# ECOLOGICAL SURVEY

# 53 FITZROY PARK, HAMPSTEAD, LONDON

carried out by

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

commissioned by

## WOLFF ARCHITECTS

on behalf of

## SMARTER BUILDING & CONSTRUCTION LTD

## MAY 2015

# ECOLOGICAL SURVEY

# 53 FITZROY PARK, HAMPSTEAD, LONDON

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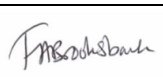
| Author | Frankie Brooksbank | |  | |
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# EXECUTIVE SUMMARY

- Clarkson and Woods Ltd. (formerly known as Michael Woods Associates) was commissioned by Wolff Architects on behalf of Smarter Building & Construction Ltd to carry out an ecological survey of a building and surrounding gardens at 53 Fitzroy Park in Hampstead, London.

- The aim of this report is to identify any planning constraints related to protected and/or notable species.

- The site comprised a derelict three storey residential property surrounded by a patio and associated garden. The garden comprised bare ground with ephemeral/short perennial vegetation. Several semi-mature trees were scattered across the site along with areas of scrub and tall ruderal vegetation.

- The development proposals are understood to comprise the construction of one residential property with associated parking and gardens.

- Trees to be retained should be protected from damage using tree protection fencing in accordance with BS5837: 2012.

- The site contained suitable foraging and commuting habitat for bats. A sensitive lighting strategy should be prepared and implemented as part of the development to avoid associated impacts on bats and other nocturnal wildlife.

- The site contained sub-optimal habitat for reptiles and amphibians. A precautionary approach should be adopted in the form of a two phased cut of vegetation within the site. Vegetation should then be maintained at ground level until site clearance activities commence.

- The site contained suitable features for nesting birds. Building demolition and vegetation clearance should either take place outside of the bird nesting season (i.e. outside March to August inclusive), or following an inspection by an experienced ecologist.

# 1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. (formerly known as Michael Woods Associates) was commissioned by Wolff Architects on behalf of Smarter Building & Construction Ltd to carry out an ecological survey of a building and surrounding gardens at 53 Fitzroy Park in Hampstead, London.

1.1.2 The survey was carried out on 5th August 2014 by an experienced ecologist, who is a graduate member of the Chartered Institute of Ecology and Environmental Management. At the time of survey, the weather conditions were cloudy and dry with a light breeze, and the air temperature was 22°C.

1.1.3 Unless the client indicates to the contrary, information on the presence of species will be passed to the county biological records centre in order to augment their records for the area.

1.1.4 The aim of this report is to identify any planning constraints related to protected and/or notable species and their habitats. This report also recommends appropriate mitigation, as well as ecological enhancements in order to maximise the value of the land for wildlife.

1.1.5 Planning permission was granted for development of a residential property within the site in 2012 (Application Ref: 2011/1682/P). This report has been prepared to inform a new planning application, with a revised layout and plans.

1.1.6 This report, originally issued in December 2014, was updated in May 2015 to include an additional tree, which will be felled under development proposals.

# 2 SITE DESCRIPTION

2.1.1 The site was located in Hampstead, London and situated within the footprint of 53 Fitzroy Park. The site comprised a derelict three storey residential development surrounded by an existing patio and associated garden. The garden comprised bare ground with ephemeral/short perennial vegetation. Several semi-mature trees were scattered across the site and there were areas of scrub and tall ruderal vegetation. Brash and rubble piles were identified within the eastern half of the site. The site is surrounded by housing associated with Hampstead and Highgate, with Hampstead Heath located approximately 100m southwest of the site boundary.

2.1.2 The development site is approximately 0.1 hectares (ha) in size, and the approximate centre of the site was at OS Grid Ref. TQ 277 869, as shown in Figures 1 and 2.

2.1.3 The proposals are understood to consist of the construction of one residential property with associated parking and gardens. The existing property will be demolished and five trees will be removed within the development proposals. The site plan (development proposals) is provided in Figure 3 below.


**Figure 1: Ordnance Survey Map Showing Location of the Site (OS Licence 100050456)**


**Figure 2: Aerial Photo of the Site (outlined in red)**

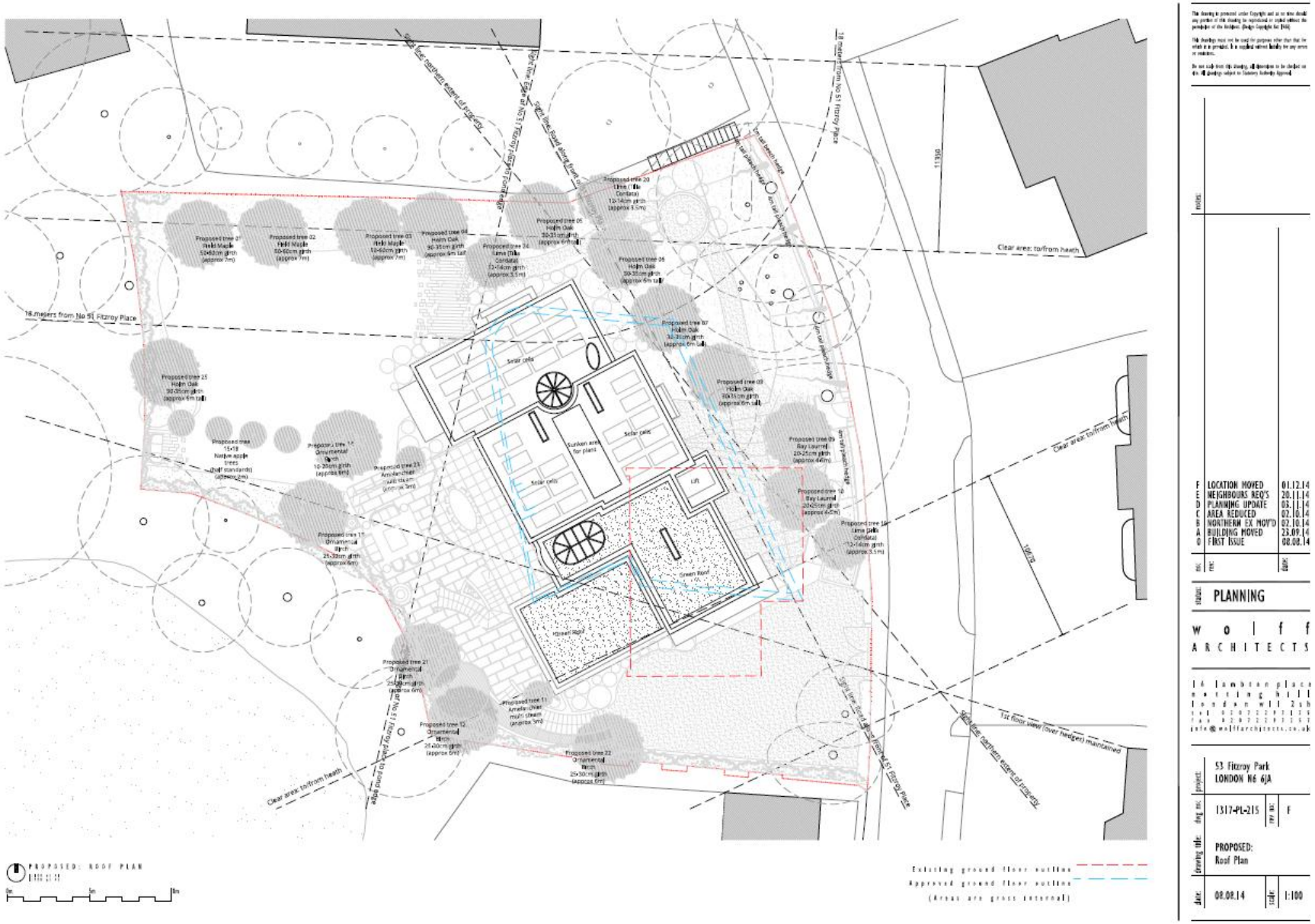



**Figure 3: Roof Plan. No 1317-PL-215 Rev F. Wolff Architects (08.08.14)**

# 3 SURVEY AND ASSESSMENT METHODOLOGY

## 3.1 Data Search

3.1.1 Statutory designated sites within proximity of the site were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).

3.1.2 The Greenspace Information for Greater London records centre (GiGL) was consulted for records of protected and notable species within 1km of the site. The records centre was also asked to provide details of locally designated sites within 1km of the site.

3.1.3 Ordnance Survey maps (1:25,000) and aerial images of the site were examined online (bing.com/maps and maps.google.co.uk).

3.1.4 The Local Development Framework documents for Camden (Camden Development Policies 2010-2025 and Camden Core Strategy 2010-2025) were consulted for details of planning policies relevant to designated sites, protected species and habitats, and general ecological and environmental protection.

## 3.2 Field Survey

***Personnel***

3.2.1 The field survey was undertaken by Frankie Brooksbank, GradCIEEM. Frankie has 2 years' experience undertaking ecological surveys and has a BSc and MSc in relevant subjects. Frankie has been assessed under the MWA QA processes as competent to complete the survey.

***Habitats***

3.2.2 A habitat survey was carried out on 5th August 2014, based on standard field methodology set out in the *Handbook for Phase 1 Habitat Survey* (2003 edition)[1].

3.2.3 The hedgerows were surveyed for their native species-richness. Particular attention was paid to the status of each hedgerow with regards to the Hedgerow Regulations (1997).

