



Preliminary Ecological Appraisal

Former Belmore Allotments, Hayes, London Borough of Hillingdon

On Behalf of:

Hillingdon Borough Council

December 2018

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Report Status	Final
Date of Issue	06/12/18

Ecology, Countryside Management

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Executive Summary

1. This report presents the results of a preliminary ecological appraisal carried out at Former Belmore Allotments in Hayes, London Borough of Hillingdon. The survey was carried out to inform a detailed planning application for residential development of the site.
2. The site is located to the north-east of Hayes (Ordnance Survey Grid Reference TQ 10192 82003). There are two small outbuildings on site. The site is bordered by residential housing and Yeading Brook Meadows.
3. There were no European designated sites within 8km or SSSI within 5km of the site. There were a number of statutory and non-statutory designated sites within 5km, comprising Local Nature Reserves (LNR) and Sites of Importance for Nature Conservation (SINC). Direct and indirect effects are predicted upon Yeading Brook Meadows LNR; mitigation is proposed to appropriately alleviate these effects.
4. The habitats on site were of low ecological value. They are common and widespread, and no rare, protected or non-native, invasive plant species were recorded.
5. Yeading Brook exists off site to the north. Measures are detailed to mitigate any negative effects on this protected habitat.
6. Great crested newts and roosting bats are considered absent from the site and therefore no further actions or mitigation measures are recommended for these species.
7. Rough grassland and scrub provide suitable habitat for reptiles and the site is connected to wider areas of habitat. Therefore, further surveys are required to determine whether reptiles are present. Appropriate mitigation should then be provided based on the results of further surveys.
8. Scrub and trees provided suitable habitat for nesting birds, therefore vegetation should be cleared outside of the breeding bird season (March to August inclusive) or after an ecologist has confirmed the absence of active nests.
9. Precautionary measures are detailed to mitigate negative effects on badger, hedgehog, and foraging bats and enhancements for biodiversity have been provided.

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1.0 Introduction and Aims

- 1.1** Southern Ecological Solutions Ltd. (SES) was commissioned by the London Borough of Hillingdon to undertake an Extended Phase 1 Habitat survey and building inspection for bats at the land at Former Belmore Allotments, Hayes, London (the site) (Appendix 1). The site is approximately 1.2 ha and comprises managed semi-improved grassland, scattered broad-leaved trees, hedgerow, scrub, and buildings.
- 1.2** The proposed development includes residential units with associated parking, amenity gardens, and access roads (Appendix 2). Previous survey work relating to this site has been reviewed (SES, 2011).
- 1.3** The following preliminary ecological appraisal follows guidance and methods as prescribed by the Chartered Institute for Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Appraisal* (2016) and the *Guidelines for Ecological Impact Assessment* (2018). Following these methods, a baseline of rare and/or noted ecological receptors (species and habitats) was established and valued. Predicted significant impacts upon these receptors have been identified and constraints and opportunities identified. This step-wise assessment process has informed likely mitigation and enhancement measures. Recommended phase 2 ecological surveys have been identified as well as a timetable for implementation. These surveys will fully inform the predicted impacts of the scheme in accordance with the National Planning Policy Framework (NPPF) (MHCLG, 2018), local planning policy and relevant wildlife legislation.
- 1.4** The objectives of this extended Phase 1 Habitat survey were to:
- Map the main ecological features within the site and compile a plant species list for each habitat type;
 - Make an initial assessment of the presence or likely absence of species of conservation concern;
 - Identify any legal and planning policy constraints relevant to nature conservation which may affect the development;
 - Determine any potential further ecological issues;
 - Determine the need for further surveys and mitigation;
 - Make recommendations for minimising impacts on biodiversity and providing net gains in biodiversity where possible in accordance with *chapter 15: Conserving and Enhancing the Natural Environment*, of the *National Planning Policy Framework (NPPF)* (MHCLG, 2018) and *Section 8.7 of the Hillingdon Local Plan* (2012) as set out in *Section 3*.

2.0 **Methods**

Desk Study

- 2.1** SES commissioned a data search for records of protected and notable species and non-statutory designated sites via Greenspace Information for Greater London (GiGL). The data search encompassed the study area, and up to 2km from the boundary for protected species. Data were received from GiGL on the 26 July 2017.
- 2.2** A web-based search for statutory designated sites via the Multi Agency Geographic Information for the Countryside (MAGIC) spatial data resource was undertaken on 11 August 2017 for the following designations: European designated sites (up to 8km from the site boundary); and national (5km from the site boundary).
- 2.3** An online search was undertaken for waterbodies within 500m of the site boundary utilising Promap and MAGIC Map in July 2017.

Extended Phase 1 Habitat Survey

- 2.4** An extended Phase 1 Habitat survey was carried out on 24 July 2017. This is a standard technique for obtaining baseline ecological information for areas of land, including proposed development sites. Phase 1 Habitat Survey methods are described in the *Handbook for Phase 1 habitat survey* (Joint Nature Conservation Committee, 2010). Habitat mapping using a set of standard colour codes to indicate habitat types is shown on a Phase 1 Habitat map (Appendix 3).
- 2.5** The dominant and readily identifiable higher plant species identified in each of the various habitat parcels were recorded and their abundances assessed on the DAFOR scale:
- D - Dominant
 - A - Abundant
 - F - Frequent
 - O - Occasional
 - R - Rare
- 2.6** These scores represent the abundance within the defined area only and do not reflect national or regional abundances. Plant species nomenclature follows Stace (2010).

Protected and Notable Species

- 2.7** The site was assessed for its suitability for the protected and notable species that were likely to occur in the area. Taking into account the location and habitats on site, an assessment was carried out for:
- Rare and notable plant species;
 - Invasive non-native plant and animal species;
 - Great crested newt *Triturus cristatus*;
 - Common reptile species;
 - Badger *Meles meles*;
 - Roosting bats;
 - Nesting birds;
 - Otter *Lutra lutra* and water vole *Arvicola amphibius*;
 - Rare and notable invertebrates; and

- Rare and notable mammals.

- 2.8** Habitats were assessed for their potential to support rare and notable plant species as well as non-native species listed on Schedule 9 of *The Wildlife and Countryside Act (WCA) 1981*.
- 2.9** Terrestrial habitats were assessed for their suitability for great crested newt. Suitable terrestrial habitat generally includes rough grassland and woodland where they can forage and hibernate, with good links to the ponds where they breed.
- 2.10** The site was assessed for its suitability for the four most common reptile species; common lizard *Zootoca vivipara*, slow worm *Anguis fragilis*, grass snake *Natrix natrix*, and adder *Vipera berus*. Specific habitat requirements vary between species. Common lizard favours rough grassland, however it can be found in a variety of habitats ranging from woodland glades to walls and pastures. Slow worm utilise similar habitat to common lizard and are often found in gardens and derelict land. Grass snake habitat requirements are similar to that of common lizard, albeit with a greater reliance on ponds and wetlands. Adder is often associated with woodland edge habitat and rough, open countryside.
- 2.11** An initial assessment was made to identify areas that might be used by badger for foraging, commuting and sett creation.
- 2.12** The site was assessed for its suitability to support roosting bats. Buildings and trees were assessed from ground level following best practice guidance, and assigned a corresponding level of suitability (Collins, 2016).

Table 1: Assessment of the potential suitability of a proposed development site for roosting bats (Collins, 2016)

Suitability	Roosting Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.
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 but with none seen from the ground or features seen with only very limited roosting potential.
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.
High	A structure or tree with one or more potential roost sites that a 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.

- 2.13** The site was assessed for its potential to support nesting birds. Suitable habitat generally includes scrub, trees and ruderal vegetation but can also include buildings, open grassland, and piles of debris.
- 2.14** The site was assessed for potential to support otter and water vole, including connectivity to off-site aquatic habitat.
- 2.15** The site was assessed for potential to support rare and notable invertebrates. Suitable habitats generally include vegetation with a mosaic of differing heights, and areas of deadwood.
- 2.16** The site was assessed for potential to support rare and notable mammals. Suitable habitats generally include arable field margins, grassland, and areas of scrub and hedgerow.

3.0 Constraints

- 3.1** Desktop data searches are a valuable tool in evaluating a sites potential to hold rare and protected species, it is not however an absolute in confirming presence or absence of notable species due to the nature of how the records are collected.
- 3.2** GiGL does not release badger records or records of bat roosts due to confidentiality. As such, records from the NBN Atlas were sought for these species.

