

**Legend**

- Site Boundary
- 30 Km Study Area
- Special Area of Conservation**
- Candidate
- Designated
- RAMSAR

Figure Title  
**Special Areas of Conservation with Bats as a Qualifying Feature**

Project Name  
**West of Ifield**

Project No.  
**1620007949-003**

Date May 2025	Figure No. 3	Revision 2.0
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Prepared By MB	Scale 1:250,000 @A3
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Client  
**Homes England**



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## **APPENDIX 2 NATURAL ENGLAND CORRESPONDENCE**

Date: 21 May 2020  
Our ref: DAS/30762



Customer Services  
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CW1 6GJ

0300 060 3900

**BY EMAIL ONLY**

Dear Matthew

**Discretionary Advice Service (Charged Advice)  
Land West of Ifield - 307262  
Development proposal and location:**

Thank you for your consultation on the above dated 27 April 2020, which was received on the same day.

This advice is being provided as part of Natural England's Discretionary Advice Service. Mat Royal of UK Environ LTD has asked Natural England to provide advice upon:

- HRA Screening Technical Note
- District Level Licensing
- Ancient woodland buffers

This advice is provided in accordance with the Quotation and Agreement dated 30 April 2020.

The following advice is based upon the information within

1. The HRA Screening Technical Note
2. Email from Matthew Royal to Rebecca Pearson of 27 April 2020

**Land West of Ifield Screening Methodology Technical Note**

I note the comments of the Technical Note and have the following comments which I advise will be key considerations for investigating all potential impact pathways to International Wildlife Sites through the Land West of Ifield development.

**Hydrological and Hydrogeological effects-Water Resources**

I note that the information provided with respect to impacts to International wildlife Sites is a distance-based criteria and wish to advise that with respect to hydrological impact pathways the distance criteria should not be used in order to screen out potential impacts. Emerging evidence is indicating the deleterious effect that developments within Horsham District are having on features within the Arun Valley SPA, SAC and Ramsar sites. Developments coming forward will therefore need to ensure these impact pathways are screened in to HRA's. This is further explained below.

**Water Quantity**

Natural England has reviewed data regarding the abstraction license at Hardham with the EA and the Water Company. Our role is to provide advice on potential impacts of abstraction operations on statutory wildlife sites.

A summary of our advice is as follows:

#### Water Resources-Arun Valley SPA, SAC and Ramsar Site

In December 2019 Natural England wrote to Southern Water services to state that based on a recent evidence review of the Hardham groundwater abstraction, an adverse effect on the integrity of the Arun Valley SAC, SPA and Ramsar features could not be excluded with certainty. This abstraction is a significant contributor during certain supply conditions to Southern Water's Sussex North supply area. This area supplies Horsham and has clear implications for plans and projects in this area. The Environment Agency and Natural England are working with Southern Water to try to identify a long term more sustainable water supply. In the meantime, whilst the adverse effect remains or is uncertain, development in Horsham must be certain not to add to this adverse effect. I therefore advise that water quantity is screened in for appropriate assessment in the HRA. I advise that you consult studies such as the Gatwick Sub Regional water cycle study regarding this issue. For example the study cites the requirement to demonstrate water neutrality in order for sufficient water to be available to the district.

With regard to the above I advise that in order to meet the requirements of the Habitats Regulations your project will need to provide evidence of water usage. Of further note is that Horsham District is within the Gatwick sub-region WCS –This strategy has concluded that water use within the district will need to demonstrate neutrality in order for sufficient water to be available to the district.

#### Water Quality

Natural England is currently assessing the potential effects of reduced water quality on Arun Valley SAC SAC/SPA and Ramsar. This is mainly via Waste Water Treatment Works. The condition of the SSSIs that underpin the European sites in the Arun Valley is being reviewed. At a site level these condition assessments indicate the sites' contribution to the European site conservation status which is assessed nationally. As one of only four European sites for the SAC species *Anisus vorticulus*, the condition of the SSSIs that underpin the Arun Valley SAC is of particular importance. The supplementary advice for the European sites has water quality attributes and the condition assessment will assess whether these are currently met. A *prima facie* assessment of the condition data for the abstraction assessment described above, indicates that the condition of the sites is out-of-date and may fail the water quality targets when reassessed. Condition cannot be changed until an assessment compliant with the national guidance (common standards monitoring guidance, CSMG and favourable condition tables) is completed. If Natural England determines the site is at unfavourable condition and therefore contributing to unfavourable conservation status, as Natural England's *prima facie* view suggests it may be, then the development in Horsham must not add to unfavourable condition or hinder the ability to restore the sites' condition.

In summary should our assessment confirm that this site is failing its water quality objectives this will require Plans and Projects to be assessed in line with the Dutch Nitrogen ECJ (see below). With respect to your project this means that any development coming forward that uses WwTW which outfalls into the catchment of the river Arun, must provide robust mitigation including strategic solutions such as nutrient neutrality, to ensure the proposed growth has the potential to meet the legislative tests.

Natural England recommends evidence is required in order for your authority to undertake an HRA of development's contribution to the river water quality changes in the designated sites. Mitigation for water quality impacts would be required to demonstrate that proposed growth has the potential to meet the legislative tests.

We have yet to conclude this assessment and are therefore providing this information at this time in order to inform you of our work in this area.

Should subsequent evidence confirm that the International site is failing water quality objectives we will of course work closely with you on this matter.

### Dutch Nitrogen Case

Caselaw<sup>1</sup> has tightened the interpretation of the application of these tests, in particular in relation to the certainty required to avoid adverse effects and issuing of permissions to European sites which already have existing adverse effects. This has particularly significant implications for assessments of plans or projects that can add to atmospheric pollution, water resource pressures or water quality impacts.

### **Traffic and Air Quality Impacts**

We note and concur that air quality impacts considered in though the screening exercise.

### **Bats**

We note that impacts to SACs designated for bats within the wider search radius will be considered in the screening exercise. This should include impacts of habitat loss and fragmentation (i.e. any impacts to functionally linked habitats outside of the SACs

Natural England has produced a protocol for the Sussex Bat SACs which has been included in the South Downs National Park's Local Plan. The protocol is designed to guide development within a core conservation area of 6.5km and wider conservation area of 12km from the SACs. This includes much of Horsham District.

### **District Level Licensing (DLL)**

I am checking with licensing colleagues regarding this matter and will respond in due course

### **Buffers to Ancient Woodland**

Thank you for your question regarding buffers to ancient woodland. Ancient woodland is a habitat of exceptional importance. It is an irreplaceable habitat which, once lost cannot be re-created. I advise that you also consider whether the project will impact on any veteran trees, which are afforded policy protection through the NPPF. The value of irreplaceable habitats is reflected in the robust policy protection that they have been afforded through the NPPF. I advise that you consider any impacts on ancient woodland and ancient or veteran trees in line with paragraph 175 of the NPPF which states:

175 c) "*development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused unless there are wholly exceptional reasons (footnote 58) and a suitable compensation strategy exists*".

I advise that this requires both direct protection of the habitat itself and the prevention of its deterioration. This means any indirect affects need to be carefully considered which include for example;

- Fragmentation and severance of interlinking habitats around the woodland,
- Changes in the existing hydrological regime (hydrological pathways water quality and quantity),
- Air quality,
- Recreational impacts (access to, disturbance and trampling of woodland)
- Lighting

I advise that the 15m buffer within the standing advice refers to a buffer of *at least* 15m and any project must consider indirect impact pathways when providing suitable buffers. Of key importance is maintaining the resilience of these habitats through assessing their functionality and that of any adjoining habitats, and ensuring that these are maintained through environmental masterplanning from the outset. I welcome your proposal to ensure these buffers are as wide as possible and I also


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<sup>1</sup>Case C-323/17 People over wind and Sweetman. Ruling of CJEU [Coöperative Mobilisation case](#) (often referred to as the Dutch Nitrogen cases).

advise that both distance and the impact of the development surrounding the buffer will be of key importance. For example, does a road sever hedgerows linking the woodland? If so, how can this be avoided? Therefore I again advise that environmental masterplanning will be key and should also include the provision of green infrastructure, avoiding key habitats, maintaining connectivity and providing biodiversity net gain. I will of course be happy to advise further on this matter.