3.2.4 Botanical names follow Stace (1997)[2] for higher plants and Edwards (1999)[3] for bryophytes.

3.2.5 Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (Table 1) are used to describe habitats not readily conforming to recognised types and evidence of or potential for protected species and species of conservation concern.

[1] Nature Conservancy Council. (1990 - 2003 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee
[2] Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press
[3] Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff

### 3.3 Protected and Notable Species

3.3.1 Details of the legislative protection afforded to those protected species which have been identified as occurring or potentially occurring on the site are detailed in Appendix A.

***Badgers***

3.3.2 A search was made for badger *Meles meles* setts, and any sett entrances found were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying. Main setts are typically large structures which constitute the principal shelter and breeding location for a single social group. Subsidiary setts are significant setts which receive regular or sporadic usage but are not the focal sett for a social group. Annexe setts are smaller structures closely associated with Main setts but are not connected by underground tunnels. Outlying setts are located away from other setts and usually comprise no more than two, infrequently used sett entrances.

3.3.3 Any sett entrances present were counted and mapped to record tunnel direction and their relative level of usage according to the categories well used, partially used and disused. Well used entrances show signs of having been used regularly or probably within the preceding 48hrs; partially used entrances may contain debris in the entrance indicating a lack of recent activity, but the tunnel and entranceway could be easily be cleared and brought back in to use, while disused entrances are largely or completely blocked and have not been in use for at least the previous year.

3.3.4 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped where present within the site.

***Bats***

3.3.5 The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust[4].

3.3.6 *Buildings:* the exteriors of the building were examined through the use of ladders, torches and binoculars for features capable of supporting roosting bats or allowing bats entry into potentially suitable roosting spaces beyond. Additional factors taken into consideration included the potential for noise disturbance to the potential roost feature, exposure to the elements, lighting levels, proximity/connectivity of vegetation and water and whether these features/apertures led on to cavities further into the structure.

3.3.7 Internally, all accessible roof voids and accessible parts of the building were entered where safe and possible to do so in order to describe their characteristics and to look for potential roosting locations. A 1 million candle-power torch was used where necessary. Any signs of occupation

[4] Hundt. L. (2012) *Bat Surveys: Good Practice Guidelines, 2nd Edition*. The Bat Conservation Trust, London.

including urine staining, prey remains, fur rubbing marks and droppings were noted where found. Droppings were compared against reference material to identify likely species, but DNA analysis may be undertaken in certain circumstances.

3.3.8 *Trees:* an inspection of trees on site was carried out from the ground, using binoculars, to record any signs of use of the tree by bat species. A ladder and powerful torch was used where necessary. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were inspected and recorded. Any signs of staining (from urine or fur rubbing) and scratch marks below potential access points were noted, and a search was made for droppings underneath these features.

3.3.9 *Habitat:* the habitats within the site were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

***Amphibians***

3.3.10 Ponds within 500m of the site were identified using Ordnance Survey maps and aerial imagery, and were assessed during the field survey for their suitability to support amphibian species where access was possible.

3.3.11 Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the methodology described by Oldham et al[5]. HSI scores give a relative indication of the likelihood that a water body would support breeding great crested newts *Triturus cristatus*. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.

3.3.12 Terrestrial habitats were also assessed for their suitability for foraging and sheltering amphibians. Amphibians require habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

***Reptiles***

3.3.13 Features on site were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

[5] Oldham. R.S., Keeble L., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.

***Birds***

3.3.14 Any buildings and vegetation were surveyed for signs of use by nesting birds and any birds seen or heard during the survey were noted. The site's potential to support bird species of particular conservation concern (i.e. Schedule 1, NERC S41 and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the site, the context of the site in the wider landscape and the results of the desk study.

***Dormice***

3.3.15 Any hedgerows, scrub and woodlands were assessed during the walkover for their suitability to support dormice *Muscardinus avellanarius*. Particular consideration was paid to the abundance of food sources within them, density for nesting and overnight shelter and the strength of connectivity to other suitable habitats leading off site. In addition, any direct sightings, nests or feeding signs observed during the site visit were also recorded. Where hazel *Corylus avellana* was recorded on site, a search for gnawed hazelnuts was conducted.

***Invasive Species***

3.3.16 Invasive species, such as Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* were searched for and recorded.

***Other Notable Species and Species of Conservation Concern***

3.3.17 Field signs indicating the presence of other species of conservation concern, such as European hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act (2006)) were recorded. Habitats were also assessed for their potential to support such species.

## 3.4 Quality Assurance

3.4.1 All ecologists employed by Clarkson and Woods are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct[6] when undertaking ecological work.

3.4.2 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS)[7].

3.4.3 This report has been prepared in accordance with the relevant British Standard: *BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*[8].

[6] CIEEM (2013). *Code of Professional Conduct*. www.cieem.net/professional-conduct.
[7] CIEEM (2013). *Competencies for Species Survey (CSS)*. www.cieem.net/competencies-for-species-survey-css-
[8] The British Standards Institution (2013). *BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*. BSI Standards Ltd.

### 3.5 Ecological Evaluation

3.5.1 The evaluation of ecological value builds upon the criteria provided within the CIEEM guidelines for Ecological Impact Assessment (2006)[9] and the Criteria for Nature Conservation Evaluation described by Ratcliffe (1977)[10]. These criteria are described further in Appendix B. With due consideration to the evaluation criteria ecological receptor value is then classified on a scale between 'International' and 'Site' value with an additional Negligible category included for those features which are of no intrinsic ecological value. Where further information is required to determine the true value of a species or habitat present the value of the receptor is marked as 'unknown'.

[9] IEEM (2006). Guidelines for Ecological Impact Assessment in the United Kingdom. www.cieem.net
[10] Ratcliffe, D.A. (1977). *A Nature Conservation Review*, Cambridge University Press

# 4 SURVEY LIMITATIONS

## 4.1 Desk Study

4.1.1 The data presented within the report should not be seen as exhaustive. Data obtained from within the search area is highly unlikely to constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed development site that have not been identified within the desk study.

4.1.2 The data presented within the desk study section of this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods should be contacted.

## 4.2 Badgers

4.2.1 Areas with dense ground cover (hedges, scrub, woodland etc.) were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

## 4.3 Bats

4.3.1 Bats are very small creatures, capable of accessing small spaces and it is possible that these animals, or their signs, might have been missed during the survey if they are normally present opportunistically or in small numbers for a short period of time each year.

4.3.2 Not all features in trees or buildings suitable for use by bats are visible from the ground and there can be no external evidence of use of features by bats; consequently it is only possible to make a best effort when carrying out such a survey.

## 4.4 General

4.4.1 This survey offers only a single 'snapshot' of the site and takes no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.

4.4.2 If no action or development of this land takes place within twelve months of the date of this report, then the findings of this survey should be reviewed and may need to be updated. After three years the findings will be out of date and the full survey should be repeated.

# 5 RESULTS

## 5.1 Data Search – Designated Sites

***International Designations within 5km of the Site***

5.1.1 No internationally designated sites were identified within 5km of the site boundary.

***National Designations within 2km of the Site***

5.1.2 Hampstead Heath Woods Site of Special Scientific Importance (SSSI) is located approximately 350m west of the site at its closest point. Hampstead Heath Woods comprises North Wood and Ken Wood, which are both examples of long-established high forest woodlands with an exceptional structure comprising an abundance of old and over-mature trees providing dead wood habitat for a range of invertebrate species. This SSSI receives designation predominantly for the scare and rare species it supports, namely water horsetail *Equisetum fluviatile*, a species scarce in Greater London and the nationally rare jewel beetle *Agrilus pannonicus*.

***Local Designations within 1km of the Site***

5.1.3 The data search obtained from GiGL identified six Sites of Importance for Nature Conservation (SINCs) within 1km of the site boundary;

- Hampstead Heath SINC covers an area of approximately 317ha in size and is located 85m west from the site at its closest point. This site receives designation for the habitats and species it supports, most of which are rare in London, including both species mentioned above.
- Highgate Cemetery SINC comprises the paired Victorian cemeteries at Highgate and is located approximately 930m south east of the site boundary. This site receives designation for its blend of historic, cultural and wildlife attractions, which gives it a unique character, which includes the nationally scarce ivy broomrape *Orobanche hederae*.
- Waterlow Park SINC comprises the largest park Camden Council owns, with good wildlife habitats and a visitor centre. This site receives designation for the habitats and species it supports, including three spring-fed ponds and birds including nuthatch *Sitta europaea*, kestrel *Falco tinnunculus* and goldcrest *Regulus regulus*. This site is located 815m north east of the site boundary at its closest point.
- Highgate Golf Course SINC comprises a private golf course and is located approximately 1km north west of the site. This receives designation for the grassland within the site, which is of value to local wildlife.
- Holly Lodge Gardens SINC comprises two areas of parkland separated by a wide wooded avenue and is located 310m south east of the site. This site receives designation for the habitats it supports.

- Harrington Site SINC comprises a community horticulture project and adjacent sycamore wood and is located 950m north east of the site at its closest point. This site receives designation for providing the community with a valuable contact with nature, in addition to a small developing woodland.