4.0 Legislative and Policy Framework

National Planning Policy

- 4.1** The *NPPF* (MHCLG, 2018) outlines what the planning system should do to contribute to and enhance the natural and local environment through the following policy statements:

Paragraph 7

There are three dimensions to sustainable development: economic, social and environmental; these give rise to the need for the planning system to perform a number of roles:

- An environmental role- contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change moving to a low carbon economy.*

Paragraph 9

Pursuing sustainable development involves seeking positive improvements in the quality of the built, natural and historic environment, as well as in people's quality of life including but not limited to:

- Moving from a net loss of biodiversity to achieving net gains for nature.*

Paragraph 109

The planning system should contribute to and enhance the natural and local environment by:

- 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.*

Paragraph 118

When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

- 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; and*
- Opportunities to incorporate biodiversity in and around developments should be encouraged.*

Paragraph 125

By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Paragraph 152

Local planning authorities should seek opportunities to achieve each of the economic, social and environmental dimensions of sustainable development and net gains across all three.

- 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 establishing coherent ecological networks that are more resilient to current and future pressures.

Local Planning Policy

4.2 The *Hillingdon Local Plan* (2012) policies related to nature conservation are set out below.

1. The conservation and enhancement of the natural state of:
 - Harefield Gravel Pits
 - Colne Valley Regional Park
 - Fray's Farm Meadows
 - Harefield Pit
2. The protection and enhancement of all Sites of Importance for Nature Conservation (SINCs). Sites with Metropolitan and Borough Grade 1 importance will be protected from any adverse impacts and loss. Borough Grade 2 and Sites of Local Importance will be protected from loss with harmful impacts mitigated through appropriate compensation.
3. The protection and enhancement of populations of protected species as well as priority species and habitats identified within the UK, London and the Hillingdon Biodiversity Action Plans.
4. Appropriate contributions from developers to help enhance SINCs in close proximity to development and to deliver/ assist in the delivery of actions within the Biodiversity Action Plan.
5. The provision of biodiversity improvements from all development, where feasible.
6. The provision of green roofs and living walls which contribute to biodiversity and help tackle climate change.
7. The use of sustainable drainage systems that promote ecological connectivity and natural habitats.

Wildlife Legislation

- 4.3** The two principal wildlife statutes are the *Conservation of Habitats and Species Regulations (Habitats Regulations) 2017*, which deals with internationally important sites and species, and the *Wildlife and Countryside Act (WCA) 1981 (as amended)* that deals with nationally important sites and species.
- 4.4** Certain habitats and species within discrete sites are protected as Sites of Special Scientific Interest (SSSI) under the *WCA 1981*. A proportion of these are more strictly protected as proposed or designated Special Protection Areas (SPA), Special Areas of Conservation (SAC), and Ramsar wetland of international importance under the *Habitats Regulations 2017*. These designations protect features and resources listed as being of international importance from both direct and indirect effects arising from a range of issues including proposed development.
- 4.5** Certain species listed on *Schedule 5* of the *WCA 1981*, including all bat species, great crested newt *Triturus cristatus*, hazel dormouse and otter *Lutra lutra* are also protected under *Schedule 2* of the *Habitats Regulations 2017* making them European Protected Species (EPS). Taken together it is illegal to:

- Deliberately kill, injure or capture any wild animal of EPS;
- Deliberately disturb wild animals of any EPS in such a way to be likely to significantly affect:
 - The ability of any significant groups of animals of that species to survive, breed, rear or nurture their young; or
 - The local distribution of that species.
- Recklessly disturb a EPS or obstruct access to their place of rest;
- Damage or destroy breeding sites or resting places of such animals;
- Deliberately take or destroy the eggs of such an animal;
- Possess or transport any part of a EPS, unless acquired legally; and/or
- Sell, barter or exchange any part of an EPS.

- 4.6** A range of species other than birds, including water vole *Arvicola amphibius*, are protected from disturbance and destruction under the *WCA 1981* through inclusion on *Schedule 5*.
- 4.7** All breeding birds are protected from deliberate destruction under the *WCA 1981*. Certain species are further protected from disturbance at their nest sites being listed on *Schedule 1* of the *WCA 1981*.
- 4.8** Commoner reptiles including common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus* are protected under the *WCA 1981*, they are listed as *Schedule 5* species, therefore part of *Section 9(1)* and *Section 9(5)* apply; the *Countryside and Rights of Way Act 2000 (CROW)* also strengthens their protection.
- 4.9** Badger *Meles meles* is protected from sett disturbance and destruction under the *Protection of Badgers Act 1992*.
- 4.10** *Section 40* of *The Natural Environment and Rural Communities Act (NERC) 2006* places a legal duty on Local Authorities to conserve biodiversity. *Section 41 (S41)* sets out a list of 943 species and habitats of principal importance. These species are known as England Biodiversity Priority (EBP) species and are those identified as requiring action under the former UK Biodiversity Action Plan (BAP) and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework.
- 4.11** Native, species-rich hedgerows fitting certain criteria are protected as being ‘important’ under the *Hedgerow Regulations 1997*.
- 4.12** Japanese Knotweed *Fallopia japonica*, along with a number of other introduced and invasive species, are listed under *Schedule 9* of the *WCA 1981*. Japanese knotweed is highly invasive and its rhizomes cause damage to built structures. Hence it is also classed as controlled waste under the *Environment Protection Act 1990* and has to be removed and disposed of in a licensed landfill or the rhizomes buried to a depth of at least 5m.

5.0 Results

Site Description

- 5.1 The site (c. 1.2ha.) is situated in the town of Hayes in the London Borough of Hillingdon. Semi-improved grassland is the dominant habitat, with areas of scattered broad-leaved trees, hedgerow, scrub, and buildings. Yeading Brook Meadows LNR sits adjacent to the northern boundary. Residential housing lies to the south, east, and west. In the wider landscape the site resides within a heavily urbanised area but is south of multiple LNRs and the Yeading Brook.

Desk Study

- 5.2 The desk study highlighted a number of designated sites within the following designations: European (approx. 8km from the site boundary) and national (approx. 5km from the site boundary (Table 2). The closest statutory designated site is Yeading Brook Meadows Local Nature Reserve (LNR), which is adjacent to the northern boundary of the site. LNRs are considered to have value at a **Local** level. The site boundary does not exist within any SSSI Impact Risk Zones.
- 5.3 A non-statutory site search (approx. 2km from the site boundary) was undertaken and the results are found within Table 3. The closest non-statutory site is St Mary's Wood End SINC, 0.6km south of the site and is assessed as having value at a **Local** level.

Table 2: Designated protected sites within the vicinity of the site.

Site Name	Distance and Direction from Site	Size (Ha.)	Reason for Designation
Yeading Brook Meadows LNR	Adjacent to northern boundary	24	Dominated by grasses and wildflowers, the site supports an array of species, including Roesel's bush-cricket, five-spotted burnet moth, common spotted orchid, and skylark. Designated to protect its nature conservation interest.
Ten Acre Wood LNR	1.7km north	11.2	Developed from a plantation of oak. Understorey of hazel, hawthorn, blackthorn and field maple. Surviving examples of old clay meadows exist, with flora such as meadowsweet, and sneezewort.
Yeading Woods/Gutteridge Wood LNR	2.2km north	25	The site is comprised of ancient woodland and wildflower meadow. It supports a variety of invertebrate species.
Islip Manor LNR	2.8km north east	23.75	A wet meadow with a mosaic of grass types; over 20 grass species and ten leguminous.
Northholt Manor LNR	3.1km north east	1.79	On the site of a 14 th century manor. Varied habitats including meadows, scrub, woodlands, wetlands, ponds and small lakes
Litten Nature Reserve LNR	4.2km east	1.07	Two-acre woodland, wildflower meadows and ponds.

Statutory Designated Sites:

National: LNR = Local Nature Reserve

Table 3: Non-statutory designated sites within the vicinity of the site.

Site Name	Distance and Direction from Site	Size (Ha.)	Reason for Designation
St Mary's, Wood End SINC	0.6km south	6.8	A complex of public open space. Habitats include amenity grassland, hedgerows, scrub, semi-improved grassland, and secondary woodland. Meadows on site include species such as zig-zag clover, sheep's sorrel, and betony.
Hayes scrub SINC	0.9km west	8.04	A woodland within the Hayes business park comprised of both native and exotic species, appearing to have ancient characteristics; inaccessible to the general public.