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Yours sincerely

  
Senior Adviser  
Natural England  
Sussex and Kent Team

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## **Annex 1**

### **European Protected Species**

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's ['How to get a licence'](#) publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's [guidance](#) on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on [Natural England's website](#).

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# APPENDIX 8.7: LAND WEST OF IFIELD – INVERTEBRATE SURVEY REPORT

**Commissioned by**  
Ramboll UK Ltd  
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London  
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# **LAND WEST OF IFIELD**

## **INVERTEBRATE SURVEY REPORT**

Report number: CPA-23211  
**September 2023**

Prepared by

**Colin Plant Associates (UK)**  
**Consultant Entomologists**  
30a Alexandra Rd, London, N8 0PP

# 1 INTRODUCTION AND METHODOLOGY

## 1.1 Introduction

1.1.1 On 14<sup>th</sup> April 2023 **Colin Plant Associates (UK)** was commissioned by **Ramboll UK Ltd** to undertake an invertebrate survey of a large parcel of land west of Ifield, Sussex, covering approximately 170 hectares in extent.

1.1.2 At the landscape level the survey area presents as a wider mosaic of semi-improved and improved neutral grassland, arable farmland and mature broad-leaved woodland, with an extensive network of mature hedgerows. Various wetland features are present including numerous ponds and two watercourses: the River Mole runs across the northern half and the Ifield Brook along part of the eastern edge. The southernmost portion of the site is currently in use as Ifield Golf Course.

## 1.2 Invertebrate records

1.2.1 The site was surveyed for terrestrial and aquatic invertebrates during 2018-19 (Mellings, 2019). This assessment was based on three survey periods during mid-summer and late summer in 2018 and early spring in 2019. A variety of active sampling methods were employed including sweep-netting, beating, suction sampling and pond-netting for aquatic invertebrates, as well as a butterfly transect survey for the Brown Hairstreak *Thecla betulae*. Passive sampling methods which operate in the absence of a surveyor and involve the use of trapping techniques were not employed.

1.2.2 The survey area in 2018-19 included an additional land parcel directly adjacent to the western edge of Ifield comprising Ifield Meadows, a Local Wildlife Site. This did not form part of the survey area in 2023 as it is excluded from the proposed development area, other than a small section of pedestrian and cycle access.

1.2.3 The 2018-19 survey produced 719 species which included 32 species of conservation significance (excluding two 'Research only' Section 41 Species of Principal Importance) and concluded that the overall site could be considered to support an invertebrate assemblage of at least regional conservation value. The key species recorded by the survey are presented in Table 1.

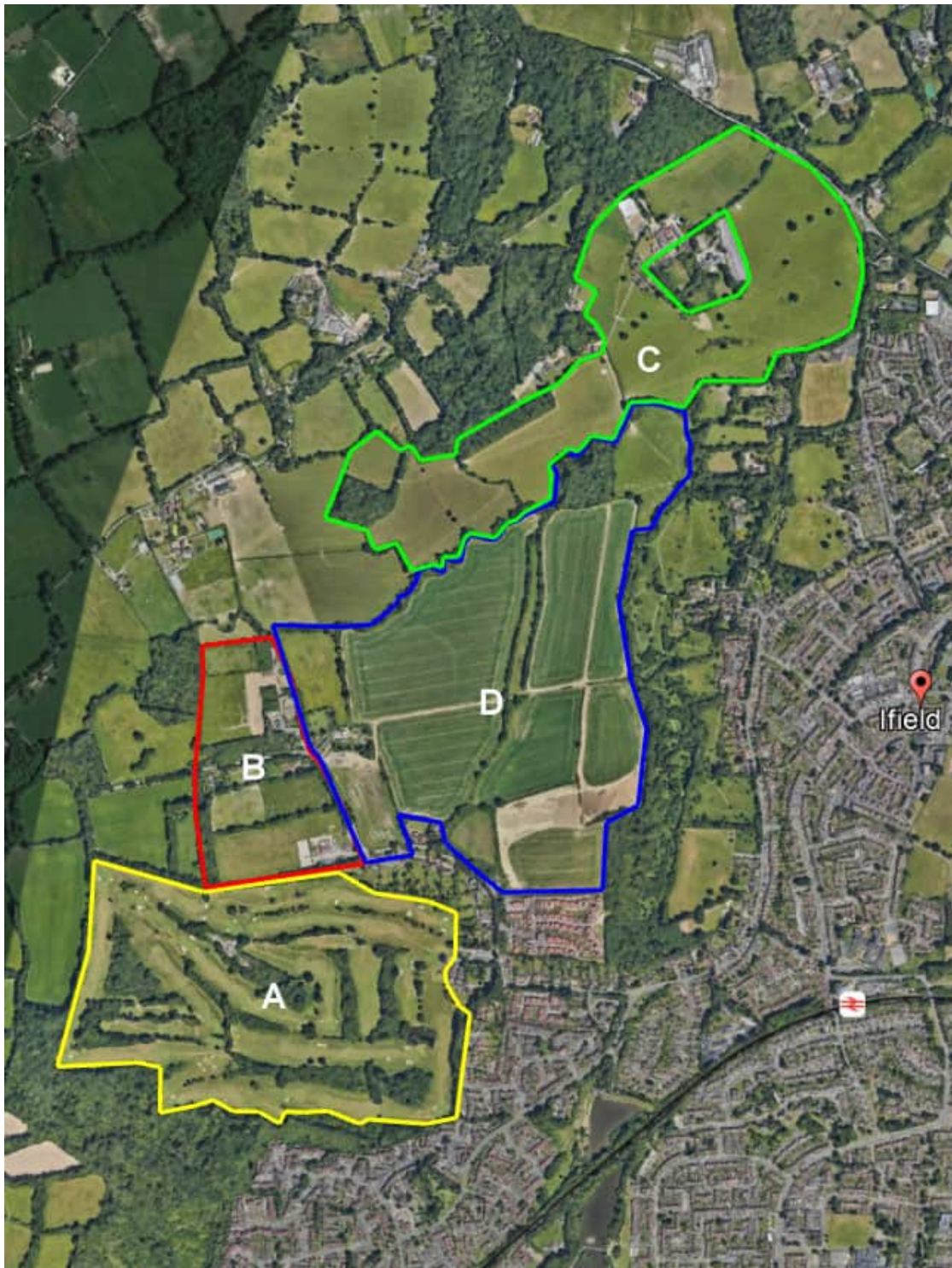
**Table 1.** Key species recorded by the 2018-19 survey.

Species	Group	Conservation status
Brown Hairstreak <i>Thecla betulae</i>	butterfly	Section 41 Species, Vulnerable
Small Heath <i>Coenonympha pamphilus</i>	butterfly	Section 41 Species, Vulnerable
<i>Acinia corniculata</i>	fly	RDB1
<i>Axinotarsus pulicarius</i>	beetle	Vulnerable, Nationally Rare
<i>Tomosvaryella minima</i>	fly	Near Threatened
Scarce Chaser <i>Libellula fulva</i>	dragonfly	Near Threatened
<i>Myopites inulaedyssentericae</i>	fly	RDB3
<i>Lygus pratensis</i>	true bug	RDB3

## 1.3 Survey Design

1.3.1 For the purpose of consistency, the current survey used the same recording compartments as the previous work in 2018-19, with the exception of Area B which was omitted (see 1.2.2). The

compartment designated Area E in 2018-19 is therefore referred to here as Area B. The location of the four survey areas is shown in Fig. 1.