### 5.2 Data Search – Protected and Notable Species

5.2.1 The following data was obtained from GiGL:

5.2.2 **Bats:** Nine bat species have been recorded within 1km of the site since 2000; namely serotine *Eptesicus serotinus*, Daubenton's *Myotis daubentonii*, Natterer's *Myotis nattereri*, Leisler's *Nyctalus leisleri*, Nathusius' pipistrelle *Pipistrellus nathusii*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared *Plecotus auritus*. Noctule *Nyctalus noctula* was most recently recorded 69m north of the site in 2009. All of the remaining species were most recently recorded 789m north west of the site between 2007 and 2012. No bat roost records were identified within the search area.

5.2.3 **Amphibians:** Common toad *Bufo bufo* and common frog *Rana temporaria* have both been recorded within 1km of the site, most recently 995m north of the site in 2008/09. Palmate newt *Lissotriton helveticus* was recorded 890m north of the site in 2007.

5.2.4 **Reptiles:** Common lizard *Zootoca vivipara* has been recorded within 1km only once since 2000; 161m north west of the site boundary in 2001.

5.2.5 **Other notable species:** European hedgehog has been recorded several times north of the site between 2001 and 2010. The nearest record was made in 2001, located 648m north of the site. Stag beetle *Lucanus cervus* is a priority species listed on the Camden Biodiversity Action Plan 2013-2018 and has been recorded as close as 286m west of the site in 2002.

5.2.6 **Birds:** Birds recorded within 1km of the site and are listed under the UK Biodiversity Action Plan[11], Species of Principal Importance (SPI)[12] or BTO Birds of Conservation Concern red/amber lists[13] can be found in Appendix C:

### 5.3 Planning Policy

5.3.1 The following policies have been identified within the Camden Local Development Framework documents "Camden Development Policies 2010-2025" and "Camden Core Strategy 2010-2025", which are considered relevant to the site.

[11] Species identified as being most threatened and requiring conservation under the UK Biodiversity Action Plan. UK BAP Species are not legally protected, however local governments are obliged to have due regard to the presence and conservation status of these species through the planning process and mitigation/enhancements for them may be recommended.
[12] Species of Principal Importance (SPI) are listed in Schedule 41 of the Natural Environment and Rural Communities (NERC) Act as requiring action under the UK Biodiversity Action Plan
[13] Red list species are those that are globally threatened, whose population or range has declined rapidly in recent years (i.e. >50% in 25 years), or which have declined historically and not recovered. Amber list species are those whose population or range has declined moderately in recent years (>25% but <50% in 25 years) declined historically but recovered recently, rare breeders (fewer than 300 pairs), internationally important populations in the UK, localised populations and those with an unfavourable conservation status in Europe.

***POLICY DP24 Securing High Quality Design***

***24.21: Responding to Natural Features***

*Development will not be permitted which fails to preserve or is likely to damage trees on a site which make a significant contribution to the character and amenity of an area. Where appropriate the Council will seek to ensure that developments make adequate provision for the planting and growth to maturity of large trees.*

***POLICY CS15 Protecting and improving our parks and open spaces and encouraging biodiversity***

*The Council will protect and improve Camden's parks and open spaces. We will:*

*a) Protect open spaces designated in the open space schedule as shown on the proposals map, including our Metropolitan Open Land, and other suitable land of 400sqm or more on large estates with the potential to be used as open space;*

*b) Tackle deficiencies and under-provision and meet increased demand for open space by:*
- *Providing additional open space at King's Cross;*
- *Securing additional on-site public open space in the growth areas of Euston, West Hampstead Interchange, Holborn and Tottenham Court Road, and other parts of Central London. Where the provision of on-site public open space is not practical on a particular site in these areas, the Council will require a contribution to the provision of additional public open space on identified sites in the vicinity. If it can be demonstrated to the Council's satisfaction that no such suitable sites are available, we will require improvements to other open spaces in the area;*
- *Securing improvements to publicly accessible open land on the Council's housing estates; and*
- *Securing other opportunities for additional public open space.*

*c) Secure from developments that create an additional demand for public open space, where opportunities arise, improvements to open spaces, including to:*
- *The facilities provided, such as play and sports facilities;*
- *Access arrangements; and*
- *The connection between spaces.*

*The Council will protect and improve sites of nature conservation and biodiversity, in particular habitats and biodiversity identified in the Camden and London Biodiversity Plans in the borough by:*

*a) Designating existing nature conservation sites;*

*b) Protecting other green areas with nature conservation value, including gardens, where possible;*

*c) Seeking to improve opportunities to experience nature, in particular in South and West Hampstead, Kentish Town and Central London, where such opportunities are lacking;*

*d) Expecting the provision of new or enhanced habitat, where possible, including through biodiverse green or brown roofs and green walls;*

e) *Identifying habitat corridors and securing biodiversity improvements along gaps in habitat corridors;*
f) *Working with The Royal Parks, the London Wildlife Trust, friends of parks groups and local nature conservation groups to protect and improve open spaces and nature conservation in Camden;*
g) *Protecting trees and promoting the provision of new trees and vegetation, including additional street trees.*

*The Council will preserve and enhance the historic, open space and nature conservation importance of Hampstead Heath and its surrounding area by:*

a) *Working with the City of London, English Heritage and Natural England to manage and improve the Heath and its surrounding areas;*
b) *Protecting the Metropolitan Open Land, public and private open space and the nature conservation designations of sites;*
c) *Seeking to extend the public open space when possible and appropriate;*
d) *Taking into account the impact on the Heath when considering relevant planning applications;*
e) *Protecting views from Hampstead Heath and views across the Heath and its surrounding area;*
f) *Improving the biodiversity of, and habitats in, Hampstead Heath and its surrounding area, where opportunities arise.*

*The Council will preserve and enhance the Regent's Canal by:*

a) *Balancing the differing demands on the Canal, its towpath and adjoining land;*
b) *Implementing opportunities to make the Canal a safer place;*
c) *Applying the guidance in the Regent's Canal Conservation Area Management Strategy;*
d) *Implementing opportunities to provide additional nature conservation areas and improve the role of the Canal and its adjoining land as a habitat corridor (green chain);*
e) *Working with British Waterways, Natural England, and other land owners/developers, users and the local community to improve the Canal and towpath.*

### 5.4 Data Search – Local Conservation Priorities

5.4.1 The following species and habitats are listed on the Camden Biodiversity Action Plan 2013-2018 that are or may be relevant to the site:

***Habitats***

- *Gardens*
- *Roadside verges*
- *Brownfield*

***Species***

- *Bats*
- *Hedgehogs*
- *Sparrows*
- *Bees*
- *Slow worm*
- *Stag beetles*

5.4.2 These habitats and species have been identified as local conservation priorities and therefore will be given appropriate additional weight within the site ecological evaluation.

## 5.5 Survey Results

***General Description***

5.5.1 The site comprised a derelict three storey house with a driveway and overgrown back garden. The back garden comprised bare ground and ephemeral/short perennial vegetation characteristic of a disused garden plot. An area of tall ruderal vegetation was noted in the north-west corner of the site and scrub was identified in the southern half of the site. A number of scattered trees and a wooden shed 2m x 1m were also present within the garden.

5.5.2 The surrounding landscape was characterised by housing and residential gardens associated with the town of Hampstead. The town of Highgate was located to the east and Hampstead Heath to the west of the site boundary.

5.5.3 The results of the ecological survey are included in map form on Figure 5 at the end of this Section. Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (Table 1) are used to describe habitats not readily conforming to recognised types and evidence of or potential for protected species and species of conservation concern.

## 5.6 Buildings

5.6.1 53 Fitzroy Park comprised a derelict house consisting of two storeys to the front and three storeys at the back, due to the change in ground level from the road. The building construction was brick-built with a probable cavity wall and timber cladding surrounding the third storey. No accessible loft voids were present and the building was flat roofed and lined with bitumen felt. This building will be demolished under the current proposals.

## 5.7 Habitats

***Ephemeral/Short Perennial Vegetation***

5.7.1 The majority of the site comprised bare ground with ephemeral/short perennial vegetation characteristic of a disused garden plot. Species present included herb-Robert *Geranium robertianum*, ivy *Hedera helix*, wood avens *Geum urbanum*, dock *Rumex* sp., thistle *Cirsium* sp., clover *Trifolium* sp., perennial rye-grass *Lolium perenne*, red fescue *Festuca rubra*, meadow

buttercup *Ranunculus acrsis*, sedge, hedgerow crane's-bill *Geranium pyrenaicum* and cut-leaved crane's-bill *Geranium dissectum*.

***Tall Ruderal Vegetation***

5.7.2 Tall ruderal species such as common nettle *Urtica dioica*, creeping thistle *Cirsium arvense,* rosebay willowherb *Epilobium angustifolium*, common ragwort *Senecio jacobaea*, dandelion *Taraxacum officinale* agg. and a species of fern were also present within north west corner of the site.

***Scrub***

5.7.3 An area of scrub was recorded along the southern boundary, which extended along the western boundary of the building. This was dominated by bramble *Rubus fruticosus* agg. with occasional common nettle, ivy and rose.

***Scattered Trees***

5.7.4 There were several trees scattered across the site, the majority of which were sycamore *Acer pseudoplatanus*, which lined the eastern boundary of the site and north of the building. Additional species included ash *Fraxinus excelsior*, wild cherry *Prunus avium* and lime *Tilia* sp.