Site Name	Distance and Direction from Site	Size (Ha.)	Reason for Designation
Uxbridge road scrub, Hayes SINC	1.0km west	1.0	An inaccessible area of scrub which provides suitable habitat for birds and mammals. The area is inaccessible to the public.
Down Way Park SINC	1.1km north	0.05	Parkland with a native hedge comprised of hawthorn, hornbeam, and field maple. It provides a good population of house sparrow.
Yeading Brook Meadows SINC	1.3km north	170.08	Comprised of an extensive mosaic of unimproved meadows and pastures, with hedgerows on an old flood plain. Species such as sneezewort, ragged robin, pepper-saxifrage are present. The site supports the only London population of the nationally scarce narrow-leaved water-dropwort.
The West London Shooting Ground and Down Manor SINC	1.4km north	30.03	The site supports a mosaic of habitats including hedges, patches of suckering English elm, and oak woodland.
Hayes by-pass roughs SINC	1.5km east	6.19	Woody vegetation and scrub on each side of the Haynes bypass. Prevailing herb species include wild carrot, hogweed, bristly ox-tongue, and creeping cinquefoil. The site provides good habitat for nesting birds.
Lake Farm Country Park SINC	1.7km south	24.17	A former agricultural area now managed for nature conservation. The grassland on site is dominated by false oat grass and perennial rye grass, with examples of couch, cock's foot and red fescue. The site supports kestrels and seasonal goldfinches.
Willowtree park SINC	1.8km south east	32.52	Publicly accessible areas set aside for wildlife; habitats include marsh, scattered trees, and unimproved neutral grassland. The site supports a high invertebrate diversity, with rich assemblages of hoverflies and solitary bees and wasps.
Yeading Brook, Minet country park and Hitherbroom park SINC	1.8km south	67.86	On an area of reclaimed derelict land, the site comprises rough grassland, aquatic habitats, and scrubby pits/hillocks. A wide range of flora and fauna is supported, including pepper saxifrage, fennel pondweed, kingfisher, skylark, whinchat, Dartford sedge warbler, and five nationally scarce species of water beetle.
Lime trees park	2.0km north	c. 8.2	Awaiting citation

Non-Statutory Designated Sites: SINC = Sites of Importance for Nature Conservation

Extended Phase 1 Habitat Survey

5.4 The Phase 1 Habitat map of the site is provided in Appendix 3 and the plant species recorded per habitat type are tabled in Appendix 4. Photographic plates are found in Appendix 5.

5.5 Broad habitat types found include:

- Dense scrub;
- Scattered scrub;
- Scattered broadleaf trees;
- Semi-improved grassland;
- Tall ruderal;
- Species-poor hedgerow with trees, and;
- Buildings.

Dense scrub

5.6 Areas of dense scrub exist at the north, south, and east borders (Appendix 5; Plate 1). They are all dominated

by bramble *Rubus fruticosus* and common nettle *Urtica dioica*.

Scattered scrub

- 5.7** Dense scrub along the western boundary grades into patches of scattered scrub, dominated by bramble.

Scattered broadleaved trees

- 5.8** Several trees were identified, including hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, goat willow *Salix caprea*, and ash *Fraxinus excelsior*.

Semi-improved grassland

- 5.9** The vast majority of the site is dominated by a single field of semi-improved grassland (Appendix 5; Plate 2). This was subject to a reptile translocation and subsequent destructive search in 2011 (SES, 2011). Species identified were common, and included false oat grass *Arrhenatherum elatius*, field bindweed *Convolvulus arvensis*, dandelion *Taraxacum agg.*, white clover *Trifolium repens*, red clover *Trifolium pratense*, broad leaf dock *Rumex obtusifolius* and creeping buttercup *Ranunculus repens*.

Tall ruderal

- 5.10** A small area of grassland grades into tall ruderal toward the east. Species include great willowherb *Epilobium hirsutum*, common nettle, false oat grass, and cocks foot *Dactylis glomerata*.

Species-poor hedgerow with trees

- 5.11** A mature hedgerow with trees exists along the northern boundary (Appendix 5; Plate 3). Species include hawthorn, bramble, blackthorn, sycamore *Acer pseudoplatanus*, common ivy *Hedera helix*, ash and elder *Sambucus nigra*.

Buildings

- 5.12** There are two buildings (Appendix 5; Plate 4, Plate 5; Appendix 6); Building 1 is a shed located along the eastern boundary. It is of timber and brick construction and is in a state of disrepair, with the roof and some of the walls missing, and appears to have been burnt. Building 2 occurs just south of building 1. It is a small brick outbuilding with a corrugated metal roof and is currently disused.

Summary

- 5.13** Most of the habitats recorded are common and widespread in the local area and contained common species typical of urban areas. Therefore, habitats are considered to be of value at a **Site** level only. The semi-improved grassland has been valued at **Local** level.

6.0 Preliminary Prediction of Impacts and Outline Mitigation and Enhancement Measures

Statutory/Non-statutory Sites

European Designated Sites

- 6.1** No European designated sites were identified within 8km of the site boundary.

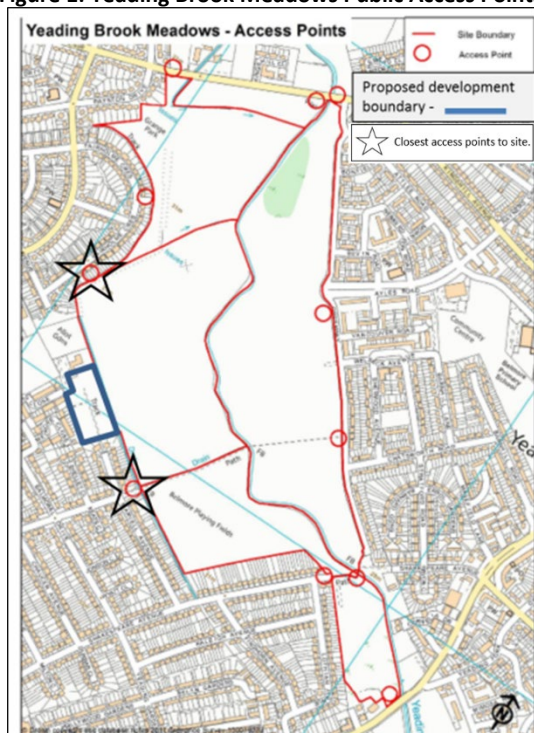
UK Designated Sites

- 6.2** Six statutory designated sites were recorded within 5km of the site, all Local Nature Reserves (LNR). LNRs are usually owned by local authorities, and as such their protection is decided locally, and varies from site to site.
- 6.3** Yeading Brook Meadows LNR is adjacent to the northern boundary. It is an area dominated by grasses and wildflowers around the local Yeading Brook. As it is located directly adjacent to the site, all potential direct and indirect effects caused by the proposed development should be considered.

Indirect effects

- 6.4** Yeading Brook Meadows is accessible, and the public are encouraged to use it via access areas, surfaced pathways, and children's play areas (Hillingdon Borough Council, 2016). As such, the LNR is expected to already be subject to moderate / high levels of recreational disturbance. Given the size of the proposed development, additional disturbance across the whole LNR are not considered to be significant. However, disturbance localised to the boundary bordering the site can be expected during the operational stage of development. This would likely be manifested as residents clearing the hedgerow to provide direct access to the meadow, and fly tipping rubbish. To minimise these effects homeowners should be encouraged to use Yeading Brook Meadows through official access paths (Figure 1), the two closest of which are a c.580m and c.800m walk away from site. Direct access from the site at the northern boundary should be restricted; this could be accomplished by shortening the length of garden areas adjacent to the northern boundary, installing security fencing and planting native thorny species. Taken together these measures will act as a buffer between the proposed housing and Yeading Brook Meadows, and direct homeowners to access the LNR through official access points. The provision of public open space (POS) will also help to alleviate recreational pressure on the LNR. It is considered that these measures will mitigate any indirect effects predicted on Yeading Brook Meadows. Indirect effects are not predicted on other designated sites as a result of the proposed development, given the scale of works and distances between the sites.

Figure 1: Yeading Brook Meadows Public Access Points (Hillingdon Borough Council, 2016)



Direct effects

6.5 As Yeading Brook Meadows LNR exists directly adjacent to the site boundary, it is considered that works during the construction phase of development may result in direct effects on the LNR without mitigation. These effects would likely manifest as polluting areas close to the site boundary, and physical damage caused by workers. The following measures are recommended to mitigate for the direct effects of the development upon Yeading Brook Meadows and its qualifying features:

- Install a fencing buffer along the northern boundary to protect it from pollution and physical damage; and
- Pollution prevention measures should be adhered to across the development site, to ensure materials and chemicals are stored safely and stored away from the northern boundary.