**Fig. 1.** The survey boundary showing the four survey compartments A-D.

## 1.4 Invertebrate habitats

- 1.4.1 Area A (46.5 ha) is currently in use as Iffield Golf Course and presents as a mosaic of improved and semi-improved dry neutral grassland associated with the greens, fairways and roughs, as well as remnant areas of deciduous woodland containing numerous mature oaks *Quercus*. Other tree species include willows *Salix*, hawthorn *Crataegus*, Silver Birch *Betula pendula* and Scot's Pine *Pinus sylvestris*. A number of small ponds are present, four of which were sampled for aquatic invertebrates (Figs. 2 & 5).



**Fig. 2.** Area A showing the location of the four ponds (P1-P4) sampled during the survey.

- 1.4.2 Area B (16 ha) comprises a number of small fields of semi-improved neutral grassland which are cut for hay or used for horse pasture, as well as several barer areas supporting ruderal vegetation. The hedgerow network contains numerous mature oaks, as well as Blackthorn *Prunus spinosa*, Ash *Fraxinus excelsior*, Field Maple *Acer campestre* and Hazel *Corylus avellana*. A small pond is present adjacent to Rusper Rd which is surrounded by immature willow scrub with abundant Common Fleabane *Pulicaria dysenterica* and Large Bird's-foot Trefoil *Lotus pedunculatus* (Figs 3 & 5). This pond was sampled for aquatic invertebrates.



**Fig. 3.** Area B showing the location of the malaise trap (M) and pond P5.

- 1.4.3 Area C (43 ha) is dominated by improved grassland, much of which is currently grazed by cows. The open grassland is punctuated by numerous mature open-grown oaks, in places recalling an old parkland landscape (Fig. 5). Several small blocks of deciduous woodland are also present in the western half. The River Mole runs along the southern boundary.
- 1.4.4 Area D (61 ha) is centred on a number of very large fields which are under arable cultivation, although in places these have quite extensive flower-rich margins including Common Fleabane and Red Bartsia *Odontites vernus* (Fig. 5). The eastern margin is adjacent to Ifield Meadows LWS and forms a long mature hedgerow including numerous mature oaks as well as hawthorn, Blackthorn, Ash, Field Maple and Common Alder *Alnus glutinosa*. Extensive wide and uncut Blackthorn hedges are present along the northern boundary, which have a particularly warm and sheltered aspect (Fig. 5). Several recent records of the Brown Hairstreak *Thecla betulae* are known from this area. A long and narrow strip of damp semi-improved grassland with abundant *Juncus* tussocks is presents between two of the larger arable fields, bounded by mature hedgerows. The River Mole and Ifield Brook run along the southern boundary and eastern boundaries. Aquatic sampling points for these watercourses are shown in Fig. 4.



**Fig. 4.** Area D showing the locations used to sample the Ifield Brook and River Mole. The central sampling point was included to sample an additional ditch running north-south parallel to the Ifield Brook.

## 1.5 Methodology

- 1.5.1 Invertebrate sampling visits were made on the following dates: 9<sup>th</sup> May, 23<sup>rd</sup> May, 5<sup>th</sup> June, 8<sup>th</sup> June, 28<sup>th</sup> June, 30<sup>th</sup> July and 11<sup>th</sup> August 2023.
- 1.5.2 Sampling was undertaken by Marcel Ashby and Tristan Bantock, both of which have an expert knowledge of the British invertebrate fauna, including all the major terrestrial and aquatic groups used in ecological assessment.
- 1.5.3 Arachnida (spiders), Coleoptera (beetles), Hemiptera (true bugs), aculeate Hymenoptera (bees, wasps and ants) and numerous families of Diptera (flies) were specifically targeted as primary ecological indicators, given the nature of the habitats present. These groups were identified systematically and many others were included at the discretion of the surveyors.

1.5.4 Invertebrate sampling was undertaken by direct observation/capture and by the following active sampling methods:

**Sweep-netting.** A stout hand-held net is moved vigorously through herbaceous vegetation or scrub to dislodge resting insects. This technique is effective for many invertebrates, including bees and wasps, flies, many groups of beetles and true bugs and large number of other insects that live in vegetation of this type.

**Beating.** A cloth tray, held on a folding frame, is positioned below branches of trees or bushes which are sharply tapped with a stick to dislodge insects. This technique is effective in obtaining arboreal species, including many beetle groups, true bugs, caterpillars of Lepidoptera, spiders and others.

**Grubbing/hand searching.** Important host plants may be searched by hand. This is particularly useful for species which live on or even below the ground surface and can be found by grubbing around and underneath basal leaf rosettes. Other invertebrate microhabitats such as loose bark, dung, litter, fungi and various decay features associated with dead wood can also be productive when searched by hand. Turning large stones, pieces of wood and other refuse often reveals species which are nocturnally active, in particular spiders, ground beetles and rove beetles.

**Suction Sampling.** A garden vacuum with a mesh bag fitted inside the inlet pipe is used to collect samples from low vegetation and the ground surface by suction. The sample is then everted into a large net bag or white trays for examination. The advantage of suction sampling is that it quickly collects strongly ground dwelling species which do not fly or ascend the vegetation readily, as well as species which live in deep, structurally complex habitats such as dense grass tussocks and reed beds, which are difficult to sample by other methods. It is particularly productive for certain groups of beetles, true bugs and spiders.

**Pond netting.** Pond nets on wooden poles with a mesh diameter of one millimetre are used to capture invertebrates from all available aquatic habitats, including open water and amongst emergent, floating and submerged vegetation. Net samples are sorted in white trays on the bank-side and stored in 50% isopropyl alcohol for subsequent identification.

**Brown Hairstreak Survey** A Brown Hairstreak transect was undertaken in the northern half of Area D on the 11<sup>th</sup> August, during suitable weather conditions for butterfly activity. The route followed hedgerows and field boundaries containing unmanaged Blackthorn, particularly those in close proximity to Ash. The route was walked slowly looking for Brown Hairstreak on the wing or ovipositing on Blackthorn. Where mature Ash trees were present, binoculars were used to scan the canopy to look for adults in flight.

1.5.5 The following passive sampling methods were also used. These consist of traps which are left in place and continue to operate in the absence of a surveyor:

**Malaise trapping.** A tent-like net is erected on poles, using guy ropes, in the habitat to be sampled. The two, long side walls of the tent are absent and a long central wall is present. Insects collide with the central net wall and are funnelled upwards to a catching chamber. Traps are usually left for one or more months and the catching chamber, which is filled with 50-70% isopropyl alcohol, emptied fortnightly or monthly depending on site, habitat and weather. This is the single most effective sampling method for all flying insects and frequently catches species that have not been found by any other method. One malaise trap was set at the grassland/hedgerow interface close to the centre of Area B (Figs 3 & 5) and operated between 8<sup>th</sup> June and 30<sup>th</sup> July 2023.



(L) Mature open grown oak with aerial wood decay in Area C; (R) Hedgerow with mature oak in Area D



(L) Wide and uncut Blackthorn hedge in Area D; (R) Flower-rich arable margin in Area D



(L) Pond P1 in Area A; (R) Pond P5 in Area B



(L) Mature hedgerow in Area B showing the malaise trap; (R) Semi-improved grassland in Area B

**Fig. 5.** Various invertebrate habitats and features present throughout the survey area.

## 1.6 Survey Constraints

- 1.6.1 Following successful collection of the first malaise trap sample on 28<sup>th</sup> June 2023, the trap was interfered with at some point between 29<sup>th</sup> June and 30<sup>th</sup> July such that the second sample was missing when it was examined on 30<sup>th</sup> July.
- 1.6.2 Several of the fields in Area B including large areas of semi-improved grassland were cut in mid July. Cutting any grassland in mid-summer will have a negative effect on its invertebrate fauna, via direct impacts on plant-feeding species utilising the aerial parts of the sward, which will be unable to complete their life cycles and via indirect effects on species exploiting nectar and pollen sources as a forage resource, for example solitary bees and wasps.
- 1.6.3 The survey used a range of general invertebrate survey methods only. Comprehensive coverage of certain invertebrate groups requires the use of more specialised sampling methods which target specific microhabitats, for example aerial flight intercept trapping in the case of dead wood species.

