats are provided in Appendix 4. This section provides methodologies for the primary survey types used to assess the status of bats at a site, depending on the particulars of the site and the commission, not all these survey types may be carried out.

Preliminary Roost Assessment - Buildings

2.7 The survey comprised an external inspection of each building, involving a detailed search of all accessible architectural features for bat droppings, urine staining, scratch marks, staining around suitable crevices and feeding remains. Window panes and other external surfaces were visually checked for droppings or other secondary evidence. A high-powered torch was used to illuminate recesses and crevices at height, and these were inspected using close focusing binoculars. This included external features, such as soffit boxes, roof tiles, hanging tiles, ridge areas and window casements. Any features that could potentially provide access into internal areas such as roof voids and cavity walls were noted.

2.8 During the internal inspection the surveyor worked through the roof voids of the building in logical progression searching each adjoining void in turn as well as all small storage

areas such as dormer rooms and water towers. Within the roof voids all surfaces including floor areas were checked for discarded feeding remains and bat droppings. The beam from a high-powered torch was shone along the length of each individual rafter, where appropriate to the roof type, looking for bats, staining and droppings. The roofing material was also inspected for areas of overlapping materials, holes and potential access points into the ridge area. Any open water tanks were inspected for the presence of bat corpses.

DNA analysis

2.9 If present, a sample of each different type of bat dropping, differentiated by size and morphology, may be collected by an ecologist with gloved hands and then placed into clean, dry, containers. These droppings are then sent for laboratory analysis within 48hrs of collection or stored in a dry, cool location for later dispatch.

Preliminary Ground Level Roost Assessment - Trees

2.10 Any trees that were within the site boundary and likely to be impacted by the proposals were inspected for any suitable features that could provide suitable roosting locations for bats, including: loose, flaking or folded bark; cracks and fissures in limbs; woodpecker holes; or any downward-facing crevices or holes in the limbs or trunks. They were also inspected for any signs indicating possible use by bats, such as tiny scratches, rub marks and staining around access points, bat droppings in around or below access points.

EVALUATION AND IMPACT ASSESSMENT

Evaluation

2.11 The conservation status of those 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].

2.12 If emergence and re-entry surveys were carried out, then the foraging and commuting activity recorded during those surveys is summarised along with an outline interpretation of the function the site may provide for these activities.

2.13 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, 2018) 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

2.14 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 types of construction impact to bats and their roosts including; disturbance, loss, modification and fragmentation in relation to duration and timing. For the site, 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

2.15 It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that there is a lack of ecological interest;

[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

the area may be simply under-recorded. Bats are highly mobile animals and can move roost sites both within and between years. Where surveys are not spread throughout the bat active season is possible that they could miss roosts that are occupied earlier or later in the year. However, where undisturbed, evidence of bats inside a building 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. Data from bat surveys should be valid for a period of 24 months, unless there are any gross changes to the buildings or other habitats within the site.

3 Results

DESK STUDY

Data search

3.1 The data search returned 43 records of bats or bat roosts, of seven different bat species; common pipistrelle, soprano pipistrelle, brown long eared, noctule, serotine, Natterer's and Daubentons' bat from 1991 to 2018. There were two historic EPSM licences within a 2km radius of the site, and no statutory sites designated for bats within 2km. A summary of the most pertinent results is presented in Table 3.1 and Table 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
Serotine	0.13km south west	24/05/1991	Grounded bat	Hyland Road, Epsom
Serotine	0.17km east	05/06/2016	Grounded bat	Pine Hill, Epsom
Soprano pipistrelle	0.42km north	01/08/2011	Grounded bat	The Greenway, Epsom
Pipistrelle species	0.4km south	04/08/2011	Bat droppings	Hambledon Hill, Epsom
Unidentified bat species	0.4km south	04/08/2011	Bat droppings	Hambledon Hill, Epsom
Brown long eared	0.53km north west	18/07/2009	Grounded bat	Ebbisham Road, Epsom
Natterrer's bat	0.66km south east	03/07/2005	Bat droppings	Ashley Road, Epsom
Pipistrelle species	0.9km west	29/06/2004	Bat droppings	Milburn Walk, Epsom
Brown long eared	1.06km north east	10/08/2011	Grounded bat	The Derby Square, Epsom
Brown long eared	1.14km south west	01/10/2015	Bat droppings	Oak Way, Ashtead
Common pipistrelle	1.1km north west	07/09/2016	Grounded bat	Church Side, Epsom
Common pipistrelle	1.3km south west	26/07/2011	Grounded bat	Farm lane, Ashtead
Unidentified bat species	1.71km north west	29/06/2009	Roost; peak count 2	Middle Lane, Epsom
Serotine	1.72km north west	26/07/2011	Grounded bat	Middle Lane, Epsom
Common pipistrelle	1.7km north	21/06/2012	Roost; peak count 109	Hook Road, Epsom
Common pipistrelle	1.89km west	24/08/2004	Roost; peak count 3	Overdale, Ashtead

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

Species	Distance & Orientation	Date	Roost type	Notes
Pipistrelle species	1.96km south	15/10/2007	grounded	Rosebery Road, Langley Vale

Table 3.2: Summary of extinct/ extant EPSM licences within 2km of site

Species	Distance & Orientation	Date	Record type	Notes
Common pipistrelle	1.6km north east	2014	Non-breeding	EPSM2013-6826 Licence allows destruction of a resting place.
Common pipistrelle	2km south west	2016	Non-breeding	2016-22154-EPS-MIT Licence allows destruction of a resting place.

Surrounding habitat

3.2 Immediately adjacent to the site, the habitat is predominantly roads, buildings, a small woodland with pond, and residential gardens, which includes scattered trees.

3.3 The wider area includes woodlands suitable for bats including Epsom Common LNR and SSSI 400 m west of site and Ashtead Common National Nature Reserve (NNR) 1.1 km west of site which is designation is due to a large number of ancient oak located.

3.4 While the site itself is relatively small it provides some connectivity between various larger areas with good roosting and foraging value for bats.

FIELD SURVEYS

Overview

3.5 The PRA covered buildings and trees on site, the results are detailed individually below with a site plan provided in Appendix 1 and supporting photographs in Appendix 2.

Weather Conditions

3.6 The PRA and GLRA assessments were carried out in optimal weather conditions:

3.7 *PRA and GLRA:* 4 December 2019, 7ºC, light breeze (Beaufort 2), 2/8 okta[5] cloud cover and no rain. Survey commenced at 09:30 and continued until 14:30.

[5] An okta is a unit of measurement for cloud cover, based on an estimate of how many eighths of the sky are obscured by cloud.

Preliminary Roost Assessment - Buildings

Rowan House (Building N) Description:

3.8 A three to four-storey brick building constructed around the 1930s which once housed the nurse's quarters but is now derelict. The building was roughly H-shaped with both pitched and flat roofing sections (Appendix 2, Photograph 1).

3.9 The pitched roofs were complex and contained both hip / valley and gabled sections. The pitched sections were clad in clay tiles with the exception of north eastern and south eastern roof sections which were clad in slate tiles. The north eastern section of the building also contained four dormer windows on the 1st storey. Two flat roof sections were present in the north western, and the south eastern section of the building and were constructed with bitumen.

3.10 Four brick-built chimneys; one on the gable end of the north western section of the building and three on the ridge of the central pitched section were present (Appendix 2, Photograph 2). Timber soffit boxes, window frames and doors were all in a fair state of repair. Lead flashing was also present around the chimneys, dormer windows and slate tiled roofs.

3.11 Internally, the central pitch and western pitched sections were accessible through a single loft hatch and were split into 10 sections separated by open doors. The voids were approximately 3m in height and contained UPVc water tanks. The roof was constructed from metal structural beams, timber ceiling joists, concrete and plasterboard floor. The voids contained layer of Strammit board directly below the roofing tiles Appendix 2, Photograph 3).