**5.8 Protected Species and Species of Conservation Concern**

***Badgers***

5.8.1 No evidence of badger activity was identified within the site boundary. Habitat suitable for badgers was identified within Hampstead Heath to the west of the site. Scrub within the site was fully examined and no evidence of badgers was found. No setts were identified directly adjacent to the site during the survey. The clearance of the site to facilitate development does not represent a significant loss of potential foraging habitats for any badgers residing within in the vicinity of the site. Mitigation is therefore not considered necessary and badgers are not considered any further within this assessment.

***Bats: Building Inspection***

5.8.2 The wooden cladding surrounding the third storey of the building within the site was tightly sealed, with no potential for roosting bats. In addition, no access points were identified between the overhang of the roof and the wooden cladding.

5.8.3 A soffit box was present around the first storey of the building which was thoroughly inspected and found to be in a good state of repair. The paintwork surrounding the soffit box above the front door had been stripped back exposing what appeared to be a potential access point. However, upon further investigation with a ladder, this feature was not found to extend further than the external layer of paint.

5.8.4 An access point into the building was identified around the garage doors (Photograph 1) although no evidence of use by bats was noted (such as staining or droppings). It was noted that this access point was large and exposed to the elements and to light.

5.8.5 The building was relatively draughty and thermally unstable. Given the lack of access points surrounding the roof and the lack of any notable roof void that would provide opportunity for roosting bats the internal space of the building was considered unsuitable for roosting bats.

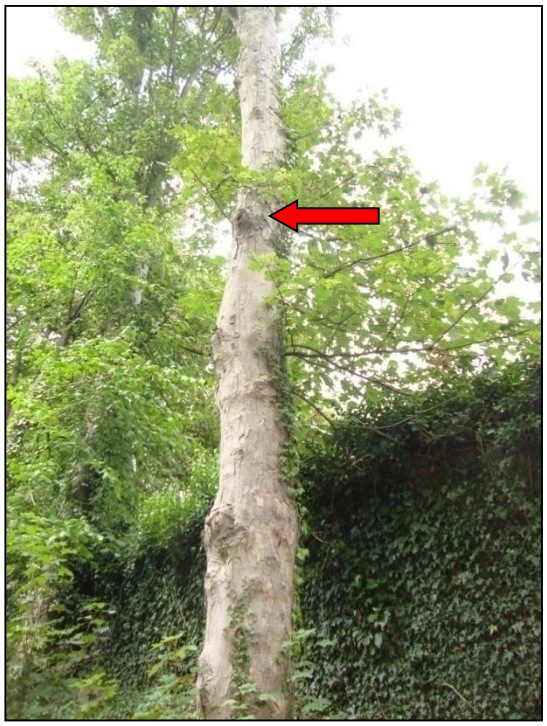
5.8.6 No evidence of bat activity (feeding remains) or bat droppings were identified anywhere inside the building. It was therefore concluded that the building did not support a bat roost and it was considered to offer negligible potential for roosting bats.

**Photograph 1: Gaps surrounding the garage doors**

***Bats: Habitat***

5.8.7 The trees provided suitable habitat for commuting and foraging bats. One of the semi-mature sycamore trees along the eastern boundary (Figure 5, Target Note 4) had a potential roosting feature in the form of a pruning scar with a small hole (Photograph 3). This feature was located on the western side of the trunk approximately 5m above ground level and was classified as Category 1 for its potential value for roosting bats according to Bat Conservation Trust guidance[14]. This sycamore tree will be retained under current proposals.

[14] Hundt L (2012) Bat Surveys: Good Practice Guidelines 2nd Edition



**Photograph 3: Sycamore tree with pruning scar**

***Dormice***

5.8.8 No signs of dormice were identified during the survey. No hedgerows were identified within the site and the trees and scrub provided poor dormouse habitat and did not comprise the structural diversity associated with suitable dormouse habitat. In addition, connectivity into the wider landscape was limited. Dormice are not considered further within this assessment.

***Amphibians***

5.8.9 Seven ponds were identified within 500m of the site, as shown in Figure 4. Ponds 1-5 are located within Hampstead Heath and separated from the site by a public footpath, fencing and gardens. These ponds are used commercially and comprise, in order, a Stock Pond, Kenwood Ladies' Bathing Pond, Bird Sanctuary Pond, Model Boating Pond and Highgate Men's Bathing Pond. Pond 6 was located in an adjacent managed garden and separated from the site by a wooden fence. Pond 7 was not accessed at the time of survey and comprised a garden pond separated from the site by a road and residential properties.

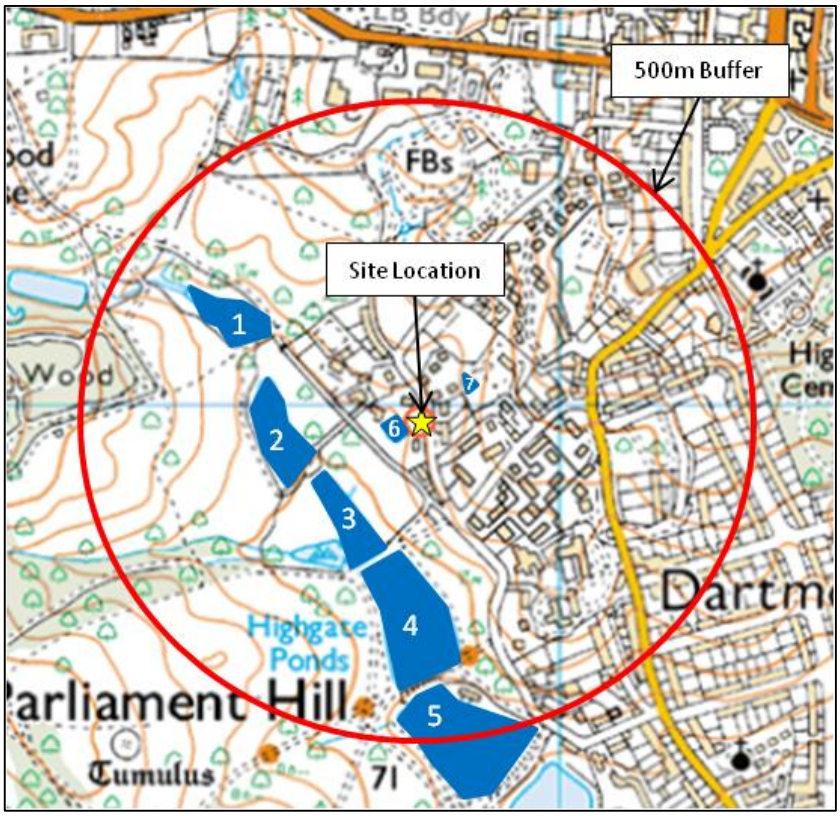



**Figure 4: Ponds Located within 500m of the Site**

5.8.10 The Habitat Suitability Index (HSI) methodology[15] was used to assess the suitability of Pond 6 for great crested newts. Although Ponds 2 and 3 were considered highly unlikely to be used by this species, a HSI assessment was also carried out for these water bodies. Ponds 2 and 3 were classed as having 'poor' suitability and Pond 6 was classed as having 'average' suitability. The HSI calculations are provided in Appendix D at the end of this document.

5.8.11 The scrub habitat provided suitable habitat for newts moving between hibernation and breeding sites during the terrestrial phase. However, the majority of the site comprised bare ground with ephemeral/short perennial vegetation, which was sub-optimal for foraging newts.

5.8.12 A robust desk study did not identify any great crested newt records within 1km of the site boundary. Low suitability of nearby ponds in combination with a lack of nearby records and the limited extent of the site itself suggests it is very unlikely great crested newts occur within the site. As such, this species is not considered further within this assessment.

5.8.13 More widespread amphibians such as common toad and common frog may be present within the scrub habitat around the site. The common toad is a Species of Principal Importance under the NERC Act 2006.

[15] Oldham RS, Keeble J, Swan MJS & Jeffcote M, (2000). *Evaluating the suitability of habitat for Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10(4), 143-155

***Reptiles***

5.8.14 The scrub, brash and rubble within the site provided sub-optimal habitat as hibernation sites/refuges for reptile species. The tall ruderal vegetation may provide suitable shelter for reptile species. A robust desk study identified a record of common lizard 161m north west of the site boundary in 2001.

***Birds***

5.8.15 It is likely that the area supports a number of breeding birds typical of urban garden habitats. The trees and patches of scrub represent suitable bird nesting habitat. Species recorded on site included carrion crow *Corvus corone*, wood pigeon *Columba palumbus* and starling *Sturnus vulgaris*.

***Invertebrates***

5.8.16 The trees and tall ruderal habitats within the site are likely to provide suitable habitat for a range of invertebrate species. It is likely that the remaining habitats within the site would support a fairly restricted range of common invertebrates. No invertebrate species of conservation concern were observed during the survey.

***Other Protected Species, Species of Conservation Concern and Invasive Species***

5.8.17 Although no signs were observed during the survey the site may support populations of hedgehog, with shelter provided within the scrub or beneath the wooden shed.