## 2 INVERTEBRATE SPECIES

### 2.1 Summary

2.1.1 The survey produced a total of 782 invertebrate species. This total is broken down by taxonomic grouping and by survey area in Table 2. All species are detailed in Appendix 1 where the list is annotated with formal conservation status codes, which are explained in Appendix 2. The list is also annotated with the primary ecological associations of each species, where known, allowing species with differing habitat affinities to be discerned.

**Table 2.** Taxonomic breakdown of the 782 species recorded across the four areas A-D.

Species group	Survey area				
	All areas	A	B	C	D
Beetles (Coleoptera)	<b>282</b> (36%)	135	199	85	125
True bugs (Hemiptera)	<b>138</b> (18%)	69	105	36	88
True flies (Diptera)	<b>98</b> (12%)	40	71	32	45
Spiders (Araneae)	<b>60</b> (8%)	30	40	20	39
Butterflies & moths (Lepidoptera)	<b>59</b> (8%)	19	29	17	29
Bees, wasps & ants (Aculeate Hymenoptera)	<b>55</b> (7%)	22	34	12	32
Sawflies (Hymenoptera)	<b>30</b> (4%)	9	21	9	9
Dragonflies & damselflies (Odonata)	<b>13</b> (2%)	5	8	2	4
Caddisflies (Trichoptera)	<b>11</b> (1%)	4	4	3	4
Amphipods & Isopods (Crustacea)	<b>6</b> (<1%)	6	5	6	5
Grasshoppers & bush crickets (Orthoptera)	<b>6</b> (<1%)	5	5	3	5
Snails (Mollusc)	<b>5</b> (<1%)	3	0	3	1
Lacewings (Neuroptera)	<b>4</b> (<1%)	1	4	2	1
Harvestmen (Opiliones)	<b>3</b> (<1%)	1	3	2	2
Other Groups	<b>12</b> (2%)	5	8	2	4
<b>Total</b>	<b>782</b>	<b>354</b>	<b>536</b>	<b>234</b>	<b>393</b>

2.1.2 Coleoptera (beetles) and Hemiptera (true bugs) made up over half of the species recorded inside the survey area. The next most speciose groups were Diptera (flies), spiders and Lepidoptera (butterflies and moths).

2.1.3 The highest species total was recorded from Area B, while Area C produced the lowest.

## 2.2 Species of conservation interest

2.2.1 Several categories of invertebrates are of raised significance in an ecological assessment. These categories are explained in Appendix 2 and the corresponding species found during the survey are now examined.

### UK Biodiversity Action Plan (UK BAP) Priority Species/Section 41 Species

2.2.2 UK BAP priority species were those identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP). The original UK BAP list was created between 1995 and 1999 and stood at 577 species. Following a two-year review, a revised list was produced in 2007 which increased the number of BAP priority species to 1149. A total of 123 species no longer met the criteria for selection and were removed.

2.2.3 As a result of devolution, and new country-level and international drivers and requirements, much of the work previously carried out by the UK BAP is now focussed at a country level rather than a UK level, and the UK BAP has recently (July 2012) been succeeded by the *UK Post-2010 Biodiversity Framework* (JNCC, 2012). The full list of priority invertebrate species can be viewed at: <https://data.jncc.gov.uk/data/98fb6dab-13ae-470d-884b-7816afce42d4/UKBAP-priority-terrestrial-invertebrates.pdf>

2.2.4 The UK BAP list remains an important reference source and has been used to help draw up statutory lists of priorities in England, Scotland, Wales and Northern Ireland. For England and Wales these statutory lists are currently presented in *The Natural Environment & Rural Communities Act, 2006: Section 41. List of Species of Principal Importance for Conservation of Biological Diversity in England* and *Section 42: List of Species of Principal Importance for Conservation of Biological Diversity in Wales*.

2.2.5 Three such Species of Principal Importance for Conservation of Biological Diversity in England were recorded during the present survey:

**Long-horned Bee *Eucera longicornis* S41 NS(Na)** is a large solitary bee (Fig. 6) found in various open habitats including coastal cliffs, coastal grazing marsh, woodland rides, unimproved grassland and occasionally brownfield sites such as quarries and claypits. The species nests in bare soil on south-facing slopes where it can form aggregations. Known sites are characterised by a combination of suitable nesting habitat plus an abundance of key legumes such as Meadow Vetchling, Kidney Vetch, clovers and trefoils, which are used for foraging by both sexes.

The Long-horned Bee requires large areas of flowery habit and has been badly impacted by the 97% reduction in flower-rich grassland that has taken place during the 20th century. It is a much declined species which is now mainly confined to scattered sites along the southern coasts of England and Wales and is particularly rare inland.

A single male Long-horned Bee was recorded in Area B. This individual was found in the malaise trap sample collected between 8<sup>th</sup> June and 28<sup>th</sup> June.

**Brown Hairstreak *Thecla betulae* S41 VU** is a butterfly (Fig. 7) mainly confined to warm and sheltered parts of open woodland, woodland edges and hedgerows on heavy soils, the larvae feeding on *Prunus*, especially Blackthorn *P. spinosa*. Like most hairstreaks, adults are elusive and spend much time high up feeding on honeydew in the tree canopy; females are more typically seen when they descend to lay eggs on young Blackthorn closer to the ground. Both sexes do sometimes visit flowers for nectar.

The Brown Hairstreak has undergone a substantial decline and has been recently assigned an IUCN threat status of Vulnerable. The species is also protected under Schedule 5 of the Wildlife and Countryside Act 1981. It has been heavily impacted by hedgerow removal and annual hedge flailing, a widespread practice which removes terminal Blackthorn growth and destroys a high proportion of its eggs. The species is found locally in parts of southern and south-western England and south Wales and usually occurs in small colonies. It is no longer present in Kent and East Anglia.

A single male Brown Hairstreak was seen close to the northern edge of Area D at approximately TQ242377 during the course of the transect route walked on 11<sup>th</sup> August (Fig. 6).



**Fig. 6.** Area D showing the route of the Brown Hairstreak transect (yellow) and location of the adult recorded on 11<sup>th</sup> August (x).

**Small Heath *Coenonympha pamphilus* S41 VU** is a butterfly found in various open habitats on dry, light soils, the larvae feeding on fine-leaved grasses such as *Festuca* species. Although widespread throughout Britain, the species has undergone a significant decline in recent decades due to the widespread loss and improvement of species-rich grassland and has now been assigned an IUCN threat status of Vulnerable. It has declined more at inland sites than it has in coastal areas, though it remains present throughout at a lower density than before. The presence of large numbers, indicating a thriving population, at an inland site is potentially more important than a similar discovery in a coastal locality, although that should not imply that coastal colonies are unimportant.

The Small Heath occurs widely throughout much of the survey area and butterflies were seen in Areas A, C and D.



**Fig. 7.** Two of the three Section 41 species recorded by the survey: Brown Hairstreak *Thecla betulae* (L) and Long-horned Bee *Eucera longicornis* (R).

### Former UK Biodiversity Action Plan (UK BAP) ‘Research only’ moth species

- 2.2.6 The original list of UK Biodiversity Action Plan Priority Species of butterflies and moths was divided into two sections. In the first, a total of 81 species are afforded the status of UK BAP Priority Species; none of these are recorded in the surveyed area and none are likely to be present. The second section is a list of 69 species whose populations have declined significantly during the past 25 years. These were defined as “not yet rare” and were flagged as UK BAP species “for research only”.
- 2.2.7 It is unfortunate that this “Research Only” list has been incorporated into the current priority listing process and that these species are now, therefore, of statutory interest. Some bodies now specifically recommend that these species are excluded from an appraisal of Section 41 and Section 42 species and this is a view with which we fully agree. Unfortunately, the species are not listed separately so that non-specialists are unable to discern them.
- 2.2.8 At the site under discussion two such “Research Only” moth species were recorded:

**Blood-vein *Timandra comae* S41 RO** is a moth found in various habitats, particularly damp places with rank, herb-rich vegetation including woodland edges and wet meadows. The larvae feed on docks *Rumex* species, Common Orache *Atriplex patula*, Knotgrass *Polygonum aviculare* and other related species. Widespread throughout England and Wales as far north as southern Scotland, where it is much more local. An adult moth was recorded in Area A.