3.12 *Building N Results.* No bats or evidence of bats such as urine staining, or droppings were recorded within the building. However, numerous features with the potential to support roosting bats were identified. These are shown on Figure 1, Appendix 1 and included lifted/slipped roofing tiles, hole in soffit box, missing brickwork, gap in window frame, missing mortar, and gap in ridge tile. (Appendix 2, Photograph 4, 5, 6). Internally, there were crevices between roofing tiles and Strammit board, and soffit boxes which could be utilised by crevice dwelling bat species. Furthermore, there was light spillage from the outside and defunct pigeons' nests which would indicate that access into the loft void was possible.

3.13 Based on the above, Building N have been assessed as having **moderate potential** to support roosting bats in the summer and l**ow potential** to support hibernating bats.

Woodcote Lodge (Building M) Description:

3.14 A three-storey brick building constructed in the1980s which currently houses hospital staff. The building was rectangular in design with a pitched roof Appendix 2, Photograph 7).

3.15 The pitched roof was Mansard in design and clad in slate tiles with vented uPVC ridge tiles. uPVC soffit boxes, window frames and doors were all in a good state of repair. Lead flashing was present around the third-floor windows.

3.16 Internally, there were multiple loft voids which were divided by individual apartments. The void was approximately 1.5m in height. The roof was constructed from timber structural beams, timber ceiling joists, timber floorboards and contained fibreglass. The voids contained layer of bitumen felt directly below the roofing tiles Appendix 2, Photograph 8).

3.17 *Building M Results.* No bats or evidence of bats such as urine staining, or droppings were recorded within the building. However, a number of features with the potential to support roosting bats were identified. These are shown on Figure 1, Appendix 1 and included lifted/slipped roofing tiles, and missing mortar (Appendix 2, Photograph 9). Internally, there were crevices between roofing tiles and bitumen felt, which could be utilised by crevice dwelling bat species.

3.18 Based on the above, Building M has been assessed as having **low potential** to support roosting bats in the summer and **low potential** to support hibernating bats

York House (Building J) Description:

3.19 A two-storey brick building constructed around the 1930s which was previously used as a training centre but is now derelict. The building was L-shaped with a pitched roof (Appendix 2, Photograph 10 and 11).

3.20 The pitched roof was cross hipped in design and clad in clay tiles with clay ridge tiles. Building J contained two brick-built chimneys; one on the game end of the south western section and one in the middle of the building. Timber soffit boxes, window frames and doors were all in a good state of repair. Lead flashing was present around the chimneys.

3.21 Internally, there was a single loft void accessible via a fold out ladder. The void was approximately 2m in height and contained several a water tank. The roof was constructed from timber structural beams, timber ceiling joists, timber floorboards. The voids

contained layer of bitumen felt directly below the roofing tiles (Appendix 2, Photograph 12).

3.22 *Building J Results.* No bats or evidence of bats such as urine staining, or droppings were recorded within the building. However, a number of features with the potential to support roosting bats were identified. These are shown on Figure 1, Appendix 1 and included lifted/slipped roofing tiles, and hole in soffit box (Appendix 2, Photograph 13). Internally, there were crevices between roofing tiles and bitumen felt, and soffit boxes which could be utilised by crevice dwelling bat species.

3.23 Based on the above, Building J has been assessed as having **low potential** to support roosting bats in the summer and **low potential** to support hibernating bats.

Boiler House (Building K) Description:

3.24 A two-storey brick building constructed around the 1930s which was is currently used as a boiler house. The building is roughly rectangular in design with a pitched roof (Appendix 2, Photograph 14).

3.25 The pitched roof was hipped in design and clad in slate tiles with concrete ridge tiles. Adjacent to Building K was the 130-foot cylindrical brick-built chimneys. Vents were present in the north and south elevation leading into the boiler house as well as barn hatch from dormer on the northern elevation. Timber soffit boxes, and doors were all in a good state of repair.

3.26 Internally, the building didn't contain any loft voids and was entirely open. The building contained a lot of plant and was very well lit from the outside (Appendix 2, Photograph 15).

3.27 *Building K Results.* No bats or evidence of bats such as urine staining, or droppings were recorded within the building. However, a number of features with the potential to support roosting bats were identified. These are shown on Figure 1, Appendix 1 and included missing mortar and gaps into chimney (Appendix 2, Photograph 16, 17). Internally, there were crevices between roofing tiles and bitumen felt, and soffit boxes which could be utilised by crevice dwelling bat species.

3.28 Based on the above, Building K has been assessed as having **low potential** to support roosting bats in the summer and **low** potential to support hibernating bats

Preliminary Ground Level Roost Assessment – Trees

3.29 The site contained mature and semi mature trees, species included Scots pine, Norway maple, common beech, ash and silver birch

3.30 As per the Arcadis Report a standing dead wood tree on the western boundary of the site contained several PRF's such as rot holes and flaking bark which offered moderate potential to support roosting bats (Arcadis, 2018). Further survey for roosting bats are recommended prior to works commencing on site and are detailed below.

4 Evaluation and Impacts

EVALUATION

4.1 In the absence of further surveys, it is not possible to fully evaluate how bats use the site and assess likely impacts of the proposed development. However, it can be noted, that the site is connected to the wider landscape via adjacent gardens. The desk study also identified roost sites and field records within proximity of the site. As such, Building N was assessed to have moderate potential to support roosting bats and Buildings M, J and K as having low potential to support roosting bats. It is understood all buildings on site will be demolished. As the proposed development works would impact the potential bat roost features identified by removal, further survey work is required to identify the presence of a roost, in line with best practice (Collins, 2016) and comply with legislation in relation to bats.

4.2 On completion of the recommended further surveys on Buildings N, M, J and K which are detailed in Section 5, this section of the report will be updated.

IMPACT ASSESSMENT

4.3 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. Under this legislation it is an offence to deliberately capture, kill, disturb a bat and to damage or destroy a bat roost.

Construction Phase

4.4 In the absence of suitable mitigation, the development proposals have the potential to result in long term impacts to bats. The following impacts that may potentially occur during the construction phase include the following:

- Death, injury or disturbance to roosting bats, during the demolition of Buildings N, M, J and K;
- Loss of potential roosting features due to the demolition of Buildings N, M, J and K;
- Disturbance of a roost during the construction works via physical obstruction, lighting, noise and vibration, and fragmentation of flight line

Operational Phase

4.5 Long term impacts could include increased lighting, through the installation of security or other lighting which could result in disturbance and abandonment via the illumination of any nearby roosts and it could also obstruct and disturb commuting and foraging activity.

5 Summary and Recommendations

SUMMARY OF FINDINGS

5.1 This section summarises the data gathered during the surveys.

5.2 The following ecological constraints have been identified:

- Building N has moderate potential to support summer roosting bats and low potential to support hibernating bats. There are three buildings, M, J and K, with low potential to support roosting bats and low potential to support hibernating bats. Further survey for roosting bats are recommended prior to works commencing on site and are detailed below.
- A single standing dead tree (with moderate potential) on the western boundary of the site near York house. Further survey for roosting bats are recommended prior to works commencing on site and are detailed below.
- There is habitat on site to support foraging bats, measures should be taken to retain and protect these habitats.

RECOMMENDATIONS

Further survey

5.3 The requirements for further survey are outlined in Table 5.1 below.

Table 5.1: Recommendations for further survey

Survey Requirement	Number of surveys and seasonal considerations
To survey Building for bat roosting potential	As per the Bat Conservation Trust's *Good Practice Guidelines* (Collins, 2016), buildings assessed as having low potential to support roosting bats should be subject to either one dusk emergence or dawn re-entry survey, with buildings with moderate potential to support roosting bats subject to a dusk emergence and dawn re-entry survey. The surveys should be carried out between May and August. Should bats be identified as roosting within the building then further roost characterisation surveys will be required.
Buildings with hibernation potential	A precautionary approach where all potential roosting features are checked would be required prior to demolition (subject to the completion of the above emergence / re-entry surveys). The demolition works to commence out outside of sensitive periods (maternity or hibernation) either March – April or October to November.