5.8.18 No invasive species were noted during the survey.

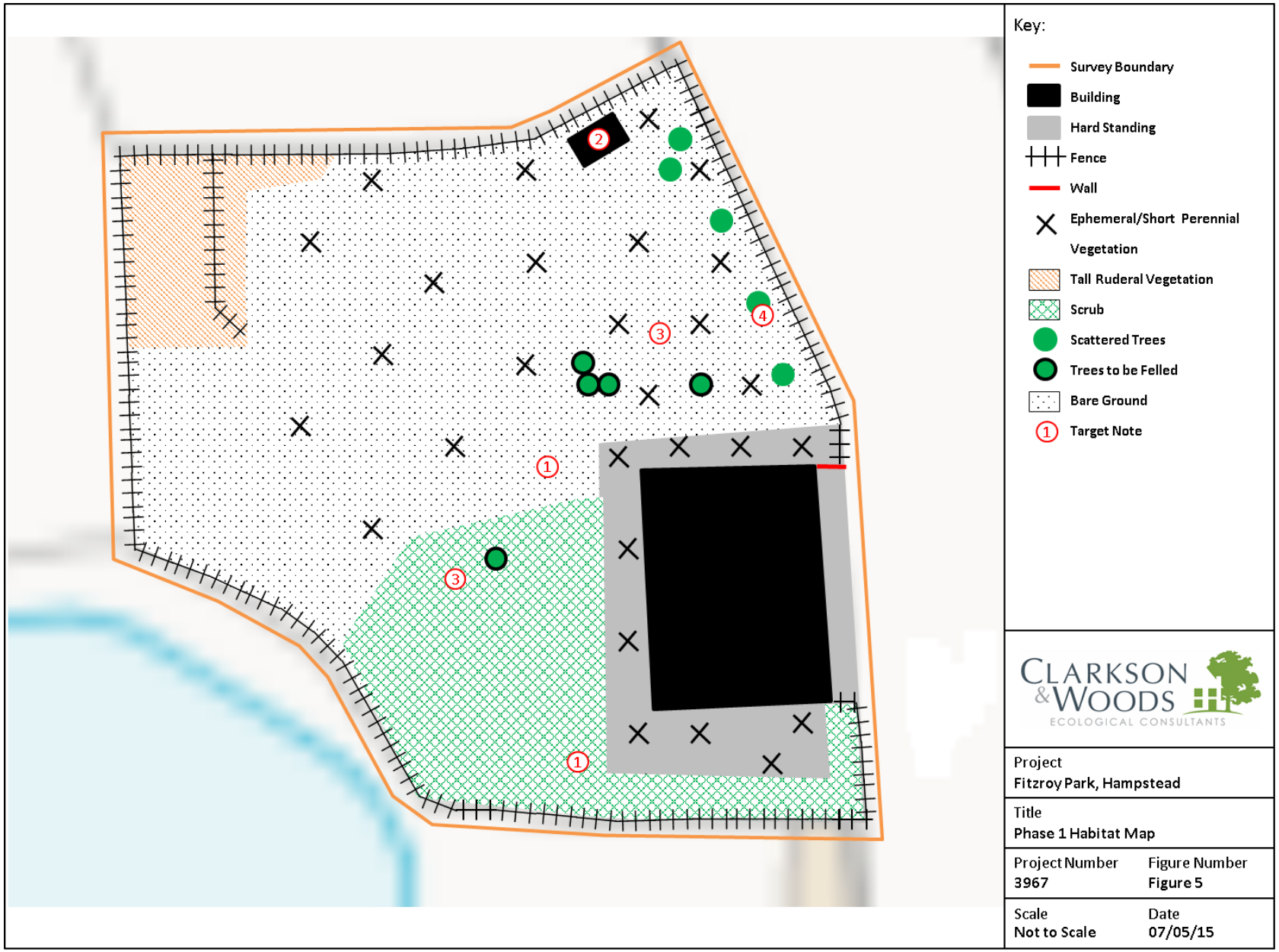

Key:
Survey Boundary
Building
Hard Standing
Fence
Wall
Ephemeral/Short Perennial Vegetation
Tall Ruderal Vegetation
Scrub
Scattered Trees
Trees to be Felled
Bare Ground
Target Note
1
2
3
4
CLARKSON & WOODS
ECOLOGICAL CONSULTANTS
Project
Fitzroy Park, Hampstead
Title
Phase 1 Habitat Map
Project Number
3967
Figure Number
Figure 5
Scale
Not to Scale
Date
07/05/15

**Table 1: Target Notes**

| No. | Description |
|---|---|
| 1 | Wood/brash pile providing sub-optimal hibernation/refuge potential for reptile and common amphibian species |
| 2 | Small wooden shed providing potentially suitable shelter beneath for hedgehogs |
| 3 | Small rubble piles providing sub-optimal hibernation/refuge potential for reptile and common amphibian species |
| 4 | Semi-mature sycamore tree classified as Category 1 suitability for roosting bat species |

# 6 ECOLOGICAL EVALUATION

6.1.1 This section provides an analysis of the value of ecological receptors (the designated sites, habitats and protected species) identified as actually or potentially occurring within or in proximity of the site. The valuation of the receptor reflects its legal protection, rarity and conservation status as well as its relative abundance on site and whether it is identified as a local or national conservation priority. Where appropriate the social and economic value of ecological receptors has also been considered.

**Table 2: Ecological Evaluation**

| Ecological Receptor | Description/Comments | Ecological Evaluation |
|---|---|---|
| **Designated Sites** | | |
| Hampstead Heath Woods SSSI | Long-established high forest woodlands with an abundance of old and over-mature trees | National |
| Hampstead Heath SINC | Open space comprising expanses of grassland and ancient woodland | District |
| Highgate Cemetery SINC | Victorian cemetery with historic, cultural and wildlife attractions | District |
| Waterlow Park SINC | A park run by Camden Council, with good wildlife habitats | District |
| Highgate Golf Course SINC | A private golf course with grassland of value to local wildlife | District |
| Holly Lodge Gardens SINC | Two areas of parkland separated by a wide wooded avenue | District |
| Harrington Site SINC | A community horticulture project and adjacent sycamore wood | District |
| **Habitats** | | |
| Ephemeral/short perennial vegetation | Limited species diversity but is likely to provide foraging and shelter opportunities to invertebrates and potentially species groups such as common amphibians and foraging birds/bats | Site |

| Ecological Receptor | Description/Comments | Ecological Evaluation |
|---|---|---|
| Tall ruderal vegetation | Limited in extent but provides diversity to the habitats present. Sub-optimal habitat for reptile species. May support invertebrates and foraging birds and bats as a consequence | Site |
| Scrub | May provide suitable habitat for nesting/foraging birds, invertebrates and foraging bats | Site |
| Scattered trees | Likely to be used by foraging/commuting bats and nesting/sheltering/foraging birds. | Site |
| Species | | |
| Bats | The site is likely to support foraging and commuting bat species as part of a wider network of habitat. A semi-mature sycamore tree supported a potential bat roosting feature | Unknown but likely to be Site. If a roost is present in the sycamore, this value could be increased depending on the type of roost and species present |
| Reptiles & Amphibians | Although considered sub-optimal, the scrub, rubble and tall ruderal vegetation may support small numbers of common reptile and amphibian species | Unknown but likely to be Site |
| Birds | The trees and scrub habitats are likely to provide shelter, nesting and foraging opportunities for a range of birds typically found in garden environments | Unknown but likely to be Site |
| Other notable species | Suitable habitat for hedgehogs was identified beneath the shed | Unknown but likely to be Site |

# 7 ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION AND ENHANCEMENT

## 7.1 Introduction

7.1.1 This section considers the effects of the proposed development upon the ecological receptors identified in Section 6. Avoidance, mitigation and compensatory measures are then described to ensure adverse effects associated with the construction and operation of the proposed development can be eliminated or reduced as far as possible. Recommendations are also provided for any further work that might be required as well as suggestions for ecological enhancement measures that would be appropriate within the development in accordance with the National Planning Policy Framework.

## 7.2 Details of Proposed Development

7.2.1 This assessment has been based upon drawing number 1317-PL-215 Rev F 'Roof Plan' (Wolff Architects) shown in Figure 3.

7.2.2 The proposed development is approximately 0.1ha in size and comprises the demolition of the existing dwelling followed by the construction of a new residential dwelling with associated parking and gardens. Five semi-mature trees are to be felled to make way for the development.

7.2.3 Any significant changes to the building design and layout and landscaping prior to submitting for planning should be issued to Clarkson and Woods for review. Ecological impacts and mitigation opportunities may be affected by these changes.

## 7.3 Designated Sites

7.3.1 The proposed development is a relatively small-scale development in the context of the local landscape and is not situated within any sites designated for nature conservation. Hampstead Heath SINC is designated for nature conservation and located 85m west of the site boundary, but is separated from the site by a road and the Highgate ponds.

7.3.2 The proposed development will replace an existing dwelling and will be of an equivalent size and therefore no increase in recreational use of the SINC or other designated sites identified is anticipated.

7.3.3 It is considered highly unlikely that the construction activity will present any risk of impacts (either direct or indirect) on the designated sites identified during the desk study.

## 7.4 Habitats

7.4.1 The habitats on site are common to urban locations and the ephemeral/short perennial vegetation is of low intrinsic nature conservation value.

7.4.2 The trees and scrub can be considered to provide some habitat of value as nesting, foraging and commuting habitat for a range of wildlife including bird and bat species. Within the development proposals scrub and five of the trees are to be removed. Recommendations for vegetation clearance are detailed within section 7.5.9 below.

7.4.3 Trees to be retained should be protected from damage during construction activities using tree protection fencing in accordance with BS5837: 2012. This will prevent accidental damage during construction and ensure materials are not stored at the base of trees and other retained habitat. Such measures will ensure these habitats remain in good health and can support associated wildlife for the long term. The advice of an arboriculturalist should be sought to determine the root protection zones of the retained trees.