6.6 Direct effects are not predicted on other designated sites as a result of the proposed development, given the scale of works and distances between the sites.

Non-Statutory Designated Sites

6.7 11 non-statutory designated sites were identified within 2km. The closest of these is St. Mary's, Wood End SINC. It is designated for its range of habitats (grassland, scrub and hedgerow) in an area lacking in accessible wildlife sites. The public have access to all of the site. Given this, and the small scale of the proposed development, it is considered that there will not be a significant increase in recreational pressures on St. Mary's, Wood End, and significant direct or indirect effects are not predicted. Effects on other SINCs identified are not predicted due to the scale of development and the distances between sites.

Protected Habitats

Hedgerow

- 6.8** A NERC habitat was observed on site; a hedgerow running along the northern boundary. Despite being made up of native species, it is of low diversity and ecological value and has been assessed as having value at a **Site** level only. A formal hedgerow survey was not conducted; however, given the low number of native species and lack of associated hedgerow features present, it is considered that the hedgerow is unlikely to qualify as important under *The Hedgerow Regulations 1997*. The current development plans look to retain the hedge in its entirety (Appendix 2). During the construction phase it is recommended that the hedgerow be buffered and protected from works so as to avoid damage, including to the roots.

Lowland Meadow

- 6.9** The site is dominated by a single semi-improved grassland field however this has been modified by a destructive search for reptiles in 2011 (SES, 2011). Species identified from the ground flora were common, and it is considered that this habitat fails to classify as *NERC Act 2006* habitat of principal importance “Lowland Meadow”, given its semi-improved nature and previous land usage (allotments). However, grassland habitat is comparatively rare in the London area and has value at a **Local** level. It will be retained and enhanced where possible.

River (off-site)

- 6.10** Although not part of the site, the Yeading Brook represents a biodiverse and ecologically sensitive habitat occurring c.243m from site and has value at a **Local** level. The brook can be classified as a habitat of principle importance under the *NERC Act 2006* due to its natural / near-natural form. The brook may have the potential to be used by a number of protected and notable species, such as kingfisher, otter etc. as discussed in following sections. In addition, the brook’s ecological and chemical status is legally protected under the *Water Environment (Water Framework Directive) Regulations 2003*. As a ‘main river’, negatively effecting the brook’s ecological and / or chemical status could result in an offence under the *Water Environment Regulations 2003*. As such the brook should be protected during the construction and operational phase of the development.
- 6.11** To mitigate for any effects on the Yeading Brook, proposals for the site should include a buffer comprised of native planting along the northern boundary, which will aim to protect the watercourse against pollution and physical damage during construction.
- 6.12** During the operational phase signage should be installed along the buffer to warn of the important, sensitive nature of the river. The buffer will include tree / scrub planting, long grasses and preferably wildflowers to act as an enhancement. The river is separated from site by a section of the Yeading Brook Meadows LNR, which may be entered by new homeowners and/or recreational users. Given the small scale of the proposed development, the distance of the river from site, and the mitigation measures outlined above, significant direct and indirect effects are not predicted upon this LNR and associated watercourse.

Protected and Notable Species

Badger

- 6.13** The online search did not reveal any records within 2km of the site. However, this may be a result of under-recording, and should not be taken as definite.
- 6.14** The habitats on site (semi-improved grassland, hedgerow) provide good foraging opportunities for individuals that may be present in the wider landscape. Sett-building opportunities are considered to be negligible, due to the absence of any suitable embankments on site. Mammal runs were present throughout (Appendix 5; Plate 6) however other field signs such as hairs, snuffle marks *etc* were not observed. Two holes were found within the hedgerow on the northern boundary, but were not of a size and shape consistent with badger.
- 6.15** The site has value at a **Site** level for badger as it is considered that they may utilise the site for foraging/dispersal only. No further survey is considered necessary however general precautionary techniques sympathetic to badger (applicable to most sites) are recommended due to the potential for badger to forage in and disperse across the site:
- Covering trenches at night or leaving a plank of wood leant against the side to ensure badgers can escape if they were to accidentally fall in; and
 - Storing chemicals safely (e.g. locked away).

Bats - roosting

- 6.16** The desk study results of bat species are shown in Table 4 below.

Table 4: Records of bat species within 2km of the site boundary via the GIGL data search.

European Protected Species	Number of records	Last recorded (distance from site)
Pipistrelle Bat species <i>Pipistrellus sp.</i>	4	25/08/1993 (0.8km north)
Unidentified Bat records (Vespertilionidae)	2	12/07/1986 (1.3km north)

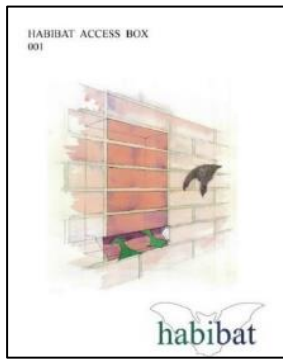
- 6.17** The site is connected to the surrounding environment through land to the north, comprised of semi-improved grassland meadows (including Yeading brook meadows LNR) and areas of hedgerow.
- 6.18** An external inspection of buildings 1 and 2 were undertaken (Appendix 5; Plate 4, Plate 5). In general, both buildings are open, resulting in draughty conditions, which are unsuitable for bats. No field signs of bats (staining, droppings, scratch marks) were observed in either building. An internal inspection of the buildings did not exhibit any features with the potential to support roosting bats. Given the lack of evidence of bats and lack of potential bat roost features present, both buildings are considered to have negligible potential to support roosting bats under best practice guidance (Collins, 2016). As such, further survey is not considered necessary.
- 6.19** Trees present on site were subject to an inspection from ground level. Features with the potential to support roosting bats were not identified. Additionally, no field signs were observed. Following best practice guidance (Collins, 2016), these trees are considered to have negligible potential to support roosting bats and no further surveys are required.
- 6.20** Although the trees on site are not considered to provide roosting habitat for bats, they may provide suitable foraging habitat and therefore have value at a **Site** level. If these trees are to be retained, it is likely they will be indirectly affected by the proposed works due to increased lighting. To mitigate any indirect effects on

foraging bats it is recommended that a sensitive lighting strategy be implemented around the trees that are to be retained, the details of which can be found in section 5.22.

Bats - foraging/commuting

- 6.21** The hedgerow on site is considered to provide minor amounts of suitable foraging and/or commuting habitat for bats. There is good connectivity and commuting habitat to the wider landscape, represented by the hedgerow to the north connecting to the Yeading Brook Meadows LNR and the brook itself. Given the site is dominated by short semi-improved grassland and the small size of the site, is considered to be of low suitability for foraging/commuting bats following best practice guidelines (Collins, 2016), and unlikely to support a diverse assemblage or high numbers of bats. Activity surveys are not recommended as it is considered that effects to local foraging and commuting bat populations can be wholly mitigated through the retention of the northern hedgerow, and the implementation of a lighting strategy sensitive to bats (detailed below). This should be employed throughout the site during the construction and operational phases, in particular along the sensitive northern boundary.
- 6.22** Site lighting will be kept to a minimum during both the construction and operational phases, especially in areas of potential foraging/commuting corridors such as hedgerows and scattered trees. If lighting is necessary then there are a number of ways to minimise the effect of lighting on bats. The following mitigation strategies have been taken from *Bat Conservation Trust Landscape and Urban design for Bats and Biodiversity* (Gunnell et al., 2012) and other referenced sources:
- In general, light sources should emit minimal ultra-violet light (Langevelde et al., 2011) and avoid the white and blue wavelengths of the light spectrum, so as to avoid attracting insects and thus potentially reducing numbers in adjacent areas, which bats may use for foraging.
 - Limiting the height of lighting columns to 8m and increasing the spacing of lighting columns (Fure, 2006) can reduce spill of light onto sensitive areas such as the aforementioned habitats.
 - The spread of light should be kept near to or below the horizontal plane, by using as steep a downward angle as possible and eliminating bare bulbs and upward pointing light fixtures.
 - Other ways to reduce light spill include the use of directional luminaires, shields, baffles and/or louvres. Flat, cut-off lanterns are best.
 - Additionally, lights should be located away from reflective surfaces where the reflection of light will spill onto potential foraging/commuting corridors.
 - Lighting that is required for security or access should use a lamp of no greater than 2000 lumens and be Passive Infrared (PIR) sensor activated, to ensure that the lights are only on when required and turned off when not in use (Jones, 2000; Hundt, 2012).
- 6.23** The site could be enhanced for bats through the planting of plant species known to benefit bats (see Appendix 7) and the inclusion of integrated bat boxes within the proposed buildings (away from artificial light) or provision of traditional bat boxes that could be hung on retained trees/new buildings. There are numerous bat box designs but the Habitat 001 Bespoke (www.habibat.co.uk) provides excellent summer roosting conditions for crevice inhabiting species including common pipistrelle *Pipistrellus pipistrellus*, which has been recorded in the vicinity of the site. Furthermore, no maintenance is required. See Figure 2 for a diagram.