Survey Requirement	Number of surveys and seasonal considerations
Trees with potential to support roosting bats	A single standing dead tree (with moderate potential) on the western boundary of the site near York house. As per the Bat Conservation Trust's Good Practice Guidelines (Collins, 2016), trees assessed as having moderate potential to support roosting bats should be subject to one dusk emergence and one dawn re-entry survey. The surveys should be carried out between May and August. Should bats be identified as roosting within the tree then further roost characterisation surveys will be required. Due to H&S issues the standing dead tree is unsafe to climbed as such a climbed inspection is not suitable.

5.4 Building N was assessed as having moderate potential to support roosting bats, while buildings M, J and K were assessed as having low potential to support roosting bats. As all these buildings are due to be demolished, further surveys area recommended prior to any site works, as outlined in Table 5.1. Should a bat roost be present within any of the buildings, a Natural England license and mitigation strategy may be required.

Trees

5.5 Mature beech tree, sycamore and scots pine trees which were assessed as having negligible potential to support roosting bats were also present on site (Arcadis, 2018). These trees are however of value to foraging and commuting bat and will likely be felled to facilitate the redevelopment of the site.

5.6 Working under the principle of net gain the loss of trees on site should be avoided, where this is not practicable then replacement habitat should be provided at a ratio of 1:1 either on site or within the immediate local area.

5.7 Some more generic proposals for, compensation and enhancement measures are provided in Appendix 6.

References

Arcadis (2018) *EPSOM HOSPITAL – ECOLOGICAL AND ARBORICULTURAL CONSTRAINTS REPORT.* Report for Epsom & St Helier University Hospitals NHS Trust. Report number 10020221-ARC-XX-XX-RPZZ-0001-01-Ecological and Arboricultural Constraints Report

Bat Conservation Trust (2018) *Bats and artificial lighting in the UK*. Bat Conservation Trust, London.

British Standards Institution (2015) *BS8956 Surveying for Bats in Trees and Woodland.* BSI London.

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

Collins. (2016) *Bat Surveys - Good Practice Guidelines* 3rd Edition. Bat Conservation Trust, London.

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

Department of Communities and Local Government (2018) *National Planning Policy Framework*. Available from https://www.gov.uk/government/publications/national-planning-policy-framework--2

Epsom and Ewall Borough Council (2015) *Development Management Policies.* Available from*:*

https://www.epsom-ewell.gov.uk/sites/default/files/documents/residents/planning/planning-policy/Development%20Management%20Policies%20Document%20Final%20Version.pdf

Epsom and Ewall Borough Council (2016) *Biodiversity Action Plan*. Available from*:*

https://www.epsom-ewell.gov.uk/sites/default/files/documents/residents/planning/LBAP%202016%20Annual%20Report.pdf

Harris & Yalden (2008). *Mammals of the British Isles: Handbook, 4th Edition.* The Mammal Society, Southampton.

Fure, A. (2006) *Bats and lighting*. The London Naturalist 85.

Institute of Lighting Engineers (2009) *Bats and Lighting in the UK* Version 3. Institute of Lighting Engineers and Bat Conservation Trust [online]. Available from

http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk__final_version_version_3_may_09.pdf

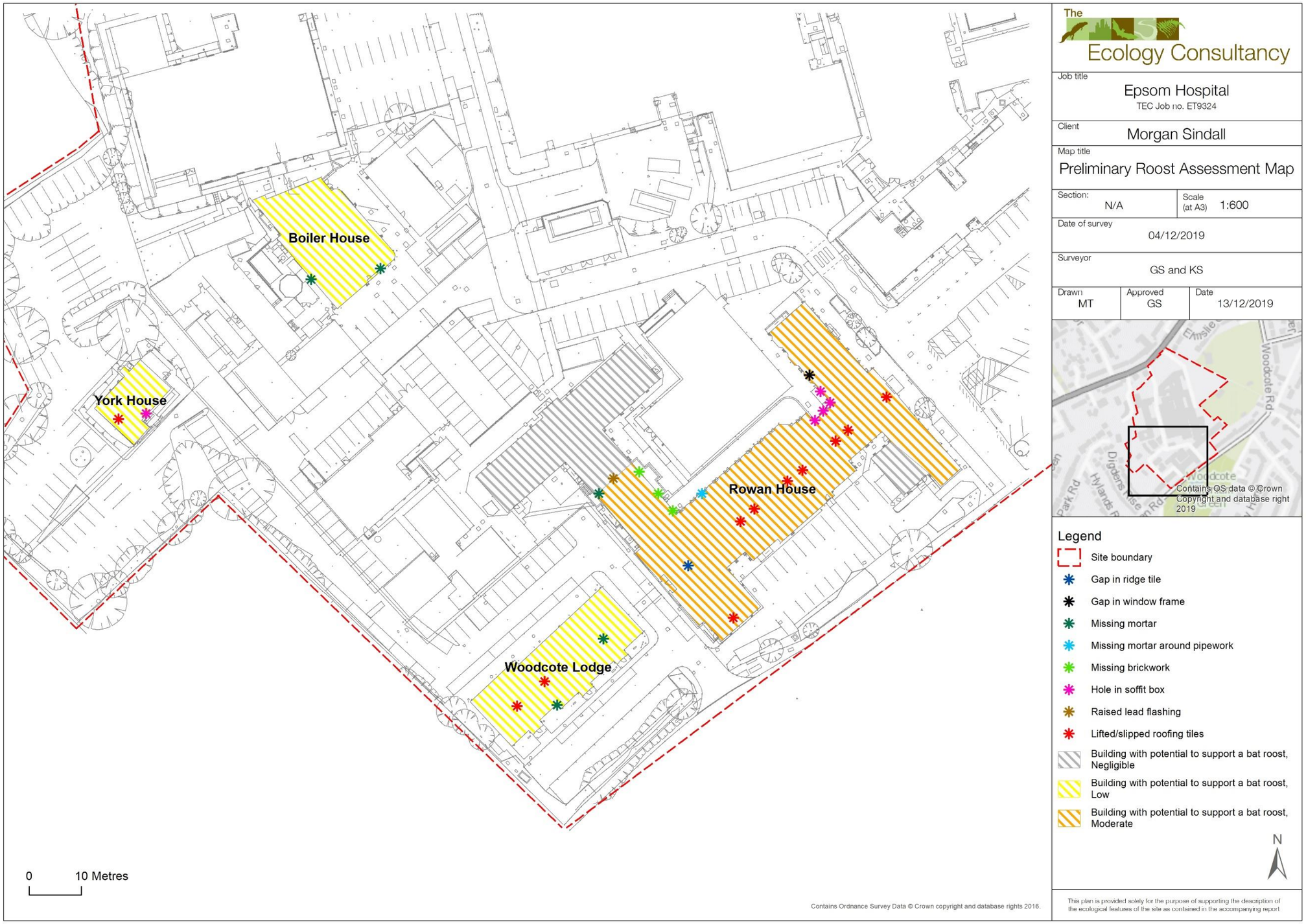
Jones, J. (2000) *Impact of lighting on bats*. Bat Conservation Trust, London. http://www.bats.org.uk/downloads/Helpline/lighting.pdf

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

Morgan Sindall (2019) *Construction Environment Plan: Guild Living Epsom*

Appendix 1: Map of Survey Results

Figure 1: Building Inspection Plan



The Ecology Consultancy

Job title: Epsom Hospital
TEC Job no. ET9324

Client: Morgan Sindall

Map title: Preliminary Roost Assessment Map

Section: N/A

Scale (at A3): 1:600

Date of survey: 04/12/2019

Surveyor: GS and KS

Drawn	Approved	Date
MT	GS	13/12/2019

Legend

- Site boundary
- Gap in ridge tile
- Gap in window frame
- Missing mortar
- Missing mortar around pipework
- Missing brickwork
- Hole in soffit box
- Raised lead flashing
- Lifted/slipped roofing tiles
- Building with potential to support a bat roost, Negligible
- Building with potential to support a bat roost, Low
- Building with potential to support a bat roost, Moderate

N

This plan is provided solely for the purpose of supporting the description of the ecological features of the site as contained in the accompanying report

Appendix 2: Photographs

Photograph 1
Rowan House, southern elevation

Photograph 2
Rowan house, northern elevation of main building section and western elevation of slate tiled section.