7.4.4 Areas of new soft landscaping should use a mix of locally appropriate, native species, or species of known value to British wildlife. Flowering plants such as lavenders, foxgloves, penstemons and snap dragons within borders and climbing plants such as honeysuckle, clematis and common hope provide valuable foraging resources for bumble and honey bees.

7.4.5 It is noted that the proposed development contains a number of solar cells and green roofs, which it is assumed will be planted with sedum mixes. Green roofs provide good opportunities for a wide range of invertebrate and bird species. Green roofs also help water attenuation and have better thermal capacity than typical roofing and solar cells will generate energy for the new dwelling. Overall, the installation of green roofs and solar cells will all help to reduce the environmental impact of the proposed new property. Given the nature of the existing building, the provision of green roofs are considered to be an ecological enhancement measure.

## 7.5 Protected Species and Species of Conservation Concern

***Bats***

7.5.1 No bat roosts or signs of bats were recorded within the building on site. The building constituted negligible potential for roosting bats and as such no further investigations for bats of the building are recommended.

7.5.2 The trees and scrub habitat are likely to provide suitable habitat for foraging and commuting bat species. A semi-mature sycamore tree was classified as Category 1 for its potential value for roosting bats. This tree will be retained under development proposals.

7.5.3 Five of the trees are to be removed within the development proposals. The tree identified as providing potential bat roost habitat will be retained as part of the proposals. Clearance of a small number of trees with no potential roost features is unlikely to result in negative impacts upon foraging bats due to the available suitable habitat retained and around the application site. However, it is recommended that mitigation planting in the form of replacement tree/shrub planting should take place within the new development. Species planted should be native, or species known to attract invertebrates and thus benefit foraging bats.

7.5.4 During construction the retained trees should be protected through installation of fencing in accordance with BS 5837 (2012).

7.5.5 All retained trees should be protected from light-spillage from newly installed light sources. Any exterior lighting used on the site should be minimised but if essential should be set on an automatic timer or use low-level lighting bollards which avoid casting light up into tree canopies.

7.5.6 The site is small-scale and does not provide a unique habitat assemblage or habitat of elevated value in relation to those within the local landscape. The majority of features likely to be of most value to bats will be appropriately protected and not significantly impacted by the proposals. As a result and providing the recommendations set out above are followed, bat activity surveys are not recommended as impacts on bats will be reduced and mitigated for.

***Amphibians***

7.5.7 Small numbers of widespread amphibians such as common toad and common frog may occur within vegetation around the site. Care should be taken not to harm or kill amphibians during site clearance. It is recommended that the vegetation is strimmed and maintained at a low level prior to works commencing. This would reduce the shelter currently provided on site and reduce the likelihood of encountering these species. Any amphibians found during site clearance should be caught and released at the edge of the site away from construction activity.

***Reptiles***

7.5.8 The scrub, rubble and tall ruderal habitats within the site were identified as sub-optimal habitat for reptiles. The site was bounded by managed gardens to the north, west and south, with a road bounding the eastern boundary. Therefore connectivity to the wider landscape was limited. It was noted that the trees within the site overshadowed much of the garden and therefore there were limited areas for reptiles to bask.

7.5.9 A precautionary approach is recommended, in the form of a phased strimming of vegetation within the site. Vegetation should be cleared to a height of 250mm above ground level (using hand held strimmers or a mower set on its highest setting) and then left for 48 hours. Following this, the vegetation should be further cut to ground level (or as close as possible therefore) and maintained at this height until site clearance takes place.

7.5.10 The new gardens within the site are likely to provide an equivalent area of suitable habitat to the current gardens, and therefore, should reptiles be present on the site it is considered unlikely that there would be any long-term adverse effects upon this species group.

***Birds***

7.5.11 The site contained suitable nesting habitat for birds within the hedgerows and trees. Vegetation clearance affecting nesting habitat should be timed to occur outside the bird nesting season (usually March to August inclusive but seasonally variable). If this is not possible, a suitably experienced ecologist will be required to check the vegetation for active nests first. This check would identify individual nests and life stages of the occupants (eggs, chicks, fledglings). Any active nests found would need to be protected until eggs have hatched and young fledged. This would be ensured through the creation of at least a 10m buffer zone free of any other vegetation clearance. Until the young have fledged, the nest should be subjected to regular monitoring to ensure that a second brood is not raised once the first brood has fledged.

7.5.12 It is recommended that two bird boxes are installed within the new development to compensate for the loss of suitable nesting habitat. These should be installed on retained trees or on the walls

of the new dwellings. Boxes such as Schwegler 1B general nesting boxes or a sparrow terrace is recommended.

***Other Protected Species and Species of Conservation Concern***

7.5.13 Habitat for hedgehogs (local conservation priority within Camden BAP) was recorded on site during the survey. It is recommended that demolition of the small wooden shed is carried out with caution to avoid injury to hedgehogs which may be sheltering or nesting beneath. If any such animals are found advice from Clarkson and Woods should be sought. The animal may need to be taken to an RSPCA unit or similar.

7.5.14 A hedgehog house (such as a 'Hogitat' or similar) should be provided in suitable retained habitat within the garden on completion of the development.

## 7.6 Ecological Enhancements

7.6.1 The National Planning Policy Framework[16] (NPPF), issued in March 2012, states that the planning system should contribute to "minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures". It also states that "opportunities to incorporate biodiversity in and around developments should be encouraged".

7.6.2 Enhancements for biodiversity, such as the following, are additional to specific mitigation measures mentioned above and are not expressly required. Any adopted enhancements would however, make a positive, permanent contribution to local biodiversity.

7.6.3 Good horticultural practices should be used when managing any vegetation on site. This would include the use of peat-free composts, mulches and soil conditioner, and avoiding the use of herbicides, pesticides and fertilisers within landscape planting areas.

7.6.4 Consideration should be given to providing a number of additional bird nesting boxes on site. It is recommended that, in addition to the two boxes discussed above, an additional four bird boxes should be appropriately placed on the walls of the buildings or in suitably mature trees. These bird boxes should be selected to provide suitable nesting sites for a variety of species including house sparrow, robin and blue tit.

7.6.5 Consideration should be given to providing at least two bat boxes within the new development. These should be installed within retained trees or on the walls of the new dwelling. Boxes such as the Schwegler 1FF and Schwegler 1FR bat tube are recommended.

7.6.6 Features for hedgehogs (in addition to a hedgehog nesting box discussed above) could be incorporated into the landscaping of the gardens. To allow passage by hedgehogs between gardens and onto/off the site, a gap measuring 50mm x 50mm should be cut into the bottom of each length of close-boarded fence.

[16] DCLG (2012). *National Planning Policy Framework*. www.communities.gov.uk

7.6.7 Log piles and other hibernacula such as small buried rubble piles could be created inside the perimeter of the development site at very little cost, providing suitable habitat for sheltering and overwintering amphibians or insect life. Common toad and many insect species are listed on the UKBAP so creating new habitat for these species would contribute towards national conservation targets.

### 7.7 Summary of Recommended Further Work

7.7.1 Below is a summary of the recommended further work which should be carried out prior to site clearance taking place.

| Species | Scope of work | Timescale |
|---|---|---|
| Habitats – Trees | Trees to be retained should be protected using tree protection fencing in accordance with BS5837: 2012. | Installed prior to site clearance |
| Bats | A suitable lighting strategy should be prepared and implemented within the site to protect retained features suitable for commuting and foraging bats. | Prior to site clearance |
| Reptiles & Amphibians | A precautionary phased cutting of vegetation, which will be maintained at ground level | Prior to site clearance |
| Birds | If any vegetation and/or buildings are to be directly affected by construction activities (including site clearance) during the months of March to August inclusive, a check of suitable habitat for nesting birds prior to site activity in that area should be carried out by a suitably qualified ecologist. | Nesting bird checks should take place no more than 48hrs prior to site clearance activities commencing |
| Hedgehog | The shed should be removed carefully checking for hedgehogs sheltering underneath. Should any be found, contact Clarkson and Woods for advice. | Shed removal |

# 8 CONCLUSIONS

8.1.1 The proposed development will result in adverse impacts upon a number of ecological receptors classified as having Site to potentially higher level of ecological value. Avoidance measures, and mitigation measures have been proposed to ensure that these adverse impacts are reduced to acceptable levels as far as possible. The majority of the trees will be retained, with new tree planting proposed along the northern boundary. These measures, in addition to precautionary clearance approaches recommended, will ensure that wildlife using the site can be protected during construction and continue to use the site once operational.

8.1.2 Assuming the successful implementation of the measures described the scheme can be considered in line with planning policy DP24 and CS15 of the Camden Local Development Framework documents "Camden Development Policies 2010-2025" and "Camden Core Strategy 2010-2025".

# APPENDIX A: WILDLIFE LEGISLATION & SPECIES INFORMATION

## BATS

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

## AMPHIBIANS

Great Britain supports seven native amphibian species. The four most widespread species; smooth and palmate newts, common frog, and common toad, receive partial protection under the Wildlife and Countryside Act 1981 (as amended) which prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. The great crested newt, pool frog and natterjack toad are also fully protected in England and Wales under the Conservation of Habitats and Species Regulations 2010 (as amended). Penalties for offences against amphibian species include fines of up to £5,000 and/or up to six months in prison.