Figure 2: Habitat Integrated Bat Box



- 6.24** As mentioned in Section 6.4, it is recommended that native planting along the northern boundary be incorporated into the development plan, to act as a buffer between the Yeading Brook and the site. This will help to enhance the site for bat species, providing habitat which will in turn attract invertebrate prey.

Birds

- 6.25** 1613 records of 66 bird species were found during the data search. 15 species are protected under *Schedule 1* of the *WCA 1981* including firecrest *Regulus ignicapilla*, bittern *Botaurus stellaris*, black redstart *Phoenicurus ochruros*, and merlin *Falco columbarius*. The habitats on site (semi-improved grassland, hedgerow, trees, buildings) are considered to provide small amounts of suitable hunting/foraging/nesting habitats for firecrest and black redstart, the latter of which is known to breed within London. The site is considered to provide habitat ubiquitous with the surrounding landscape and is suitable for common species and has value at a **Site** level only. Given the habitats present, it is considered that the site could support breeding birds. However, the small size of the site suggests that it is not suitable for a significant number of species. As such, breeding or wintering bird surveys are not required.
- 6.26** Habitat suitable for nesting (e.g. scrub and trees) should be cleared outside of the nesting season (generally 1 March to 31 August) or after an ecologist has confirmed active nests are not present.
- 6.27** The site may be enhanced for birds by installing a variety of bird boxes on the trees and proposed buildings. Furthermore, appropriate planting of native species or plant species known to benefit wildlife for more formal areas (see Appendix 8) could be included in the masterplan to provide increased nesting and foraging opportunities.

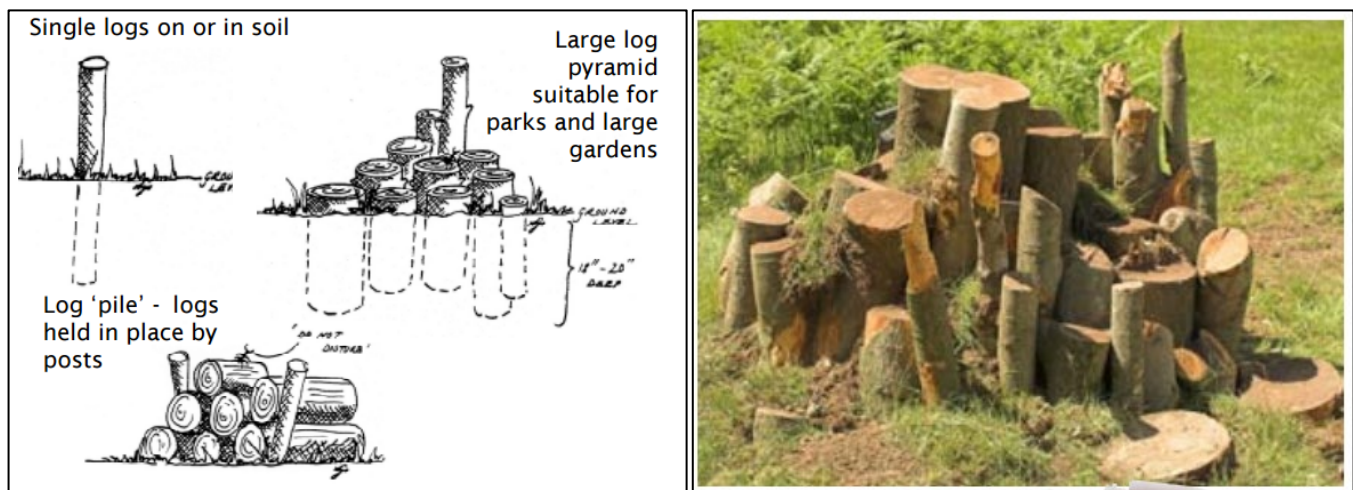
Great Crested Newt

- 6.28** Seven records of great crested newt (GCN) were identified within 2km, the most recent of which was in 2012, 1.9km from the site. The nearest record was in 2009, 1.3km from site.
- 6.29** The site comprises small amounts of terrestrial habitat suitable for GCN, including semi-improved grassland and hedgerows. No aquatic habitats are found on the site and there are no ponds within 500m (the maximum distance great crested newts are generally considered to distribute from breeding ponds).
- 6.30** As such, it is considered highly unlikely that GCN will utilise habitat on site, given the lack of viable water bodies nearby, and barriers to dispersal such as the town of Hayes to the south, east, and west, and the Yeading Brook to the north and further survey is not required.

Invertebrates

- 6.31** 33 records of stag beetle were returned by the data search, the closest of which was in 1998 c.500m from site. The most recent record was in 2009, 1.2km from site. Other notable invertebrates include several priority moth species. Semi-improved grassland on site does not exhibit a mosaic of vegetation heights or transient habitats preferred by invertebrates. Additionally, there was no deadwood or habitats suitable for saprophytic organisms on site. It is unlikely that stag beetle is present, or that the site supports any significant assemblages other rare/noted invertebrates and no further surveys are required.
- 6.32** Given the amount of stag beetle records in the area, there is scope to enhance the site for stag beetle as part of the development plan. Half-burying logs underground will aid the decomposition process and provide valuable habitat for stag beetle to lay eggs in and use as a food source (Figure 3). These could be installed along the northern boundary hedgerow.

Figure 3: Log pile enhancements for stag beetle



- 6.33** The inclusion of nectar rich plants in the landscaping design would also enhance the site post-development for invertebrates. Night-scented plant species such as evening primrose *Oenothera sp.*, honeysuckle *Lonicera sp.* and jasmine *Jasminum officinale* attract moths in the evening, which would in turn attract foraging bats.

Notable mammals

- 6.34** The desk study showed records of West European hedgehog c. 1km from site.
- 6.35** Semi-improved grassland and hedgerows provide suitable habitat for European hedgehog. Field signs of hedgehog are difficult to locate, and no field signs were found during the site visit. The site is considered to have value at a **Site** level for hedgehog.
- 6.36** Some habitats (hedgerow margins and areas of grassland) may be considered suitable for brown hare *Lepus europaeus* and harvest mouse *Micromys minutus*. However, given the surrounding urban environment it is considered highly unlikely that brown hare or harvest mouse would be present on site. No field signs were observed during the site visit.
- 6.37** Care should be taken when clearing vegetation to avoid killing or injuring hedgehog individuals throughout the year in their nests (summer, maternity and hibernation). Where possible, vegetation clearance should be undertaken in stages and be excluded during the hibernation period (October to March) when hedgehog is more vulnerable or once a fingertip search by an ecologist has been undertaken.

Plants

- 6.38** The data search returned records for *Schedule 8* species bluebell *Hyacinthoides non-scripta*, stinking goosefoot *Chenopodium vulvaria*, deptford pink *Dianthus armeria*, field eryngo *Eryngium campestre*, broad-leaved cudweed *Filago pyramidata*, cut-grass *Leersia oryzoides*, field cow-wheat *Melampyrum pratense*, pennyroyal *Mentha pulegium*, and triangular club-rush *Schoenoplectus triqueter*. None of these species were observed on site. It should be noted that only bluebell and cut-grass were recorded within the last 29 years. Habitats on site are not considered to be suitable for these species. Additionally, no other plant species recorded on site are listed under *Schedule 8* of the *WCA 1981*, and it is considered that none are rare or threatened.
- 6.39** No non-native invasive species listed under *Schedule 9* of the *WCA 1981* were recorded. As such no further works are recommended.