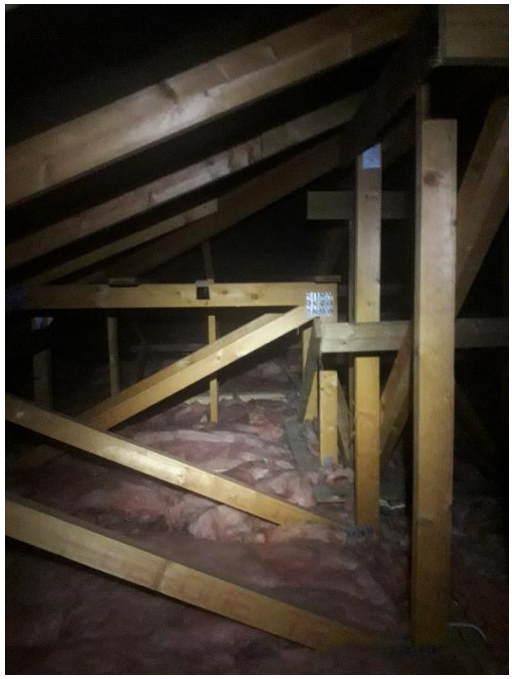
Photograph 3
Rowan house – internal view of one of the loft voids.

Photograph 4
Rowan House - PRF, missing mortar around pipework

Photograph 5
Rowan House: PRF – Missing mortar

Photograph 6
Rowan House: PRF – Hole in soffit box

Photograph 7
Woodcote Lodge - northern elevation



Photograph 8
Woodcote Lodge - internal view of one of the loft voids

Photograph 9
Woodcote Lodge – PRF: raised roofing tile

Photograph 10
York house - southern and eastern elevation.

Photograph 11
York house - internal view of loft void

Photograph 12
York house - PRF: missing roofing tile

Photograph 13
York house - northernelevation and mature Scots pine and standing dead wood tree (circled)

Photograph 14
Boiler house - Southern elevation

Photograph 15
Boiler house - internal view

Photograph 16
Boiler house – PRF: missing mortar.

Photograph 17
Boiler house – PRF: Gap leading into chimney cavity.
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Appendix 3: Legislation

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.

NATIONAL LEGISLATION AFFORDED TO BAT SPECIES

The objective of the EC Habitats Directive[6] 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 2010 (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.

Explanatory notes relating to all bat species protected under The Conservation of Habitats and Species Regulations 2017 are given below.

- 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.

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

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?

An EPSM 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[7].

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

Appendix 4: 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.

ASSESSMENT CRITERIA – GROUND LEVEL ROOST ASSESSMENT – TREES

All trees that may have a level of potential for a roost are assessed using the Cowan Scale (Cowan, 2006). The following values are assigned in considering the availability of suitable features for roosting bats:

- **0 – negligible potential** – No visible features that could be used by bats for roosting
- **1 – low potential** – One or two minor features, possible associated with feeding or night-time roosts, such as:

- sparse ivy *Hedera helix*;
- minor branch splits or fissures;
- small areas of loose bark;
- features less than ten years old.

- **2 – moderate potential** – Features that may provide a more secure site for individuals or small groups of bats, such as:
  - dense ivy;
  - significant branch splits;
  - small cavities such as woodpecker holes;
  - features present for between 10 and 30 years.
- **3 – high potential** – Features of particular significance, suitable for high priority roost such as maternity roosts and likely to be used by larger groups of bats, such as:
  - features that provide rare or uncommon conditions in the local area;
  - large cavities or extensive branch or trunk splits;
  - multiple features in the same tree;
  - features present for more than 30 years that could have been used by several generations of bats.
- **4 – confirmed roost** – Evidence indicating use by bats, such as:
  - droppings, carcasses, feeding remains;
  - bats heard ‘chattering’ inside on a warm day or at dusk;
  - bats seen roosting or observed flying from a feature.

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 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) which is summarised Appendix 5. Lighting should not illuminate any trees on-site, or suspected or confirmed bat roosting sites, including Building 7 to the south of the site which has a confirmed bat roost. Disturbance from works vehicles etc should also be minimised around Building 7, to avoid disturbance to any roosting bats that may be present.

Planting for wildlife - foraging and commuting habitats for bats

It is acknowledged that using native species in planting schemes attract insects and provide a potential food source for bats (BCT, 2009). Landscaping proposals should seek to enhance the value of the site for foraging and commuting bats by including such species.

Shrubs and herbaceous perennials should comprise night scented plants and those that flower such as honeysuckle, night scented stock, evening primrose and Nottingham catchfly to attract moths and other night flying insects which in turn provide a valuable food source for bats on site. A lists of plants of value to bats can be found at https://www.rhs.org.uk/advice/pdfs/plants-for-bats.pdf and at http://www.suffolkwildlifetrust.org/attracting-bats.

Provision of roosting bat opportunities

Bat boxes (at least two) should be installed on site post development to provide additional roosting opportunities for bats in the area. The boxes should be installed at least 4m off the ground on either buildings or trees, away from artificial lighting and facing south-east to south-west. Woodcrete boxes such as those manufactured by Schwegler Ltd, are recommended as they include a broad range of designs, are long lasting compared to wooden boxes and insulate occupants from extremes of temperature and condensation.

The Ecology Consultancy

The Ecology Consultancy is part of the Temple Group.

Making places better for people and wildlife

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- **North -** Trinity Walk, Unit G37b, Market Walk, Wakefield, West Yorkshire WF1 1QR **T.** 01924 683558

Appendix D

Tree Structural Integrity Report

BY APPOINTMENT
TO HER MAJESTY THE QUEEN
TREE SURGEONS
F.A. BARTLETT TREE EXPERTS CO. LTD.

Bartlett Consulting

TREE STRUCTURAL INTEGRITY REPORT

Our Ref: BH/190480/R/sh

Your Ref: N/A

Date: 5th December 2019

CLIENT:	Senior Living Urban (Epsom) Ltd C/O Cast Real Estate & Construction Consultancy Black Bull Yard 24-28 Hatton Wall London EC1 8JH
SITE ADDRESS:	Epsom Hospital Dorking Road Epsom Surrey KT18 7EG
DATE & TIME OF VISIT:	4th December 2019 -12:00pm
PEOPLE PRESENT:	Mr Bruce Hauxwell (Bartlett Consulting) Mr Gareth Davies (Bartlett Consulting)
REPORT COMPLETED BY:	Mr Bruce Hauxwell

Summary:

In reading and understanding the contents of this report, it should be remembered that no tree can be deemed risk free. As with all things in the natural environment, they are subject to unpredictable forces such as extreme weather, effects of disease, and man's influence upon them. In reaching a conclusion as to a level of risk the tree poses, we investigate every obvious and available facet of the structure of the tree and its surroundings.

Where applicable, these conclusions and recommendations seek to reduce the risk to a level as low as reasonably practical, given the location of the tree, the site use, the owners' acceptance of the level of risk, and the perception of the tree's value to the environment.

Table of Contents

1.0 SCOPE OF REPORT

1.1 Survey Brief

To carry out an advanced Level 3* inspection and risk assessment of T27 Hybrid Poplar (*Populus nigra Italica*) located within the grounds of Epsom Hospital. The commissioned Level 3 inspection consisted of an internal decay detection and structural integrity assessment with the use of the IML Resistance Micro-drill PD400.

To compile and collate all of the visual tree assessment survey and diagnostic information and data; to create a complete picture and understanding of the health and structural condition of the tree; to complete a qualified risk assessment and to make fully informed management recommendations, in accordance with current Arboricultural practice and tree health care techniques.

1.2 Background

The Hybrid Poplar T27 is included within a recent Survey Ref GD/190110 dated 31st May 2019 that will form part of development planning application and was subsequently assigned a Category of U – "a tree that has serious, irremediable, structural defect…" (BS: 5837 2012)

A recent Preliminary Ecological survey has identified T27 as having a High potential for bat roosting, and therefore a possible candidate for retention, bearing in mind The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000.

To establish whether the tree can be suitable retained for its ecological benefits, Bartlett Consulting have been commissioned to perform a Level 3 inspection within internal decay testing.