Four amphibian species (great crested newt, pool frog, common toad, natterjack toad) are listed as priority species under the UK Biodiversity Action Plan, and are therefore considered to be Species of Principal Importance in England and Wales (excluding the pool frog, which does not occur in Wales) under the Natural Environment and Rural Communities (NERC) Act 2006. All public bodies including local and regional authorities have a duty under this legislation to have regard for the conservation of biodiversity.

## REPTILES

All six native reptile species receive protection under the Wildlife and Countryside Act 1981 (as amended). The four more common species (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*) receive partial protection which makes it an offence to intentionally kill or injure a reptile. The two other reptile species (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), both of which are rare with very restricted UK ranges receive full protection under the Conservation of Habitats and Species Regulations 2010 (as amended). Penalties for offences against reptile species include fines of up to £5,000 and/or up to six months in prison.

Works such as site clearance or topsoil stripping which could result in killing or injury of reptiles could be considered result in an offence unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on common reptile species despite these mitigation measures being in place would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence. Works which could affect smooth snakes or sand lizards, or their habitats, would need to take place under licence from Natural England or Natural Resources Wales. However sites supporting smooth snakes or sand lizards are very rarely affected by development proposals.

In practice, mitigation for impacts of development on common reptiles generally comprise one or more of the following techniques: displacement, in which reptiles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where reptile-resistant fencing is provided between a development site and suitable retained habitat allowing reptiles to be trapped from the development footprint and released elsewhere on the site; and translocation, where animals are trapped from a development site and released on another suitable site nearby. Reptile mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with the local planning authority.

## BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

## PLANNING POLICY IN RELATION TO BIODIVERSITY

The National Planning Policy Framework (NPPF), issued in March 2012, has superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005). Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. Further guidance is also available within the Government Circular ODPM 06/2005 on Biodiversity and Geological conservation although it should be noted that this document is currently being updated by DEFRA. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 109), including:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 115):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 118) by applying principles including:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
- development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;

- opportunities to incorporate biodiversity in and around developments should be encouraged;
- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas and possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The Natural Environment and Rural Communities Act (2006) states that a 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; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

## ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a 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; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".

## UK BIODIVERSITY ACTION PLANS

The UK Biodiversity Action Plan (UK BAP) 2011 is a policy first published in 1994 to protect biodiversity and stems from the 1992 Rio Biodiversity Earth Summit. The policy is continuously revised to combine new and existing conservation initiatives to conserve and enhance species and habitats, promote public awareness and contribute to international conservation efforts. Each plan details the status, threats and unique conservation strategies for the species or habitat concerned, to encourage spread and promote population numbers.

Species or habitats identified as priorities under the UK Biodiversity Action Plan receive some status in the planning process through their identification as Species/Habitats of Principal Importance in England and Wales, under the Natural Environment and Rural Communities (NERC) Act 2006 (as amended).

Current planning guidance in England, the National Planning Policy Framework, does not specifically refer to Species or Habitats of Principal Importance, though it includes guidance for conservation of biodiversity in general. Supplementary guidance is available online at http://planningguidance.planningportal.gov.uk/blog/guidance/ and this guidance indicates that it is '*useful to consider*' the potential effects of a development on the habitats or species on the Natural Environment and Rural Communities Act 2006 section 41 list.

## APPENDIX B: ECOLOGICAL EVALUATION CRITERIA

It is important to appreciate that the level of protection given to a particular species or habitat through national or international legislation does not necessarily relate to the evaluated level of importance of that receptor to nature conservation. Whilst species may be widespread or common nationally, but of scarce occurrence in a particular county (for example, it might be at the limit of its geographical range), a species may also be considered to be rare nationally or internationally but be abundant within particular areas.

The Ratcliffe Criteria (Ratcliffe, 1977) provide a long established and widely accepted method of determining the nature conservation value of a particular site and have been used to aid the evaluation of the habitats associated with the Scheme. The attributes of the Ratcliffe Criteria are described below.

| Ratcliffe Criteria for Nature Conservation Evaluation | |
|---|---|
| **Criteria** | **Description** |
| Size | Large, continuous areas of habitat are considered to be of greater importance than small or fragmented areas. |
| Diversity | Species and habitat diversity, including variations in topography and wetness, increase the wildlife value. |
| Naturalness | This reflects man's intervention or management of the habitat. Most habitats of this survey are semi-natural. Naturalness indicates the amount of modification of the land by man. Generally a less modified area results in an increase in the nature conservation value. |
| Rarity | The scarceness of a habitat, and the presence of rare/uncommon species, relates to its importance and priority for nature conservation. Rarity is related to the frequency of occurrence at national or county level. |
| Fragility | Fragile habitats are those where changes due to man's intervention, environmental factors or natural succession can directly threaten it. Scrub invasion, agricultural improvement, fire and changes in hydrological regime are the most common threats. |
| Typicalness | This relates to the quality of the habitat in terms of how good an example it is of a recognised type. |
| Position in an ecological/geographical unit | The relationship of a site to adjacent areas of nature conservation value. It is important to recognise the important and characteristic formations, communities and species of a district. |
| Recorded history | The extent to which a site has been used for scientific study and research is a factor of some importance. |
| Potential wildlife value | The likely quality of the habitat for birds, mammals, reptiles, amphibians and invertebrates if it is managed for wildlife. If appropriate habitat management is undertaken, it is possible for an increase in the diversity and nature conservation value of an area. |
| Intrinsic appeal | The knowledge of the distribution and numbers of popular groups of species such as birds, is greater than for obscure groups. Similarly, colourful wild flowers and rare orchids arouse more enthusiasm than liverworts. It is pragmatic to give more weight to some groups than to others. |
| Criteria are based on Ratcliffe, D.A. (1977). A Nature Conservation Review, Cambridge University Press | |

Following the CIEEM Guidelines for Ecological Impact Assessment in the UK, when determining the biodiversity value of natural features found on or in proximity to the site the following characteristics will be considered:

- Animal or plant species which are rare or uncommon, either internationally, nationally or more locally;
- Endemic or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and/ or other synergistic associations (e.g. networks of hedges);
- Priority Biodiversity Action Plan (BAP) habitat or species;
- Notably large populations or concentrations of animals considered uncommon or threatened in a wider context; plant communities that are considered to be typical of valued natural/ semi-natural vegetation types;
- Species at the edge of their range; and
- Species-rich assemblages of plants or animals.

The criteria described by Ratcliffe and CIEEM will then be used to ascribe a value to each receptor according to its value in a geographic context. This is described in the table overleaf.

| Level of Value | Ecological Features |
|---|---|
| International | A habitat or species cited as a reason for the designation or proposed designation of a World Heritage Site, Biosphere Reserve, Biogenetic Reserve, Ramsar Site, Special Protection Area (SPA) or Special Area of Conservation (SAC).<br>A large extent of habitat that is listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive in good condition with typical species diversity.<br>A large and viable population of a regularly occurring species that is rare within an international context. |
| National | A habitat or species cited as a reason for the designation or proposed designation of a National Nature Reserve (NNR), Marine Nature Reserve (MNR), National Park, Site of Special Scientific Interest (SSSI) or Area of Special Scientific Interest (ASSI).<br>Any area of habitat listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive that has potential to support typical species diversity.<br>A large extent of habitat listed as a Priority Habitat in the UK BAP in good condition that supports an abundance of typical species.<br>A large and viable population of a regularly occurring species that is scarce within an international context.<br>A very large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP.<br>A large and viable population of a regularly occurring rare species that occurs in 15 or fewer 10km squares of the National Grid (e.g. a species that is listed in UK Red Data Books).<br>A bird species with a British breeding population of <1,000 pairs. |
| Regional | A large extent of habitat listed as a Priority Habitat in the UK BAP that supports typical species diversity and is in good condition.<br>A large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP.<br>A large and viable population of a regularly occurring plant species that is known to occur in 16 to 100 10km squares of National Grid (Stewart, Preston and Pearman 1994).<br>A large and viable population of a regularly occurring insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid [Ball, 1986].<br>A bird species with a British breeding population of 1,000 to 10,000 pairs. |
| County | A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a County Wildlife Site (CWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland.<br>A habitat listed as a Priority Habitat in the UK BAP which is large in extent and supports typical species diversity.<br>A medium and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP.<br>A viable population of a regularly occurring species listed in a County Red Data Book, County Flora or found in less than 10% of 1km squares of the National Grid within the count.<br>A small population of a plant species that is known to occur in 16 to 100 10km squares of National Grid.<br>A small population of an insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid.<br>A bird species with a British breeding population of 10,000 to 100,000 pair |
| District | A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a Local Wildlife Site (LWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland.<br>A habitat listed as a Priority Habitat in the UK BAP which is small in extent, supports typical species diversity or is in an unfavourable condition.<br>A small and viable population of a species that is listed in the UK BAP or LBAP.<br>A bird species with a British breeding population of 100,000 to 500,000 pairs. |
| Local | A habitat or species cited as a reason for the designation or proposed designation of a site which is officially listed e.g. on a Parish Register.<br>A semi-natural habitat that is listed in the UK BAP or LBAP, which is either small in extent and/or is in an unfavourable condition.<br>A species which occurs occasionally that is listed in the UK BAP or LBAP.<br>A bird species with a British breeding population of >500,000 pairs. |
| Site | An artificial habitat or habitat that has readily established e.g. amenity grassland.<br>A species which is common and not listed on the UK BAP or LBAP e.g. Badger. |
| Negligible | A habitat or species common within the Application Site, offering little benefit to British wildlife and biodiversity. |