Reptiles

- 6.40** The data search returned multiple records of commoner reptile species, the results of which can be seen in the table below (Table 5). Previous work on site has involved the erection of exclusion fencing and translocation of a small slow worm population, and subsequent destructive search of the site (SES, 2011). Since this work has been completed, the exclusion fencing has broken down and the site recolonised to semi-improved grassland (Appendix 5; Plate 2).

Table 5: Records of reptile species returned from the GIGL data search

UK Protected Species	Number of records	Last recorded (distance from site)
Slow-worm <i>Anguis fragilis</i>	7	29/05/2012 (0.02km north)
Grass Snake <i>Natrix helvetica</i>	5	23/05/2012 (0.2km north)
Common Lizard <i>Zootoca vivipara</i>	1	2007 (0.7km north)

- 6.41** Semi-improved grassland, scrub and hedgerows are considered to provide suitable habitat for the four commoner reptile species. These areas are ecologically connected to the wider landscape east of the site, via hedgerows, areas of scrub to the north, and the river east of site. Suitable refugia such as log piles were not observed on site. The site is considered to have value at a **Site** level for reptiles.
- 6.42** Given the habitats on site, presence of local records, and results of prior survey, a seven-visit reptile survey is required. Typically carried out from mid-March to September, surveys should be undertaken during 'suitable' days for reptile activity; a 'suitable' survey day is determined by the weather with temperature being the pre-eminent factor (10°C-17°C). Reptile refugia (0.5m x 0.5m) should be used to observe reptiles basking. Refugia should be laid at a density of 10 per hectare. This survey method is recognised as best practice by Froglife (1999) and the *Herpetofauna Worker's Manual* (Gent and Gibson, 2003).

Otter and Water Vole

- 6.43** Two records of water vole were identified during the data search, both records occurring 1.5km away in 1966. No records of otter were observed. However, this may be a result of under-recording and should not be taken as definitive.
- 6.44** No aquatic habitat exists on site and the habitats present (semi-improved grassland and hedgerow) provide negligible rest and sheltering habitat for otter or water vole. Research indicates that otter and water vole will

disperse using small ditches, streams, or even directly over ground (Chanin, 2003; Anderson & Raynor, 2007). The Yeading Brook is present c.200m north of the site. However, the habitats on site are not considered to provide suitable dispersal habitat for otter or water vole, as the site is surrounded on all other sides by residential housing. No field signs were observed on site (e.g. otter holts/couches, water vole feeding signs, latrines/spraints etc.).

Other species

6.45 The following protected species are deemed to be highly unlikely to be present on site due to a lack of local records and suitable habitats:

- White-clawed crayfish *Austropotamobius pallipes*; and
- Hazel dormouse *Muscardinus avellanarius*

Summary

6.46 Table 6 below sets out the summary evaluation of features based on the criteria listed in Section 2.16. Note that the current confidence in the prediction reflects the lack of survey work for some features with the exception of the adjacent protected sites and habitats within the site.

Table 6. Summary evaluation of features

Feature	Summary Description	Value	Confidence
LNR	Yeading Brook Meadows	Local	High
SINC	See Table 3	Local	High
Habitats	Semi-improved grassland All other habitats	Local Site	High High
Flora	Higher and lower plant species	Site	High
Badger	The site provides opportunities for foraging and commuting.	Site	Moderate
Bats	The site provides some potential for foraging and commuting but suitable habitat will be retained	Site	High
Birds	Probably common species breeding within the habitats, but majority is being retained	Site	Moderate
Notable mammals	Sub-optimal habitat for breeding and foraging hedgehog	Site	Moderate
Reptiles	The site provides suitable habitat for foraging reptiles	Site	Moderate

7.0 **Conclusion**

- 7.1** The site (c. 1.2ha) is comprised of semi-improved grassland with areas of hedgerow scrub, and scattered trees. The Yeading Brook Meadows LNR is found north of the site. The east, west, and south of the site is bordered by residential housing.
- 7.2** Direct and indirect effects are predicted upon Yeading Brook Meadows LNR. Mitigation measures are detailed in sections 6.4 and 6.5.
- 7.3** The site is considered to provide suitable habitat for reptiles, foraging bats, nesting birds, hedgehog, and foraging badger. Nesting birds and hedgehog will be protected by implementing the measures outlined in sections 6.26 and 6.36 respectively. Further surveys for reptiles are recommended (see section 6.41) and any mitigation requirements will be detailed in subsequent reports.
- 7.4** A summary of the likely impacts and mitigation is provided in Table 7.

Table 7. Summary of likely impacts, mitigation and enhancement measures and residual impacts

Feature	Likely Impacts	Potential Mitigation and Enhancement Measures	Likely Residual Impact
Yeading Brook Meadows	Direct and indirect effects as outlined in Sections 6.4 and 6.5	Encouragement of the use of existing access points into the LNR; planting of native, thorny species to create a buffer; shortening of gardens so they do not directly abut the LNR; installation of fencing during construction and control of potential pollutants.	Likely negligible
Hedgerow	Damage during construction phase	Fencing erected to prevent encroachment	Likely negligible
Semi-improved grassland	Habitat loss	Retention and enhancement where possible	Possibly significant, minor adverse
Yeading Brook river	Indirect affects	Creation of a habitat buffer along the northern boundary	Likely negligible
Badger	Disturbance to foraging and commuting badgers during the construction phase	Covering of trenches over night; provision of escape ramps; safe storage of chemicals	Likely negligible
Bats	Disturbance to foraging and commuting bats	Retention of suitable habitat; adoption of a sensitive lighting plan; provision of bat boxes	Likely negligible
Birds	Disturbance to nesting birds during vegetation removal	Clearance of vegetation outside of the nesting season (or following a check by an ecologist); provision of nest boxes	Likely negligible
Stag beetle	None as no suitable habitat is present	Creation of buried log piles and nectar-rich plant species to enhance the site	N/A
Hedgehog	Disturbance during vegetation removal	Removal of vegetation outside of the hibernation season (October to March)	Likely negligible
Reptiles	Subject to further surveys to confirm presence or likely absence	Creation of a receptor site and translocation	Likely negligible

- 7.5** In summary, it is predicted that any potential adverse impacts from the proposed development upon specific

protected species/habitats can be mitigated. With appropriate on-site mitigation and targeted enhancements, a positive change in the biodiversity could potentially be achieved, in line with *chapter 15: Conserving and Enhancing the Natural Environment*, of the NPPF (MHCLG, 2018) and development control policies as set out in the Hillingdon Local Plan (Hillingdon Borough Council, 2012).

8.0 References

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Appendix 1. Site Location



Appendix 2. Proposed Development Plan

Appendix 3. Extended Phase 1 Habitat Map



Appendix 4. Plant Species List and Relative Abundance

Common name	Latin name	Dense scrub	Scattered scrub	Scattered broadleaf trees	Semi-improved grassland	Tall ruderal	Species poor hedgerow with trees
Ash	<i>Fraxinus excelsior</i>			O			O
Blackthorn	<i>Prunus spinosa</i>			O			O
Bramble	<i>Rubus fruticosus</i>	D	D				O
Bristly ox-tongue	<i>Helminthotheca echioides</i>				O	O	
Broad-leaved dock	<i>Rumex obtusifolius</i>				O		
Cock's foot	<i>Dactylis glomerata</i>				O	O	
Common nettle	<i>Urtica dioica</i>	F	F				
Cow parsley	<i>Anthriscus sylvestris</i>					O	
Creeping buttercup	<i>Ranunculus repens</i>				F		
Creeping thistle	<i>Cirsium arvense</i>	O	F			O	
Dandelion	<i>Taraxacum agg.</i>				O		
Dogwood	<i>Cornus sanguinea</i>						O
Elder	<i>Sambucus nigra</i>						O
Elm species	<i>Ulmus sp.</i>		O				
False-oat grass	<i>Arrhenatherum elatius</i>				O	O	
Field bindweed	<i>Convolvulus arvensis</i>				O		
Goat willow	<i>Salix caprea</i>			O			
Great willowherb	<i>Epilobium hirsutum</i>	O					
Hawthorn	<i>Crataegus monogyna</i>			F			O
Hedge bindweed	<i>Calystegia sepium</i>	O					O
Ivy	<i>Hedera helix</i>	O					O
Pedunculate oak	<i>Quercus robur</i>			O			O
Perennial rye grass	<i>Lolium perenne</i>				D		
<i>Prunus sp.</i>	<i>Prunus sp.</i>			O			
Common Ragwort	<i>Jacobaea vulgaris</i>				R		
Red campion	<i>Silene dioica</i>				R		
Red clover	<i>Trifolium pratense</i>				O		
Ribwort plantain	<i>Plantago lanceolata</i>				F		
Sweet chestnut	<i>Castanea sativa</i>			R			
Sycamore	<i>Acer pseudoplatanus</i>			O			
White clover	<i>Trifolium repens</i>				O		
Vetch sp.	<i>Vicia sp.</i>				R	O	
Yorkshire fog	<i>Holcus lanatus</i>				O	O	