1.3 Report References

As a progressive company, we keep abreast of research data relating to Arboriculture. All observations, recommendations and works are based on current industry standard reference material and extensive FA Bartlett research findings, derived from the company's own facilities at the University of Reading in England as well as in Charlotte, North Carolina, in the USA. A selection of pertinent items is shown in Appendix 2.

Specific tree survey methodologies and references applied by Bartlett Consulting for this project include:

- Smiley, T, Fraedrich, B & Hendrickson, N. (2011) *Tree Risk Management*. Bartlett Tree Research Laboratories. Charlotte, NC.
- Dunstar, J.A, Smiley. T, Matheny. N, Lilly. S. (2013) *Tree Risk Assessment Manual.* International Society of Arboriculture. Champaign, IL.
- Lonsdale, D. (1999) *The Principles of Tree Hazard Assessment & Management (Research for Amenity Trees)* Department of the Environment. London.
- Mattheck, C, Breloer, H. (1994) *The Body Language of Trees (Research for Amenity Trees)* Department of the Environment, London.
- Mattheck, C, Bethge K, Weber K. (2015) *The Body Language of Trees – Encyclopedia of Visual Tree Assessment* Karlsruhe Institute of Technology Campus North.

1.0 SCOPE OF REPORT (continued…)

1.4 Report Limitations & Methodologies

This report is restricted to the Hybrid Poplar tree (T27) detailed in the Survey Brief above. The statements, findings and recommendations made within the report do not take into account any effects of extreme climate and weather incidences, vandalism, changes in the natural and/or built environment around the trees after the date of this report or any damage whether physical, chemical or otherwise.

Bartlett Consulting and Bartlett Tree Experts cannot accept any liability in connection with the above factors nor where recommended tree management is not carried out in accordance with modern tree health care techniques, within the timelines proposed and specification provided.

1.5 Assessment of Ecological Status of Tree & Potential Constraints

Following the site visit and tree survey and assessment, we have been informed that there is a HIGH potential for wildlife and ecological associations with the tree subject to this report. Ecological associations are considered to be bats, feeding birds and invertebrates.

The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000, provides statutory protection to birds, bats, insects and other species that inhabit trees, hedgerows, or other associated vegetation. It is the recommendation of Bartlett Consulting that professional, detailed, advice from an ecologist is sought (if not done-so already) to confirm the consideration of Bartlett Consulting and to check if any such constraints apply to this site and its development proposals.

All trees must be thoroughly and properly assessed prior to the commencement of any recommended tree works.

*** Levels of Tree Assessment**

Level 1 Limited Visual Assessment: A visual assessment of an individual tree or a population of trees near a specified target, conducted from a specific perspective, in order to identify certain obvious defects or specified conditions. Observations are made from ground level and the tree is not climbed.

Level 2 Basic Assessment: A detailed visual inspection and assessment of a tree and the surrounding site. The basic assessment requires the tree risk assessor to walk completely around the tree. Tree dimensions are recorded using hand tools such as a diameter tape, laser range finder and measuring tape. Further information is gathered using a "sounding hammer", binoculars and other tools such as a depth probe.

Level 3 Advanced Assessment: An advanced assessment is performed to provide detailed information about specific tree parts, defects, targets, or site conditions. Methods of advanced assessment can include climbing inspections, decay detection, root excavations, lean monitoring and pull tests.

It is important to understand that as trees are living and dynamic organisms, it is not possible to maintain them free of risk. Some level of risk must be accepted in order to experience the full range of benefits that trees provide. As such, we reference the recently published document by the National Tree Safety Group (NTSG), Common Sense Risk Management of Trees (Forestry Commission 2011). This document provides guidance on trees and public safety in the UK for owners', managers and advisors.

2.0 TREE PRESERVATION ORDER & CONSERVATION AREA PROTECTION STATUS

The Town & Country Planning Act (Tree Preservation) (England) Regulations 2012 and the Town & Country Planning Act 1990 (as amended) provides legislative protection for trees within England.

An enquiry was conducted by Bartlett Consulting on 5th December 2019 through the Epsom and Ewell Borough Council interactive mapping website http://myeebc.epsom-ewell.gov.uk/myeebc2.aspx

2.1 Tree Preservation Order (TPO) Status

The tree is not subject to any tree preservation orders.

2.2 Conservation Area (CA) Status

The tree is not located within any designated conservation areas.

2.3 Tree Management Implications

Please note that the removal of dead trees and the pruning of dead wood from living trees are permitted and "excepted" works under the 2012 Regulation listed above. These works can be undertaken only after 5 working days' notice has been given to the local planning authority.

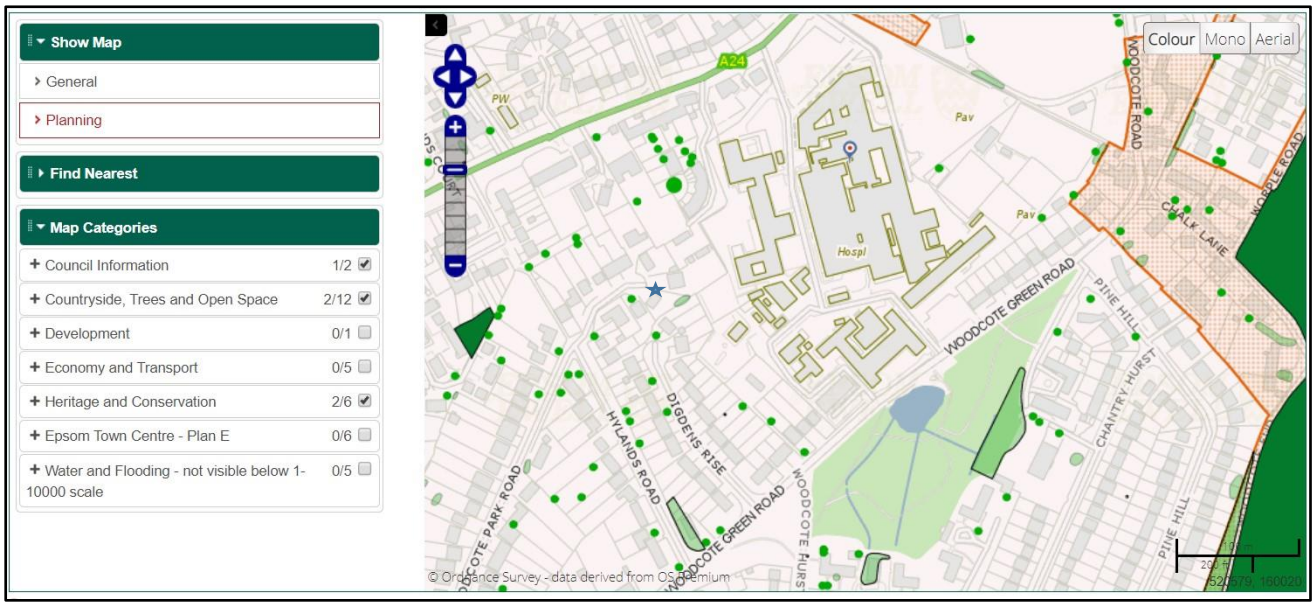


Figure 1: Screen-Shot from Epsom and Ewell Borough Council Interactive Mapping Service

3.0 TREE & SITE DETAILS

Species	Hybrid Poplar (*Populus Nigra Italica*)
Stem Diameter at 1.5m	825 millimetres
Age	(60 years ±10 years)
Tree Height	10.0 metres
Crown Spread	1.0 metre (N) / 1.0 metre (E) / 1.0 metre (S) / 1.0 metre (W)
Vitality	≤50% deadwood throughout crown at 400 millimetres diameter
Location	Abutting parking area, 1m east of neighbouring fence/garden
Targets	1 – People: 1 x tree height (west) (frequent occupancy) 2 – Cars: 1 x tree height (east) (constant occupancy) 3 – Private Residential Gardens: 1 x height (west) (occasional)
Observations	· Limited root space to north and east – tarmac parking area. · Extensive buttress formation with hollow tones throughout when sounded. · Cavity at base to west, greater than 400mm probe depth. · Decay to south at ground level, decay to east at ground level. · Slight movement at base when pressure applied to stem. · Hollow tones to entire stem to 2.0 metres height. · Included bark seams and fluting of stem. · Crack/cavity in stem from 3.0 metres above ground level to decayed top of central leader at 5.0 metres. · Historic topping cuts at 5.0 metres with extensive decay present in central leader. · Dead branch at 3.0 metres to west > 15 centimetres diameter. · 6.0 metres of epicormic regrowth poorly attached to areas of decay.