**Cinnabar *Tyria jacobaeae* S41 RO** is a moth found in various open and disturbed habitats, the larvae feeding on ragworts *Senecio* species, especially Common Ragwort *S. jacobaea*. Widespread throughout much of England and Wales, although rather local and mainly coastal in the southern half of Scotland. An adult moth was recorded in Area A.

### Post-2001 IUCN Threatened and Near Threatened species

- 2.2.9 These include taxa assessed by recent IUCN criteria which qualify for Critically Endangered, Endangered or Vulnerable status, as well as Near Threatened species which are close to qualifying or likely to qualify for a threatened category in the near future (see Appendix 2).
- 2.2.10 At the site under discussion five such species were recorded:

***Amara strenua* NT NR** is a ground beetle with rather poorly known precise ecological requirements. The species was initially thought to be associated with saltmarshes, but has since been shown to prefer coastal and floodplain grazing marsh and occasionally grasslands along river systems. It is regarded as a very scarce species of southern England, with scattered records between Somerset and Suffolk; inland records are extremely infrequent. Several *A. strenua* specimens were found by grubbing in grassland close to the site of the malaise trap in Area B. As far as we are aware, these are the first records for Sussex.

***Pilemostoma fastuosa* NT NR** is a leaf beetle (Fig. 8) found in various dry, open grasslands, both adults and larvae feeding on the leaves of Ploughman's Spikenard and Common Fleabane. This is a very local species which is largely confined to parts of south east England, with a focus of records from Sussex and Surrey, although there has been some evidence of recent spread. A single adult beetle was found by suction sampling stands of Common Fleabane in Area B.

**Brilliant Emerald *Somatochlora metallica* VU NR** is a dragonfly (Fig. 8) that breeds in mesotrophic to slightly acidic, ponds, lakes, canals and small, slow-flowing rivers usually where overhanging trees or shrubs are present. Water bodies ideally but not exclusively need to have a soft peaty or muddy substrate, often overlaid with leaf litter. The species occurs in two disjunct areas: the central Highlands of Scotland and a much larger population in central-southern England including the Weald and the heaths of Surrey, north Hampshire and Berkshire. Two Brilliant Emerald adult males were seen at pond P3 in Area A.

**Scarce Chaser *Libellula fulva* NT** is a dragonfly of lowland river floodplains that usually inhabits slow-flowing, meandering rivers and large dykes. Occasionally occurs in mature gravel pits and nearby ponds also support populations. Inhabited sites characteristically have good water quality, which supports submerged and floating plants as well as prolific stands of emergent vegetation. Populations are localised in East Anglia, the East Midlands and parts of southern England from Kent to Devon. The species has expanded its range significantly since 2004. A single adult Scarce Chaser was seen in Area D.

**Lackey *Malacosoma neustria* VU S41 RO** is a moth inhabiting various habitats, the larvae feeding on a variety of trees and shrubs, living in a communal tent. Although widely distributed throughout southern Britain, it has undergone a steep population decline. Larvae were recorded in Area B.



**Fig. 8.** Brilliant Emerald *Somatochlora metallica* (L) and the leaf beetle *Pilemostoma fastuosa* (R).

## Nationally Rare / Red Data Book species

- 2.2.11 The following seven species listed in the British Red Data Books (Shirt, 1987; Bratton, 1991) or which have been elevated to the status of Nationally Rare by subsequent formal reviews were recorded by the survey (see Appendix 2).

***Dasytes niger* NR** is a soft-wing flower beetle associated with mature woodland and the larvae are believed to develop in decaying wood. The adults are found on tree foliage and visit flowers in more open habitats along woodland edges and rides. A very local species confined to parts of central and southern England. Specimens were swept from oak foliage in Areas B, C, and D.

**Alder Leaf Beetle *Agelastica alni* NR** is a leaf beetle feeding on the leaves of alders and occasionally other deciduous trees, including poplars and willows. Usually found in open, sunny locations in wetlands, along river-banks and in wet woodland flushes, but may also occur in much drier situations. It is capable of reaching very high densities when it is very abundant and causes extensive defoliation. Historically a great rarity, the species was considered extinct in Britain until 2004 when it was rediscovered in the Manchester area, probably originating from a horticultural introduction. It has since been found in Lancashire, Cheshire, Yorkshire, parts of Wales and southern England and is spreading rapidly. It no longer warrants a conservation status. Adults and larvae were numerous on alder and willows in Areas A, B and D.

***Lygus pratensis* RDB3** is a true bug which feeds on various species of Asteraceae. Although formerly extremely local and confined to lowland heathland in southern England, it has recently undergone a significant range expansion and is now widespread throughout much of southern Britain. It no longer warrants any conservation status. Adults were swept from grassland and arable margins in Areas A, B and D.

***Gymnosoma rotundatum* RDB3** is a parasitic fly whose larvae are parasitoids of shieldbugs, in particular the Common Green Shieldbug *Palomena prasina*. An uncommon and very local species confined to south east England, particularly Kent, Sussex and Surrey. Its true status is probably better considered Nationally Scarce. An adult was seen in Area D.

***Myopites inulaedyssentericae* RDB3** is a picture-winged fly found in various open habitats, larvae developing in the flower head of Common Fleabane *Pulicaria dysenterica*. A local species largely confined to southern and central England, with most records from southern coastal counties, although there is evidence of recent northwards spread. Its current status is better considered Nationally Scarce. Adults were swept from Common Fleabane in Areas B and D.

**Squat Furrow Bee *Lasioglossum pauperatum* RDB3** is a small solitary bee found in coastal grasslands, soft rock coastal cliffs and also inland on heathland and sandy habitats, nesting in light soils. This is a very local species which is confined to parts of southern England and has a major stronghold in the Thames Gateway areas of Essex and Kent, but appears to have declined outside this region. Its true status is probably better described as Nationally Scarce. Bees were swept from arable margins in Area D.

**Large-headed Resin Bee *Heriades truncorum* RDBK** is a solitary bee found in various open habitats such as flower-rich grasslands, heathland and brownfield sites, females collecting pollen from yellow composites such as ragwort and nesting in pre-existing cavities in dead wood, such as hollow stems. Formerly a great rarity, this species is now frequent throughout much of south east England. Bees were swept from Fleabane in Area D.

## Nationally Scarce Species

2.2.12 A total of 32 such species was recorded by the survey (see Appendix 2).

***Ballus chalybeius* NS** is a jumping spider found in various habitats almost exclusively on deciduous trees, where it where it spins a retreat on the upper surface of leaves. It is particularly associated with oaks. A widespread species, but with a scattered and local distribution in south east England and the Midlands. Adults were swept from oak foliage in all survey areas.

***Acupalpus exiguus* NS** is a ground beetle found in litter and tussocks in damp grasslands and situations near water, both inland and in saltmarshes. It is a local and predominantly coastal species found in south England and south Wales as far north as Yorkshire. Adults were found by suction sampling *Juncus* tussocks in damp areas of grassland in Areas B and D.

***Anthracus consputus* NS** is a small ground beetle preferring sparsely-vegetated ground on soft soil or mud near water. It has a widespread but scattered distribution across southern England and Wales. Adults were found at the margins of pond P5 in Area B.

***Stenolophus teutonius* NS** is a ground beetle found on damp or disturbed ground at the margins of standing water, including ponds, gravel pits and coastal wetlands. Adults are probably predatory. Widespread but local in southern and central England. Adults were found at the margins of pond P5 in Area B.