Appendix 5. Plates

Plate 1: Dense scrub along the southern boundary (View: east)



Plate 2. Semi-improved grassland on site (View: west)



Plate 3: Hedgerow along the site's northern boundary (View: north-east)



Plate 4: Building 1 west aspect (View: east)



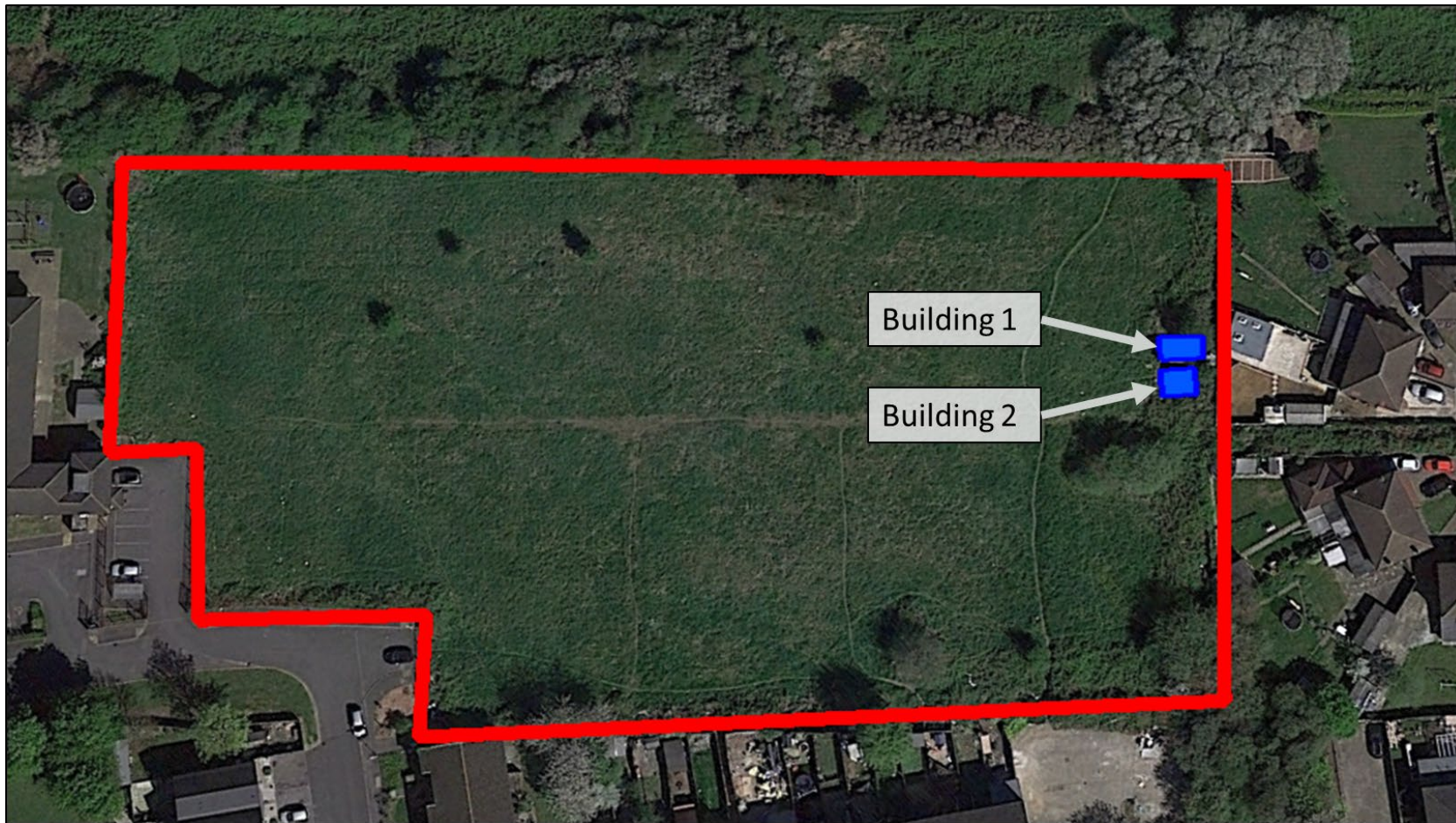
Plate 5: Building 2 south-west aspect (View: north-east)



Plate 6: Mammal run toward the west of site (View: south)



Appendix 6: Buildings on site



Appendix 7: Species of known benefit to bats

The following table is reproduced from *Gunnell, K., Grant, G. and Williams, C. (2012). Landscape and Urban Design for Bats and Biodiversity, Bat Conservation Trust*. This suggests plant species that can provide benefit for bats by either providing a food source for insects and/or roost potential. The plants listed are predominately native to Britain. The small group of non-native plants included for their documented value for wildlife. This list has been checked against Natural England's list of invasive non-native plants.

Plant species	Common name	Native (N)	Type	Benefit	Soil	Light	Extensive green roofs	Living walls	Rain gardens	Hedge/ trees	Beds/ borders
<i>Acer campestre</i>	Field maple	N	T/S	C	Any	Sun/ shade				Y	
<i>Acer platanoides</i>	Norway maple		T	S	Well drained/ alkaline	Sun/ shade				Y	
<i>Acer saoocharum</i>	Sugar maple		T	S	Any	Sun/ shade				Y	
<i>Achillea millefolium</i>	Yarrow	N	HP	C,F	Well drained	Sun				Y	
<i>Ajuga reptans</i>	Bugle	N	HP	C,F	Any	Sun/ shade	Y		Y		
<i>Anthyllis vulneraria</i>	Kidney vetch	N	HP	F	Well drained	Sun	Y				
<i>Aubrieta deltoidea</i>	Aubrieta		H	F	Well drained	Sun/shade		Y			
<i>Betula pendula</i>	Sliver birch	N	T	C	Sandy/ acid	Sun				Y	
<i>Cardamine pratensis</i>	Cuckoo- flower	N	HP	F	Moist	Sun/ shade			Y		Y
<i>Carpinus betulus</i>	Hornbeam	N	T	C	Clay	Sun				Y	
<i>Centaurea nigra</i>	Common knapweed	N	HP	C,F	Dry, not acid	Sun	Y				Y
<i>Centranthus ruber</i>	Red valerian		HP	F	Well drained	Sun	Y				Y
<i>Clematis vitalba</i>	Old man's Beard	N	C	F	well drained/ alkaline	Sun				Y	
<i>Corylus avellana</i>	Hazel	N	S	C	Any dry	Sun/ shade		Y		Y	
<i>Crataegus monogyna</i>	Hawthorn	N	S	S,C	Any	Sun/shade				Y	
<i>Daucus carota</i>	Wild carrot	N	Bi	S,C,F	Any	Sun	Y				Y
<i>Dianthus spp.</i>	Pinks	N	A-Bi	F	Well drained	Sun	Y	Y			Y
<i>Digitalis purpurea</i>	Foxglove	N	Bi	C	Well drained	Shade/ partial shade				Y	Y
<i>Erica cinera</i>	Bell heather	N	S	F	Sandy	Full sun					Y
<i>Ersimum cherira</i>	Wallflower		Bi-P	F	Well drained	Sun		Y			Y
<i>Eupatorium</i>	Hemp agrimony	N	H	F	Moist	Sun/ shade			Y		Y
<i>Fagus sylvatica</i>	Beech	N	T	C, R	Well drained alkaline	Sun/shade				Y	
<i>Foeniculum vulgare</i>	Fennel		H	F	Well drained	Sun					Y
<i>Fraxinus excelsior</i>	Common Ash	N	T	C, R	Any	Sun/ shade				Y	
<i>Hebe spp.</i>	Hebe species		S	F	Well drained	Sun /shade				Y	Y
<i>Hedera Helix</i>	Ivy	N	C	F,C	Any	Sun/ shade		Y	Y	Y	Y