Figure 2: Image of Hybrid Poplar (T27) Tree as viewed from the southeast

4.0 TESTING USING A RESISTANCE MICRO-DRILL MACHINE

A Resistance Micro-drill is used to establish the internal structural integrity of an individual tree or tree parts. The device drills a micro needle with a bit diameter of 3.0 millimetres at a constant speed, and measures both the drilling resistance and feed speed, to a nominal depth of 40 centimetres within the stem or branch. The sawdust remains in the bore hole and thus closes the drilling tunnel.

The resistance of the wood to the drill is provided on a graphic print-out with the "feed curve" and timber density shown in blue, and the "drill curve" and shaft friction shown in green along the y-axis of the graph line. The depth of the drill is shown along the x-axis of the graph line. Both are shown at a scale of 1:1. The graph translates as information on the internal structure of the wood tested, indicating the levels of decay, unseen voids or cracks, and types of wood decay, as well as providing significant information about the material properties and thickness of the residual wall of sound-wood around the stem or branch.

4.1 Micro-drill Testing Locations

A total of 4 tests were conducted on the main stem 150 mm above ground level The tests were positioned at the major buttressing (northwest-southeast, northeast-southwest, southeast-northwest, southwest-northeast). A control was taken at 2.0m above ground level positioned within the eastern quadrant of the stem.

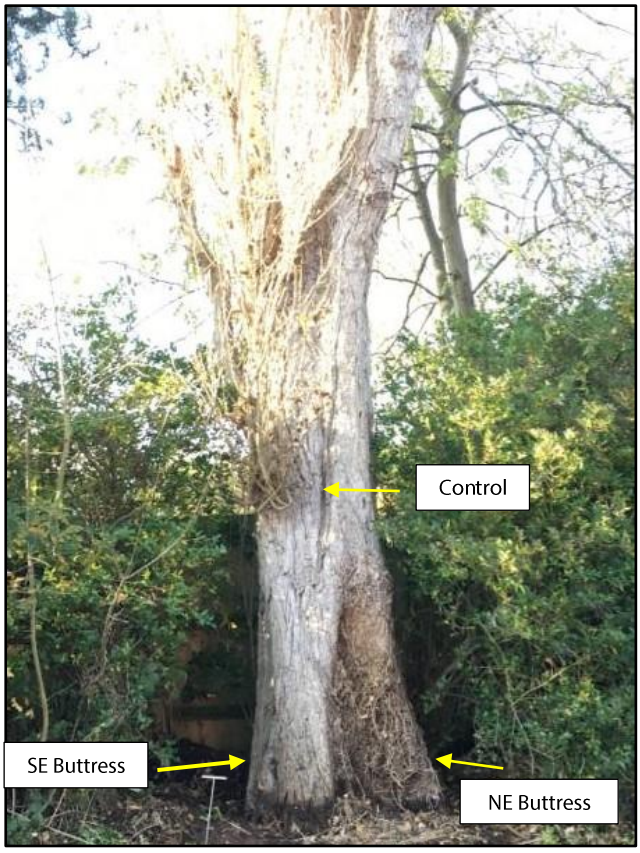
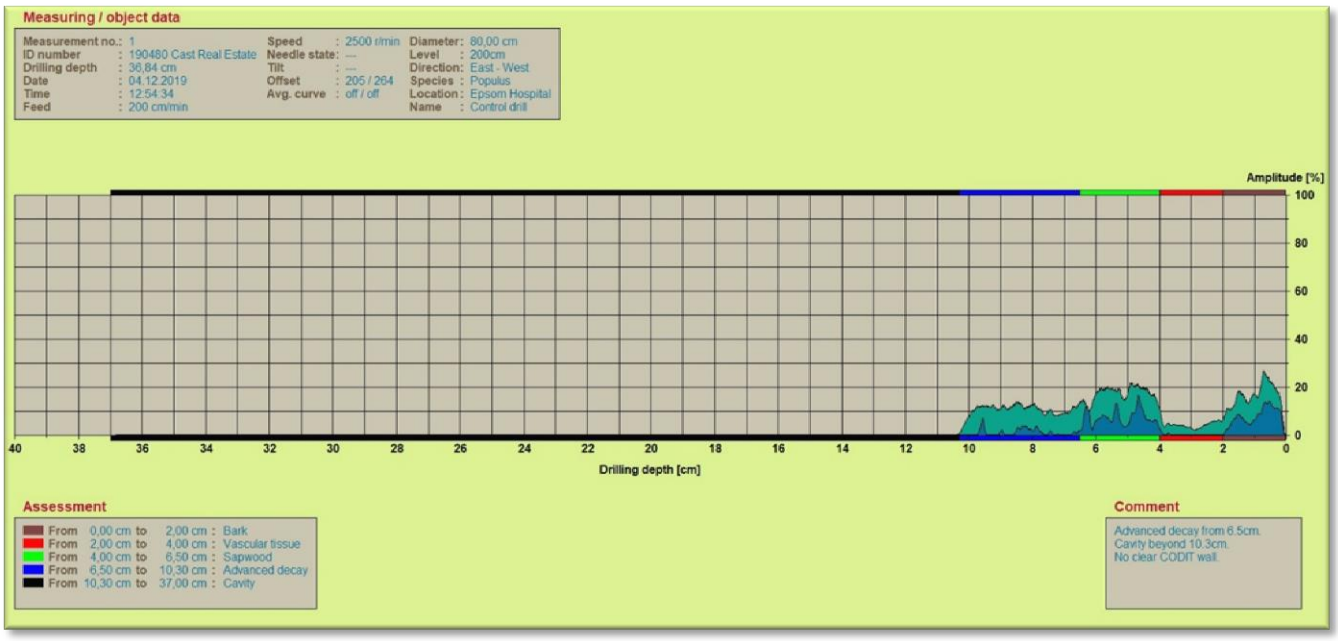


Figure 3: Image showing Resistance Micro-drill testing locations on Hybrid poplar (T27) as viewed from EAST

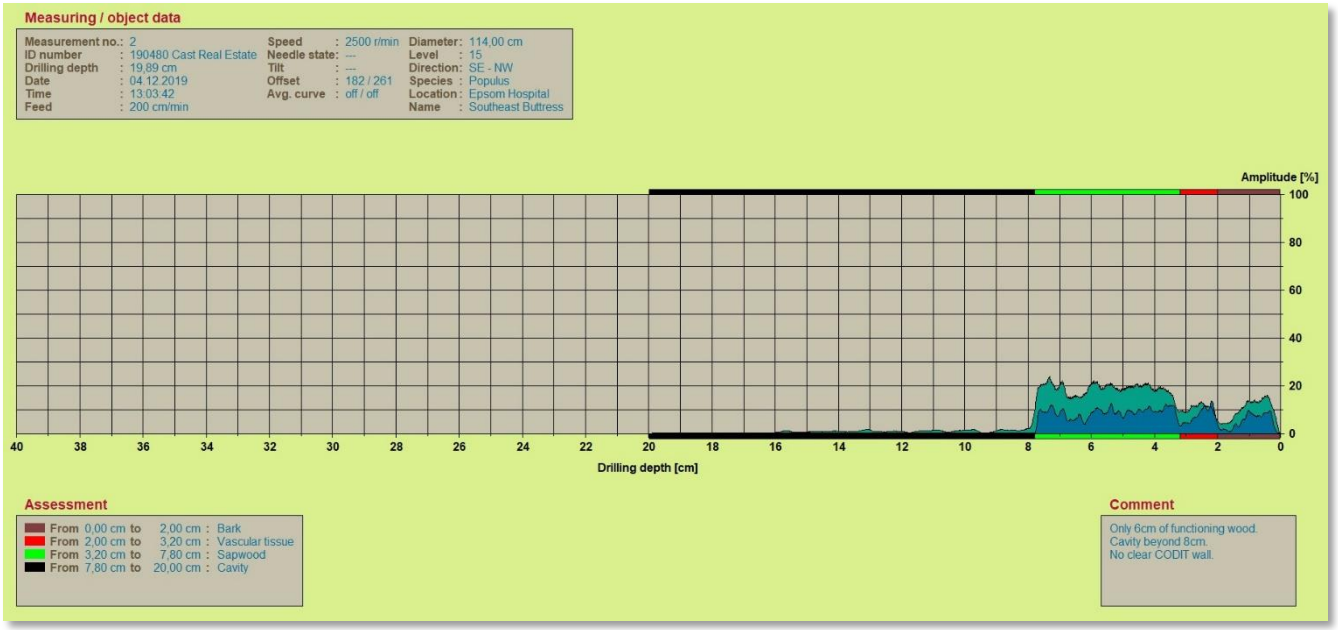
4.0 TESTING USING A RESISTANCE MICRO-DRILL (continued…)