***Hydrochus angutatus* NS** is a water beetle mainly associated with weedy stagnant or slowly moving water in ditches and pools. Widespread but local in England and Wales, with the main distribution centred on south-east England where it is particularly associated with heathland. Adults were found by pond netting pond P2 in Area A and pond P5 in Area B.

***Agrilus angustulus* NS** is a jewel beetle associated with deciduous woodland, the larvae developing under bark on dead and dying stems of various broad-leaved trees, particularly oaks. Local and occasionally common in southern and central England. Adults were swept from oak foliage in Areas A, C, and D.

***Anthocomus fasciatus* NS** is a malachite beetle found in various open habitats, usually in close proximity to mature woodland and the species probably develops in dead wood or hollow stems of tall herbaceous plants. A widespread but local species across southern and central England although largely absent from Wales and the west. Adults were swept from hedgerows in Areas A, B and D.

***Temnocerus coeruleus* NS(Nb)** is a small weevil found on willows and sometimes poplars, larvae feeding in the leaf buds. It is found locally throughout southern and central England and parts of Wales. Adults were swept from willows in Area B.

***Rhinocyllus conicus* NS(Na)** is a weevil which breeds in the flower heads of thistles in various open habitats. Formerly restricted to coastal localities in southern England, *R. conicus* has spread dramatically in the past decade and is now widely distributed in England south of the Humber-Severn. It may no longer warrant a conservation status. Adults were swept from thistles in Area B.

***Magdalis cerasi* NS(Nb)** is a small weevil associated with oaks and rosaceous trees such as hawthorn and apple in woodland edges and hedgerows, the larvae developing in twigs and small branches. A widespread but local species throughout much of England as far north as Yorkshire,

although absent from Wales and the extreme south west. Adults were swept from oak foliage in Areas A, B, and D.

***Hypera melancholica* NS(Nb)** is a weevil found on open sparsely-vegetated ground, feeding on medicks *Medicago* and perhaps various other legumes. An uncommon and local species confined to parts of southern and eastern England. Adults were found by sweeping ruderal vegetation in Area B.

***Coeliodes transversealbofasciatus* NS(Nb)** is a weevil found in woodlands and woodland edges, the larvae developing in the female flowers of oaks. Widespread in south eastern and central England, but very local and uncommon. Adults were swept from oak foliage in Areas B, C, and D.

***Donacia impressa* NS** is a reed beetle found on vegetation at the margins of a variety of water bodies. Adults feed on pollen of various Cyperaceae, the larvae develop in the roots and rhizomes of Common Club-rush *Schoenoplectus lacustris*. An uncommon and very local species throughout much of Britain. Adults were swept from the margins of Pond 1 in Area A.

***Podagrica fuscipes* NS** is a leaf beetle found in various open habitats and associated with mallows (Malvaceae), adults feeding on the leaves. Although it can be common where it occurs, the distribution is largely confined to south east England. Adults were swept from arable margins in Area D.

***Phyllotreta cruciferae* NS** is a small flea beetle which feeds on the leaves of various wild and cultivated species of Brassicaceae including *Reseda lutea*; the larvae feeding in the roots. Local in central and southern England. Adults were found by sweeping ruderal vegetation in Area B.

***Meligethes gagthinus* NS(Nb)** is a pollen beetle associated with Mints *Mentha* species in various dry and damp habitats, in particular Corn Mint *Mentha arvensis*, larvae feeding on the flower buds. Widespread but local with a scattered distribution across south east and central England. Adults were found by sweeping the margins of pond P5 in Area B and arable margins in Area D.

***Meligethes ochropus* NS(Nb)** is a pollen beetle associated with Marsh Woundwort *Stachys palustris* in damp habitats, larvae feeding on the flower buds. An uncommon and local species in parts of southern and central England. Adults were found by sweeping the margins of pond P5 in Area B.

***Korynetes caeruleus* NS** is a predatory beetle that lives under the bark of broad-leaved trees and feeds on woodworm beetles. The species is particularly associated with ancient broad-leaved woodland and wood pasture but is found on mature trees in other habitats. Very local in southern and central England, as well as parts of Wales. Adults were swept from oak foliage in Areas C and D.

**Slender-horned Leatherbug *Ceraleptus lividus* NS** is a true bug which is strongly ground dwelling. A local and uncommon species found across southern and central England, favouring dry open habitats such as grasslands, sand dunes and gravel pits, feeding on clovers and other legumes. Adults were found by sweeping ruderal vegetation in Area B.

***Reptalus quinquecostatus* NS(Nb)** is a planthopper previously misidentified as *Reptalus panzeri*. The ecology of this species remains obscure, although it is often associated with grasslands in which the ground has a tendency to crack during the summer. Since the nymphs are root-feeders, this perhaps allows the adults to lay eggs below ground. Although restricted to southern England and designated as scarce, it is a fairly common species in the London area. Adults were found by sweeping grassland in Areas A, B and D.

***Criomorphus williamsi* NS(Nb)** is a planthopper found in wet and damp eutrophic grasslands, feeding on tall grasses. A local species confined to central and southern England. Adults were found by sweeping grassland in Area B.

***Merzomyia westermanni* NS(Nb)** is a picture-winged fly found in various open, disturbed habitats, the larvae feeding in the flower head of ragworts, in particular Common Ragwort *Senecio jacobaea*. A local species throughout England as far north as Yorkshire, although absent from Wales and the south west. Adults were found by sweeping grassland in Area B.

**Hawk's-Beard Mining Bee *Andrena fulvago* NS(Na)** is a ground-nesting solitary bee which is found widely but locally across southern England, particularly but not exclusively in calcareous habitats. Pollen is gathered mainly from yellow composites including hawk's-beards, hawkbits and Cat's ear. Adults were found by sweeping grassland in Area B.

**Red Bartsia Bee *Melitta tricincta* NS(Nb)** is a solitary bee found in various open habitats on calcareous soils, nesting in the ground and collecting pollen exclusively from Red Bartsia. Very local and confined to calcareous areas of southern England, but can be numerous where it does occur. Bees were swept from arable margins in Area D.

**Sharp-collared Furrow Bee *Lasioglossum malachurum* NS(Nb)** is a solitary bee found in various habitats, including arable areas and urban greenspace, with a preference for clay soils. It nests in fairly bare soil and sometimes forms huge aggregations along paths and south-facing slopes. A wide variety of plants are used as pollen sources. Formerly scarce, it has expanded its range since 1990 and is now widespread in southern and central England and no longer worthy of a conservation status. Adults were found by sweeping grassland in Area A, B and D.

**Lobe-spurred Furrow Bee *Lasioglossum pauxillum* NS(Na)** is a solitary bee recorded from a wide variety of situations in southern and central England including heathland, calcareous grassland, coastal locations such as soft rock cliffs and other disturbed habitats. Nesting occurs in light soils. Formerly scarce, it has expanded its range since 1990 and is now widespread in southern and central England. Adults were found by sweeping grassland in all survey areas.

**Ridge-cheeked Furrow Bee *Lasioglossum puncticolle* NS(Na)** is a solitary bee found in various open habitats, preferring dry clay substrates and bare or sparsely vegetated soil in warm, sunny situations for nesting. Pollen sources include Wild Carrot, *Ranunculus*, *Cirsium* and several yellow composites. Local and largely confined to southern England, where it is particularly widespread in the Thames Gateway area. Adults were found by sweeping grassland in Area B.

***Pseudomalus violaceus* NS(Nb)** is a jewel wasp found in various habitats where it is a larval parasitoid of small dead wood nesting crabronid wasps such as *Pemphredon lugubris* and *Passaloecus corniger*. A widespread but local species across much of southern Britain. Adults were found in Area D.

***Tiphia minuta* NS(Nb)** is a small solitary wasp found in various open habitats, usually on sandy or chalky soils. The larvae are parasitoids of scarab beetle larvae which feed on the roots of grasses. A widespread but local species across much of England and Wales as far north as Yorkshire. Adults were found in Area B.