Plant species	Common name	Native (N)	Type	Benefit	Soil	Light	Extensive green roofs	Living walls	Rain gardens	Hedge/ trees	Beds/ borders
<i>Hesperis matronalis</i>	Sweet Rocket		H	F	Well drained/ dry	Sun/ shade					Y
<i>Hyacinthoides non-scripta</i>	Bluebell	N	B	F	Loam	Shade/ partial shade		Y		Y	Y
<i>Ilex aquifolium</i>	Holly	N	T	C	Any	Sun/ shade				Y	
<i>Jasmine officinale</i>	Common jasmine		C	F	Well drained	Sun		Y			Y
<i>Lavandula spp.</i>	Lavender species		S	F	Well drained / sandy	Sun		Y			Y
<i>Linaria vulgaris</i>	Toadflax	N	HP	C	Well drained/ alkaline	Sun	Y				Y
<i>Lonicera periclymenum</i>	Honeysuckle	N	C	F	Well drained	Sun		Y		Y	
<i>Lotus corniculatus</i>	Bird's foot trefoil	N	HP	F	Well drained/ dry	Sun	Y				Y
<i>Lunaria annua</i>	Honesty		Bi	F	Any	Sun/ partial shade	Y				Y
<i>Malus spp.</i>	Apple		T	C	Any	Sun				Y	Y
<i>Matthiola longipetala</i>	Night - scented stock		A	F	Well drained/ moist				Y		Y
<i>Myosotis spp.</i>	Forget me not species	N	A	F	Any	Sun	Y	Y			Y
<i>Nicotiana glauca</i>	Ornamental tobacco		A	F	Well drained moist	Sun /partial shade			Y		Y
<i>Oneothesa spp.</i>	Evening primrose		Bi	F	Well drained	Sun	Y				Y
<i>Origanum vulgare</i>	Marjoram	N	HP	F	Well drained / dry	Sun				Y	
<i>Populus alba</i>	White poplar	N	T	C	Clay loam	Sun				Y	
<i>Primula veris</i>	Cowslip	N	HP	F	Well drained/ moist	Sun/ partial shade	Y				Y
<i>Primula vulgaris</i>	Primrose	N	HP	F	Moist	Partial shade	Y	Y		Y	Y
<i>Prunus avium</i>	Wild cherry	N	T	C	Any	Sun				Y	Y
<i>Prunus domestica</i>	Plum		T	C	Well drained/ moist	Sun				Y	Y
<i>Prunus spinosa</i>	Blackthorn	N	S	C	Any	Sun/ partial shade				Y	
<i>Quercus petraea</i>	Sessile oak	N	T	C,R	Sandy loam	Sun/ shade				Y	
<i>Quercus robur</i>	Common oak	N	T	R	Clay Loam	Sun/ shade				Y	
<i>Rosa canina</i>	Dog rose	N	S	C	Any	Sun			Y	Y	Y
<i>Salix spp.</i>	Willow species	N	S	S,C	Moist	Sun/ shade			Y	Y	
<i>Sambucus nigra</i>	Elder	N	T	C	Clay loam	Sun				Y	
<i>Saponaria officinalis</i>	Soapwort	N	HP	F	Any	Sun					Y
<i>Saxifraga oppositifolia</i>	saxifage	N	HP	C	Well drained	Sun	Y	Y			Y
<i>Scabiosa columbaria</i>	small scabious	N	HP	F	Well drained/ alkaline	Sun	Y				Y
<i>Sedum spectabile</i>	Ice plant		HP	F	Well drained/ dry	Sun	Y				Y

Plant species	Common name	Native (N)	Type	Benefit	Soil	Light	Extensive green roofs	Living walls	Rain gardens	Hedge/ trees	Beds/ borders
<i>Silene dioecia</i>	Red campion	N	HP	F	Any	Shade/ partial shade		Y	Y	Y	Y
<i>Sorbus aucuparia</i>	Rowan	N	T	C	Well drained	Sun				Y	
<i>Stachys lanata</i>	Lamb's ear		HP	F	Well drained/ dry	Sun					Y
<i>Symphotrichum spp.</i>	Michalemas daisies		HP	F	Any	Sun					Y
<i>Tages patula</i>	French marigold		A	F	Well drained	Sun					Y
<i>Thymus serpyllum</i>	Creeping thyme	N	HP/S	F	Well drained/ dry	Sun	Y	Y			Y
<i>Tilia x europaea</i>	Common lime		T	C	Any	Sun/ shade				Y	
<i>Trifolium spp.</i>	Clover species	N	H	F	Any	Sun	Y				Y
<i>Valerina spp.</i>	Valerian species	N	HP	F	Moist	Sun/ partial shade			Y		Y
<i>Verbascum spp.</i>	Mulliens	N	Bi, HP	C	Well drained	Sun					Y
<i>Verbena bonariensis</i>	Verbena		HP	F	Well drained/moist	Sun					Y
<i>Viburnum lantana</i>	Wayfaring tree	N	S	C	Any	Sun/ shade				Y	Y
<i>Viburnum opulus</i>	Guelder rose	N	S	C	Moist	Sun/ shade			Y	Y	
<i>Viola tricolor</i>	Pansy	N	A	F	Well drained/ moist		Y	Y			Y

Legend

Type		Benefit	
HP	Herbaceous perennial	C	Moth caterpillar food plant
Bi	Biennial	S	Sap sucking insects (e.g. whiteflies)
BiP	Biennial perennial	F	Flowers attract adult moths
T	Tree	E	Good roost potential
S	Shrub		
H	Herb		
A	Annual		
B	Bulb		
C	Creeper/ climber		

Appendix 8: Species of known benefit to wildlife

Common Name	Scientific Name	Benefits
Blackthorn	<i>Prunus spinosa</i>	Nectar, fruit, larval foodplant, nesting cover
Broom	<i>Cystisus scoparius</i>	Nectar, larval foodplant
Buckthorn #	<i>Rhamnus cathartica</i>	Nectar, berries, larval foodplant, nesting cover
Crab Apple	<i>Malus sylvestris</i>	Nectar, nesting cover, fruit
Dog Rose	<i>Rosa canina agg.</i>	Nectar, fruit, larval foodplant, nesting cover
Dogwood	<i>Cornus sanguinea</i>	Nectar, fruit, larval foodplant
Elder	<i>Sambucus nigra</i>	Nectar , fruit, larval foodplant, nesting cover
Field rose	<i>Rosa arvensis</i>	Nectar, larval foodplant, fruit
Field maple	<i>Acer campestre</i>	Nesting cover,
Gorse	<i>Ulex europaeus</i>	Nectar, larval foodplant, nesting cover
Guelder rose	<i>Viburnum opulus</i>	Nectar, fruit, larval foodplant
Hawthorn (Common)	<i>Crataegus monogyna</i>	Nectar, fruit, larval foodplant, nesting cover
Hawthorn (Midland)	<i>Crataegus laevigata</i>	Nectar, fruit, larval foodplant, nesting cover
Hazel	<i>Corylus avellana</i>	Nuts, larval foodplant, nesting cover, early pollen for bees.
Holly	<i>Ilex aquifolium</i>	Nectar, fruit, larval foodplant, nesting cover
Hornbeam	<i>Carpinus betulus</i>	Year round shelter, roosting nesting & foraging opportunities for birds and small mammals
Oak	<i>Quercus robur/Quercus petraea</i>	Nesting cover, nuts, larval foodplant,
Rosemary *	<i>Rosmarinus officinalis</i>	Nectar
Rowan	<i>Sorbus aucuparia</i>	Fruit, nesting cover
Silver Birch	<i>Betula pendula</i>	Nesting cover
Spindle #	<i>Euonymus europaeus</i>	Nectar, fruits
Wayfaring tree	<i>Viburnum lantana</i>	Nectar, fruit, larval foodplant
Wild Cherry	<i>Prunus avium</i>	Nectar, fruit, nesting cover, larval food plant
Yew#	<i>Taxus baccata</i>	Berries, nesting cover
Wild Service Tree	<i>Sorbus torminalis</i>	Nectar, larval foodplant, fruit
Climbers		
Clematis*	<i>Clematis tangutica</i>	Nectar, seeds
Honeysuckle	<i>Lonicera periclymenum</i>	Nectar, fruit, larval foodplant, nesting cover
Ivy	<i>Hedera helix</i>	Nectar, fruit, larval foodplant, nesting cover
Traveller's joy	<i>Clematis vitalba</i>	Nectar, seeds, larval foodplant

Note:

* Non-native species

poisonous