4.2 Resistance Micro-Drill Control 2.0m East



4.3 Resistance Micro-drill Test Results

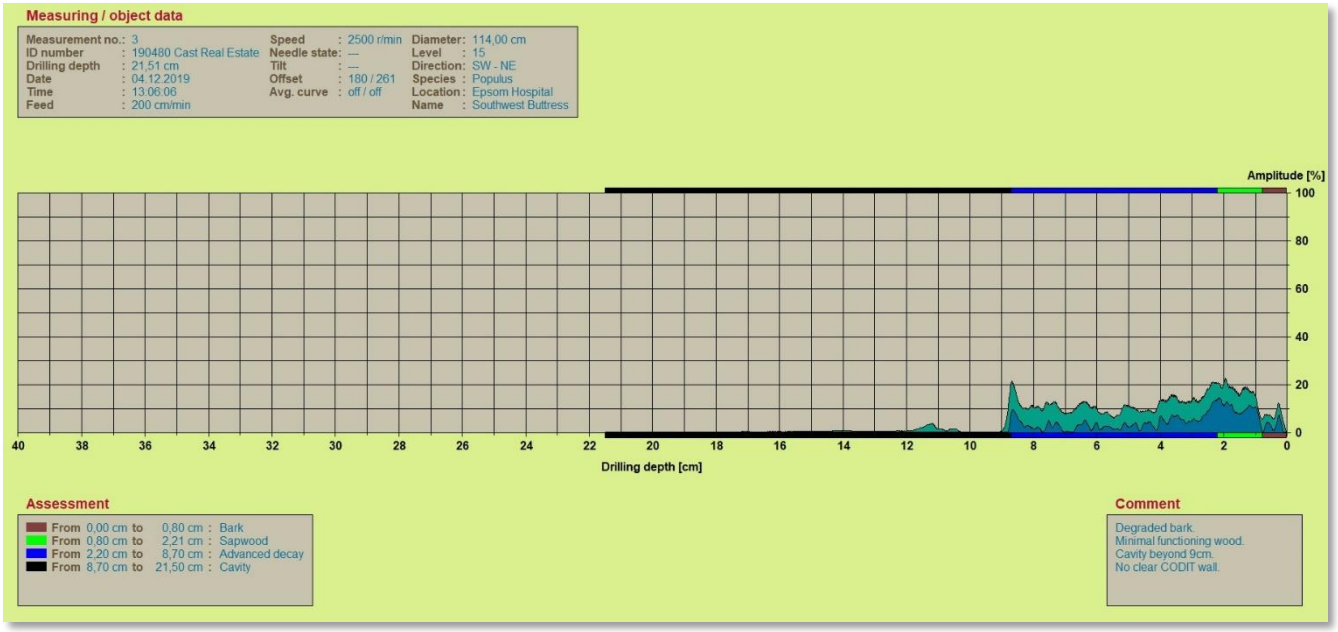
· Test 1: 150 mm height South-Eastern Buttress



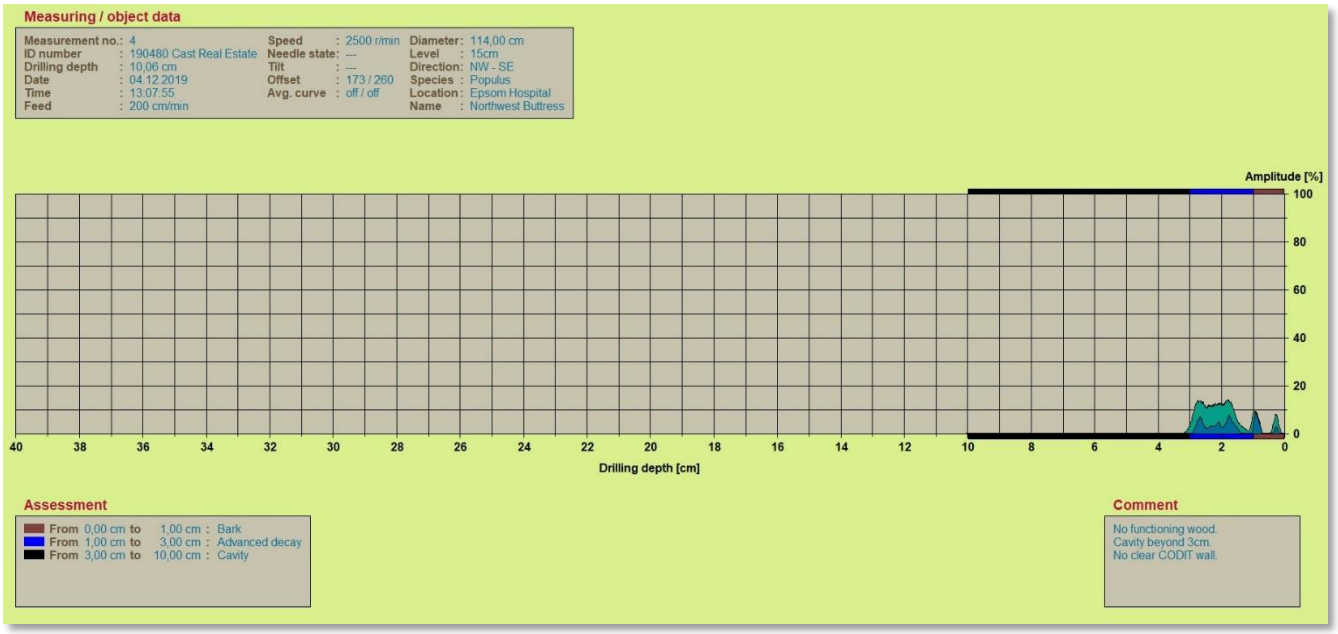
4.0 TESTING USING A RESISTANCE MICRO-DRILL (continued…)