## APPENDIX C: BIRD RECORDS WITHIN 1KM OF THE SITE

| Species | Latin | Designation | Distance and Direction from the Site |
|---|---|---|---|
| Bullfinch | *Pyrrhula pyrrhula* | BTO Amber list, UKBAP Priority Species, SPI | 161m NW |
| Lesser black-backed gull | *Larus fuscus* | BTO Amber list | 161m NW |
| Swift | *Apus apus* | BTO Amber list | 161m NW |
| Dunnock | *Prunella modularis* | BTO Amber list, UKBAP Priority Species, SPI | 161m NW |
| House Sparrow | *Passer domesticus* | BTO Red list, UKBAP Priority Species, SPI | 161m NW |
| Starling | *Sturnus vulgaris* | BTO Red list, UKBAP Priority Species, SPI | 161m NW |
| House martin | *Delichon urbica* | BTO Amber list | 161m NW |
| Redwing | *Turdus iliacus* | BTO Red list | 161 NW 2010 |
| Linnet | *Carduelis cannabina* | BTO Red list, UKBAP Priority Species, SPI | 161m NW |
| Mute swan | *Cygnus olor* | BTO Amber list | 249m N |
| Cuckoo | *Cuculus canorus* | BTO Red list, SPI | 564m SW |
| Fieldfare | *Turdus pilaris* | BTO Red list | 564m SW |
| Swallow | *Hirundo rustica* | BTO Amber list | 564m SW |
| Yellow wagtail | *Emberiza citrinella* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Wigeon | *Anas penelope* | BTO Amber list | 564m SW |
| Teal | *Anas crecca* | BTO Amber list | 564m SW |
| Shoveler | *Anas clypeata* | BTO Amber list | 564m SW |
| Honey buzzard | *Pernis apivorus* | BTO Amber list | 564m SW |
| Osprey | *Pandion haliaetus* | BTO Amber list | 564m SW |
| Yellow-legged gull | *Larus michahellis* | BTO Amber list | 564m SW |

| Species | Latin | Designation | Distance and Direction from the Site |
|---|---|---|---|
| Water rail | *Rallus aquaticus* | BTO Amber list | 564m SW |
| Stone-curlew | *Burhinus oedicnemus* | BTO Amber list, UKBAP Priority Species, SPI | 564m SW |
| Lapwing | *Vanellus vanellus* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Snipe | *Gallinago gallinago* | BTO Amber list | 564m SW |
| Woodcock | *Scolopax rusticola* | BTO Amber list | 564m SW |
| Green sandpiper | *Tringa ochropus* | BTO Amber list | 564m SW |
| Herring gull | *Larus argentatus* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Common tern | *Sterna hirundo* | BTO Amber list | 564m SW |
| Arctic tern | *Sterna paradisaea* | BTO Amber list | 564m SW |
| Turtle dove | *Streptopelia turtur* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Short-eared owl | *Asio flammeus* | BTO Amber list | 564m SW |
| Lesser spotted woodpecker | *Dendrocopus minor* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Skylark | *Alauda arvensis* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Sand martin | *Riparia riparia* | BTO Amber list | 564m SW |
| Tree pipit | *Anthus trivialis* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Meadow pipit | *Anthus pratensis* | BTO Amber list | 564m SW |
| Grey wagtail | *Motacilla cinerea* | BTO Amber list | 564m SW |
| Ring ouzel | *Turdus torquatus* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Grasshopper warbler | *Locustella naevia* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Firecrest | *Regulus ignicapillus* | BTO Amber list | 564m SW |
| Spotted flycatcher | *Muscicapa striata* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |

| Species | Latin | Designation | Distance and Direction from the Site |
|---|---|---|---|
| Red-backed shrike | *Lanius collurio* | BTO Red list, UKBAP Priority Species | 564m SW |
| Tree sparrow | *Passer montanus* | BTO Red list, UKBAP Priority Species, SPI | 564m SW |
| Song thrush | *Turdus philomelos* | BTO Red list, UKBAP Priority Species, SPI | 789m NW |
| Kingfisher | *Alcedo atthis* | BTO Amber list | 789m NW |
| Mistle thrush | *Turdus viscivorus* | BTO Amber list | 962m N |
| Wood warbler | *Phylloscopus sibilatrix* | BTO Red list, UKBAP Priority Species, SPI | 962m N |
| Goldcrest | *Regulus regulus* | BTO Amber list | 962m N |
| Kestrel | *Falco tinnunculus* | BTO Amber list | 972m W |
| Yellowhammer | *Emberiza citrinella* | BTO Red list, UKBAP Priority Species, SPI | Within 1km |

## APPENDIX D: HSI CALCULATIONS

**Pond 2**

| Habitat Suitability Index Criteria (for full details, see Oldham et al. 2000) | Pond 1 |
|---|---|
| 1. Location<br>(Zone A, 1; Zone B, 0.5; Zone C, 0.01 Oldham et al) | 1 |
| 2. Pond Area<br>(Estimated, and score extrapolated from graph, Oldham et al) | 0.47 |
| 3. Pond Drying<br>(Never, 0.9; Rarely, 1.0; Sometimes, 0.5; Annually, 0.1; | 0.90 |
| 4. Water Quality<br>(Good, 1.0; Moderate, 0.67; Poor, 0.33; Bad, 0.01) | 0.67 |
| 5. Shading<br>(Estimated % perimeter shaded, score extrapolated from Graph (Oldham et al.) | 1.00 |
| 6. Fowl<br>(Absent, 1; Minor 0.67, Major 0.01) | 0.01 |
| 7. Fish<br>(Absent, 1; Possible 0.67, Minor 0.33, Major 0.01) | 0.67 |
| 8. Ponds<br>Number of ponds within 1km (score extrapolated from graph in Oldham et al). | 1.00 |
| 9. Terrestrial Habitat<br>(Good, 1; Moderate, 0.67; Poor, 0.33; None, 0.01) | 0.33 |
| 10. Macrophytes<br>(Estimated % of pond with macrophytes, score extrapolated from graph, Oldham et al). | 0.31 |
| Totals<br>(S1xS2xS3xS4xS5xS6xS7xS8xS9xS10)1/10 | 0.43 |
| Categorisation of HSI Score | Poor |

**Pond 3**

| Habitat Suitability Index Criteria (for full details, see Oldham et al. 2000) | Pond 1 |
|---|---|
| 1. Location<br>(Zone A, 1; Zone B, 0.5; Zone C, 0.01 Oldham et al) | 1 |
| 2. Pond Area<br>(Estimated, and score extrapolated from graph, Oldham et al) | 0.11 |
| 3. Pond Drying<br>(Never, 0.9; Rarely, 1.0; Sometimes, 0.5; Annually, 0.1; | 0.90 |
| 4. Water Quality<br>(Good, 1.0; Moderate, 0.67; Poor, 0.33; Bad, 0.01) | 0.67 |
| 5. Shading<br>(Estimated % perimeter shaded, score extrapolated from Graph (Oldham et al.) | 1.00 |
| 6. Fowl<br>(Absent, 1; Minor 0.67, Major 0.01) | 0.01 |
| 7. Fish<br>(Absent, 1; Possible 0.67, Minor 0.33, Major 0.01) | 0.67 |
| 8. Ponds<br>Number of ponds within 1km (score extrapolated from graph in Oldham et al). | 1.00 |
| 9. Terrestrial Habitat<br>(Good, 1; Moderate, 0.67; Poor, 0.33; None, 0.01) | 0.33 |
| 10. Macrophytes<br>(Estimated % of pond with macrophytes, score extrapolated from graph, Oldham et al). | 0.31 |
| Totals<br>(S1xS2xS3xS4xS5xS6xS7xS8xS9xS10)1/10 | 0.37 |
| Categorisation of HSI Score | Poor |

**Pond 6**

| Habitat Suitability Index Criteria (for full details, see Oldham et al. 2000) | Pond 1 |
|---|---|
| 1. Location<br>(Zone A, 1; Zone B, 0.5; Zone C, 0.01 Oldham et al) | 1.00 |
| 2. Pond Area<br>(Estimated, and score extrapolated from graph, Oldham et al) | 1.00 |
| 3. Pond Drying<br>(Never, 0.9; Rarely, 1.0; Sometimes, 0.5; Annually, 0.1; | 0.90 |
| 4. Water Quality<br>(Good, 1.0; Moderate, 0.67; Poor, 0.33; Bad, 0.01) | 0.67 |
| 5. Shading<br>(Estimated % perimeter shaded, score extrapolated from Graph (Oldham et al.) | 0.30 |
| 6. Fowl<br>(Absent, 1; Minor 0.67, Major 0.01) | 0.67 |
| 7. Fish<br>(Absent, 1; Possible 0.67, Minor 0.33, Major 0.01) | 0.67 |
| 8. Ponds<br>Number of ponds within 1km (score extrapolated from graph in Oldham et al). | 1.00 |
| 9. Terrestrial Habitat<br>(Good, 1; Moderate, 0.67; Poor, 0.33; None, 0.01) | 0.33 |
| 10. Macrophytes<br>(Estimated % of pond with macrophytes, score extrapolated from graph, Oldham et al). | 0.36 |
| Totals<br>(S1xS2xS3xS4xS5xS6xS7xS8xS9xS10)1/10 | 0.63 |
| Categorisation of HSI Score | Average |

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