**Brown Tree Ant *Lasius brunneus* NS(Na)** is an ant that nests in mature trees, in particular oaks, although nests have also been found in stumps, hedgerows and timber framed buildings. The species is much more widespread than it was historically and is found throughout central and southern England. It no longer warrants a conservation status. Adults were found in all areas.

***Commophila aeneana* NS(Nb)** is a micromoth confined to the southern half of England. The species frequents waste ground, embankments and waysides, the larvae developing in the rootstocks of ragwort and has a scattered and local distribution. An adult was swept from grassland in Area A.

**Dusky Cockroach *Ectobius lapponicus* NS** is a native cockroach found in southern Britain as far as Norfolk but is most frequent on the heaths and commons of central southern England, especially within Dorset, Hampshire, West Sussex, Surrey, Berkshire and Buckinghamshire. It prefers heathland with scrub, tall mature Heather and tussocky grassland, and can occur also occur in woodland rides and clearings and chalk grassland with scrub and tall grassland. Adults were swept from grassland in Area A.

## 2.3 Species of conservation interest: summary by survey area

2.3.1 The 46 species of conservation interest are broken down by survey area in Table 3. The highest number of such species was recorded from Area B (n=32), while Area C produced the fewest (n=8).

2.3.2 The highest proportion of such species was found in Area D (6.4%), which was slightly higher than the overall figure of 5.9%. Area C also produced the lowest proportion of these species (2.5%).

**Table 3.** Summary of all species with a conservation status within each survey area. Section 41 Research only species have been omitted.

Species	Group	Conservation status	Area A	Area B	Area C	Area D
Long-horned Bee <i>Eucera longicornis</i>	bee	S41, NS(Na)		✓		
Brown Hairstreak <i>Thecla betulae</i>	butterfly	S41, VU				✓
Small Heath <i>Coenonympha pamphilus</i>	butterfly	S41, VU	✓		✓	✓
Brilliant Emerald <i>Somatochlora metallica</i>	dragonfly	VU, NR	✓			
Lackey <i>Malacosoma neustria</i>	moth	VU, S41 RO		✓		
<i>Amara strenua</i>	beetle	NT, NR		✓		
<i>Pilemostoma fastuosa</i>	beetle	NT, NR		✓		
Scarce Chaser <i>Libellula fulva</i>	dragonfly	NT				✓
Alder Leaf Beetle <i>Agelastica alni</i>	beetle	NR	✓	✓		✓
<i>Dasytes niger</i>	beetle	NR		✓	✓	✓
<i>Lygus pratensis</i>	true bug	RDB3	✓	✓		✓
<i>Gymnosoma rotundatum</i>	fly	RDB3				✓
<i>Myopites inulaedyssentericae</i>	fly	RDB3		✓		✓
Squat Furrow Bee <i>Lasioglossum pauperatum</i>	bee	RDB3				✓
Large-headed Resin Bee <i>Heriades truncorum</i>	bee	RDBK				✓
<i>Ballus chalybeius</i>		NS	✓	✓	✓	✓
<i>Acupalpus exiguus</i>	beetle	NS		✓		✓
<i>Anthracus consputus</i>	beetle	NS		✓		✓
<i>Stenolophus teutonius</i>	beetle	NS		✓		
<i>Agrilus angustulus</i>	beetle	NS	✓		✓	✓
<i>Donacia impressa</i>	beetle	NS	✓			
<i>Phyllotreta cruciferae</i>	beetle	NS		✓		

Species	Group	Conservation status	Area A	Area B	Area C	Area D
<i>Podagrica fuscicornis</i>	beetle	NS				✓
<i>Korynetes caeruleus</i>	beetle	NS			✓	✓
<i>Hydrochus angustatus</i>	beetle	NS	✓	✓		
<i>Anthocomus fasciatus</i>	beetle	NS	✓	✓		✓
<i>Ceraleptus lividus</i>	true bug	NS		✓		
Dusky Cockroach <i>Ectobius lapponicus</i>	cockroach	NS	✓			
<i>Rhinocyllus conicus</i>	beetle	NS(Na)		✓		
Hawk's-Beard Mining Bee <i>Andrena fulvago</i>	bee	NS(Na)		✓		
Lobe-spurred Furrow Bee <i>Lasioglossum pauxillum</i>	bee	NS(Na)	✓	✓	✓	✓
Brown Tree Ant <i>Lasius brunneus</i>	ant	NS(Na)	✓	✓	✓	✓
<i>Merzomyia westermanni</i>	fly	NS(Nb)		✓		
<i>Reptalus quinquecostatus</i>	true bug	NS(Nb)	✓	✓		✓
<i>Criomorphus williamsi</i>	true bug	NS(Nb)		✓		
<i>Coeliodes transversealbofasciatus</i>	beetle	NS(Nb)		✓	✓	✓
<i>Meligethes gagathinus</i>	beetle	NS(Nb)		✓		
<i>Meligethes ochropus</i>	beetle	NS(Nb)	✓	✓		
<i>Magdalis cerasi</i>	beetle	NS(Nb)	✓	✓		✓
<i>Hypera melancholica</i>	beetle	NS(Nb)		✓		
<i>Temnocerus coeruleus</i>	beetle	NS(Nb)		✓		
Sharp-collared Furrow Bee <i>Lasioglossum malachurum</i>	bee	NS(Nb)	✓	✓		✓
Ridge-cheeked Furrow Bee <i>Lasioglossum puncticolle</i>	bee	NS(Nb)		✓		
Red Bartsia Bee <i>Melitta tricincta</i>	bee	NS(Nb)				✓
<i>Pseudomalus violaceus</i>	wasp	NS(Nb)				✓
<i>Tiphia minuta</i>	wasp	NS(Nb)		✓		
Orange Conch <i>Commophila aeneana</i>	moth	NS(Nb)	✓			
<b>Survey area total (%)</b>			<b>17 (4.8%)</b>	<b>32 (6.0%)</b>	<b>8 (2.5%)</b>	<b>25 (6.4%)</b>
<b>Overall total (%)</b>			<b>47 (6.0%)</b>			

## 2.4 The overall invertebrate community

- 2.4.1 Rarity is only one factor to be taken into account in the assessment of the ecological value of a site. Some sites may have immensely diverse invertebrate assemblages but few rare species within these; they are of equal, if different, ecological value. It is therefore important to carry out a further assessment that also includes all remaining species.
- 2.4.2 We have undertaken this using Osiris, a habitat and resource association utility found within Pantheon, a database tool developed by Natural England and the Centre for Ecology and Hydrology and freely accessible online at [www.brc.ac.uk/pantheon](http://www.brc.ac.uk/pantheon). This system has updated and replaced the Invertebrate Species-habitats Information System (ISIS) as of 2017. A major improvement of

Pantheon has been the incorporation of current species conservation status designations, as many have changed since the original release of ISIS.