4.3 Resistance Micro-Drill Test Results (continued…)

Test 2: 150 mm Height South Western Buttress



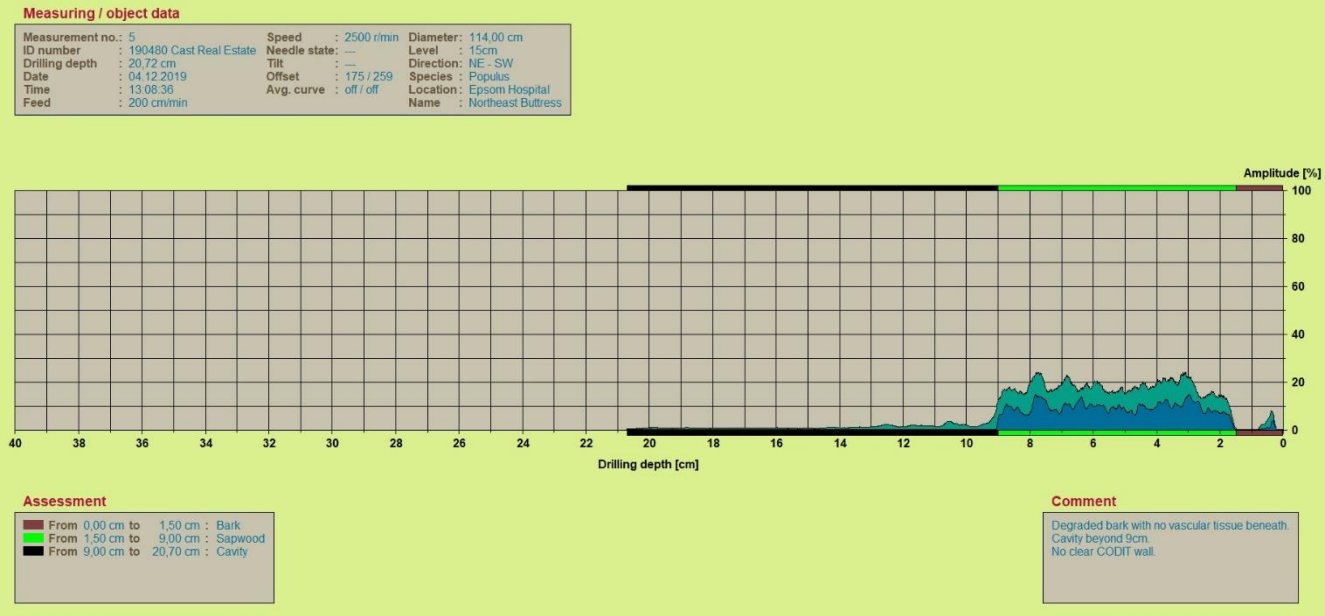
Test 3: 150 mm Height North Western Buttress



4.0 TESTING USING A RESISTANCE MICRO-DRILL (continued…)

4.2 Resistance Micro-Drill Test Results (continued…)

Test 4: 150 mm Height North Eastern Buttress



4.0 TESTING USING A RESISTANCE MICRO-DRILL (continued…)

4.3 Resistance Micro-Drill Results Interpretation

Whilst comparing the 4 test results taken around the base (150 mm above ground level), the Resistance Micro-drill (IML Resi PD400) shows that the general resistance through the zones of vascular tissue and sapwood is consistently poor.

All 4 tests showed extensive dysfunction, decay and ultimately a large cavity within the buttresses at the tested height, with insufficient sound wood supporting the tree.

The control at 2.0m to the eastern quadrant of the main stem also showed a similar extent of decay and a cavity.

Strength loss can be calculated using the t/R ratio, which is a failure criteria taking the ratio of the remaining thickness of the sound-wood against the external radius of the tree stem. The theory proposed by Mattheck & Breloer (1994) argues that when the remaining solid wood within the main stem of a tree, with a full crown, falls below a ratio of 0.3 then the tree is liable to increased risk of failure. However, it must be noted that this calculation is for trees with internal decay where the stem is still intact, the decay is centralised, and for trees with a full crown. The ratio can be reduced to t/R of 0.25 for trees with a reduced crown area and a centralised area of decay.

From the above test results it has been calculated that the residual wood measures an approximate average thickness of 725 millimetres at the 1140 millimetre test plane, with a corresponding t/R ratio of 0.12 which is fails to satisfy Mattheck's t/R ratio and failure criteria.

5.0 PHOTOGRAPHIC OVERVIEW

Figure 5: Image Showing Cavity at Western Base of the Stem

Figure 6: Image showing a Crack/Cavity on Main Stem as Viewed from the Northeast

Figure 7: Image Showing the Tree's Proximity to the Car Park

Figure 8: Image Showing the Area of Decay at the Base

6.0 DISCUSSIONS & CONCLUSION

The Hybrid Poplar is located in a very busy hospital carpark identified as having near constant use and within falling distance of parked cars. The tree is also within falling distance of the private residential gardens to the west.

The tree has undergone heavy previous pruning works resulting in its current height. These previous remedial works are likely to have been undertaken to manage risk as result of the tree's poor structural condition and location within a high target area.

The survey has revealed extensive decaying and desiccated wood at the base of the stem with some quadrant being identified as have no residual solid wood remaining. Some minor excavation at the base also identified significant decay and dissection below ground level. To establish whether the prominent buttress formation where providing sufficient support to maintain the stem further Internal testing was carried out with a Resistance Micro Drill. The drill testing disproved this theory identifying minimal residual wood to all points tested (t/R ratio 0.12).

Furthermore, when carrying out a control drill at 2.0 metres results confirmed that the significant decay has progressed to at least 2.0 metres vertically up the stem, and is very likely to extend throughout the remaining upper stem.

It is clear that the previous works to reduce weight has up till now been effective in preventing failure; however, we would advise that the tree's structure is now extremely de-graded to an extent that its structural integrity, even as a standing stem has become severely compromised.

Upon completion of the risk assessment, following the Level 3 investigations, the likelihood of failure has been categorised as 'Probable', whilst the likelihood of impacting the target is 'High'. The consequences of failure have been categorised as 'Significant' with the identified targets being parked cars.

The final risk rating is classified as **'HIGH'.**

Table 01: Schedule of Tree Works

Tree Reference	Specification of Works
Hybrid Poplar T27	Remove to ground level within 3 months

7.0 RISK ASSESSMENT

Bartlett Consulting uses the International Society of Arboriculture's (ISA) Tree Risk Assessment methodology, referred to as TRAQ. This is a 'qualitative' system which uses a matrix-based combination of ratings, to reach a conclusion of associated risk. The standard Bartlett Consulting time-line within the TRAQ system is three (03) years, unless otherwise stated within the report.

Risk is the combination of the 'likelihood' of an event: in this case the failure of a tree or part of a tree, and the severity of the potential consequences. A hazard is the likely source of harm. The two tables below define both the likelihood and risk levels as per the TRAQ system.

Table 02: Likelihood of Failure

Classification	**Description of Likelihood** (As per Dunster, Smiley, Matheny, Lilly 2013)
Improbable	Failure is not likely during normal weather conditions and may not fail during severe weather conditions, within the specified time frame of three years.
Possible	Failure could occur but is unlikely during normal weather conditions, within the specified time frame of three years.
Probable	Failure may be expected under normal weather conditions, within the specified time frame.
Imminent	Failure has started or is most likely to occur in the near future, even if there is no significant wind, weather, or increased load.

Table 03: Risk Rating

Risk Level	**Description of Risk** (As per Dunster, Smiley, Matheny, Lilly 2013)
Extreme Risk	Failure is imminent, with a high likelihood if impact on people and/or property, with severe consequences.
High Risk	Failure likely to very likely with significant consequences; or failure likely with severe consequences – to impact on people and/or property.
Moderate Risk	Failure likely to very likely with minor consequences; or failure somewhat likely with significant to severe consequences – to impact on people and/or property.
Low Risk	Failure unlikely with negligible consequences; or failure somewhat likely with minor consequences – to impact on people and/or property.
Tree Removal and Tree Surgery	Weakened crown anchor points or root system possible requiring full risk assessment by Arborist and Climber prior to tree works to determine appropriate working methods.

NOTE: Customer Must Make Tree Workers Aware of this Statement

CAUTION: Trees with structurally weak root systems, main stems or branches may not have sufficient structural strength to withstand dismantling works. The weight of people climbing the tree or using the tree branches as load carrying points may increase the load to the point of tree or branch failure. Persons engaged on such works must undertake a thorough risk assessment of the structure of the tree before finalising a working method. Alternative work methods to consider may include the use of crane or mobile elevated platform.

We trust that the contents and recommendations contained within this report were informative, easy to understand and helpful to you, with regards to managing your tree. Should you have any further questions or concerns, please do not hesitate to contact us again.

REPORT CLASSIFICATION: Tree Structural Integrity Report

REPORT STATUS: Draft

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SIGNATURE:  **DATE: 06/12/2019**

REPORT REVIEWED BY: Mr G Davies *FdSc Arb*
Arboricultural Consultant

SIGNATURE:  **DATE: 09/12/2019**