- 2.4.3 Pantheon interprets species lists by recognising assemblage types and scoring each type according to its conservation value. This information is used to assess the overall quality of the site, reveal its key ecological resources and ultimately inform decisions regarding habitat management and mitigation. In some cases, habitats that may have been overlooked or not considered important during the survey might be identified as significant.
- 2.4.4 To date around 12,000 species are included in the Pantheon database, around a quarter of the total macro-invertebrate fauna. It remains limited to those taxa and families where there is enough ecological information to give a fair level of coding accuracy. These include species such as spiders, beetles, flies, true bugs, moths, bees and wasps, as well as many others.
- 2.4.5 Invertebrate species are linked to habitats and resources in a large hierarchical database. The hierarchy is arranged with 'Broad biotopes' as the highest level. Each species can be typed to more than one habitat or resource category.
- 2.4.6 Each Broad biotope can be divided into more detailed 'Habitats' (previously known as 'Broad Assemblage Types' (BATs) in ISIS).
- 2.4.7 Each Habitat contains a set of 'Resources', defined by typing species to other environmental factors or microhabitats. Only those resources that are considered important to the completion of the life cycle of a species are included. Typing was not attempted for species that are either very catholic or where their ecology was not well defined in the literature.
- 2.4.8 Specific assemblage types' (SATs) are characterised by stenotopic (ecologically restricted) species that are of intrinsic nature conservation value. SATs are more narrowly defined than Habitats and each SAT is nested within a parent Habitat. **Note that the use of SATs is restricted to Natural England Common Standards Monitoring on SSSIs.**
- 2.4.9 Pantheon provides the following scoring systems for Broad biotopes, Habitats, Resources and SATs:
- A total count of species in each category.
  - The number of species represented in each category which have a conservation status. *Note that some statuses are reported in square brackets [ ], indicating that these are considered out of date and should be used with caution.*
  - The number of species belonging to each category as a percentage of the total number of species belonging to each category within the British invertebrate fauna.
  - A Species Quality Index (SQI) score for each category where more than 15 species are represented. Each species recorded from the sample is given a Species Quality Score (SQS) based on their conservation status. The SQI score is equal to the sum of all SQS scores divided by the number of species and then multiplied by 100 to give a 3-figure score that does not contain decimal places (e.g.100 rather than a 1.00). **Note that some SQI scores for species which have their status bracketed have been reduced to take account of this. For example, the status of the plant bug *Lygus pratensis* is listed as [RDB3] and has a corresponding SQS of 1, since it is now widespread and common.** For further information please see:  
[www.brc.ac.uk/pantheon/content/scoring-systems](http://www.brc.ac.uk/pantheon/content/scoring-systems)

## 2.5 Pantheon output

- 2.5.1 Of the 782 species recorded by the survey, 717 were represented in the Pantheon database, corresponding to a return of 92%.
- 2.5.2 Pantheon sample scores by Broad biotope are shown in Table 4. Around 690 species were typed to at least the level of Broad Biotope. Half of these were associated with open habitats and the remainder split approximately equally between tree-associated and wetland habitats. The SQI score corresponding to tree-associated habitats was the highest (SQI=128), indicating that this broad biotope contained the greatest proportion of rare and scarce taxa overall.
- 2.5.3 Pantheon sample scores by Habitat are shown in Table 5. Species associated with tall sward and scrub and the arboreal tree canopy made up the majority of the open habitat and tree-associated species respectively.

**Table 4.** Pantheon sample scores by Broad biotope (those with < 15 species have been omitted).

Broad biotope	No. of species	% representation	SQI	Species with conservation status	Conservation status
Open habitats	342	8	116	24	2 S41, 2 S41 Research only, 1 NT, 2 RDB3, 2 [RDB3], 1 [RDBk], 4 NS, 2 [Na], 4 Nb, 4 [Nb]
Tree-associated	186	5	128	15	1 S41, 1 S41 Research only, 1 VU, 2 NR, 1 [RDBK], 4 NS, 1 [Na], 4 Nb
Wetland	162	6	113	7	1 VU, 1 NT, 5 NS

**Table 5.** Pantheon sample scores by Habitat (those with < 15 species have been omitted).

Broad biotope	Habitat	No. of species	% representation	SQI	Species with conservation status	Conservation status
Open habitats	Tall sward & scrub	256	10	111	10	2 S41 Research only, 1 NT, 1 [RDB3], 3 NS, 2 Nb, 1 [Nb]
Tree-associated	Arboreal	106	8	116	6	1 S41, 1 S41 Research only, 1 NR, 1 NS, 2 Nb
Wetland	Marshland	94	11	120	5	1 VU, 4 NS
Open habitats	Short sward & bare ground	75	6	124	13	2 S41, 1 RDB3, 1 NS, 2 [Na], 3 Nb, 4 [Nb]
Wetland	Peatland	53	5	105	1	1 NS
Tree-associated	Decaying wood	52	4	152	8	1 NR, 1 [RDBK], 3 NS, 1 [Na], 2 Nb
Tree-associated	Shaded woodland floor	30	3	126	1	1 VU
Wetland	Running water	16	2	100	0	

- 2.5.4 The highest SQI score corresponded to decaying wood (SQI=152), indicating that this habitat contained the greatest proportion of rare and scarce taxa overall. This value exceeds 150, which is the approximate threshold value suggested by Natural England that corresponds to a 'good' site supporting a regionally important invertebrate fauna.
- 2.5.5 Shaded woodland floor (SQI=126) and short sward and bare ground habitats (SQI=124) received the next highest scores, indicating that these also contain assemblages with a raised interest. However, the former score was based on just 30 qualifying species and so may not be meaningful.
- 2.5.6 Although neither habitat produced very high SQI scores, both tall sward and scrub and marshland habitats contained more than 10% of the total number of species belonging to these categories within the entire British invertebrate fauna. This indicates that both support large invertebrate faunas.
- 2.5.7 We have not attempted to analyse the results from each survey compartment separately using Pantheon, since it is more appropriate to use as large a sample size as possible when carrying out whole assemblage analysis. This approach maximises statistical power, minimises any possible effects of sample bias and is in line with guidance from Natural England.
- 2.5.8 To illustrate this point further, it should be borne in mind that numerous species recorded in just one or two survey compartments are highly likely to be present in all four on the basis of their known ecological requirements. These considerations are particularly relevant to groups such as dead wood feeding invertebrates, which are usually encountered in small numbers using standard invertebrate sampling methods and are consequently difficult to record comprehensively. Sampling these groups is also affected by the accessibility of the tree canopy from the ground, which varied between the four survey compartments.
- 2.5.9 Furthermore, while the use of a malaise trap in Area B has increased the reach provided by the overall survey, it makes direct comparisons between the survey areas difficult since Area B received a greater sampling effort than the remaining three survey compartments.

### 3 DISCUSSION

- 3.1 The site surveyed to the west of Ifield supports a large and diverse overall invertebrate assemblage. We regard the 782 recorded species to be a relatively high total, despite the use of passive trapping methods (a malaise trap) which continue to operate in the absence of a surveyor, in addition to a variety of terrestrial and aquatic active sampling methods.
- 3.2 The overall fauna is of moderately high quality, including three Section 41 species, four IUCN Threatened or Near Threatened species and 39 species which are Nationally Rare or Nationally Scarce. A simple overall benchmark for any survey is the proportion of the recorded fauna composed of species with a conservation status. Sites where this exceeds 10% indicate exceptional quality. On the basis of the current survey, this figure stands at 6.0%. The comparable statistic for the 2018-19 survey is 4.5%.
- 3.3 The Pantheon analysis indicates that the site as a whole supports a regionally important dead wood (saproxylic) invertebrate fauna. These are species associated primarily with the large number of mature oaks which are a frequent component of the hedgerow network throughout the survey area. They are also present as completely open grown trees in Areas A and C. Such trees are of particular value since many saproxylic invertebrates are warmth-loving and require well-lit trunks and boughs, both for the adults on the outer wood surfaces, and for larvae developing within the decaying wood.
- 3.4 Most of the dead wood resource at Ifield is contained within standing trees. Standing dead wood tends to be much more valuable for invertebrates than fallen timber as it rots from the inside rather than from the outside, creating quite different conditions and microhabitats associated with a succession of fungi, which in turn provide specialist niches for a wide range of invertebrates.
- 3.5 Most dead wood invertebrates are imperfectly recorded using general invertebrate survey methods, such as those employed here. Although the survey produced over 50 species, it is likely that a larger and more important fauna is present, which would be revealed by the use of targeted sampling methods such as aerial flight intercept trapping. It is therefore likely that the Pantheon analysis has undervalued the true importance of the dead wood assemblage.
- 3.6 Although the wetland invertebrate fauna did not achieve particularly high SQI scores, a large assemblage is present at Ifield which includes some important species of conservation value which are likely to be uncommon in a regional context. Such species include the reed beetle *Donacia impressa*, as well as the ground beetles *Stenolophus teutonius* and *Anthracus consputus*.
- 3.7 The record of Brilliant Emerald *Somatochlora metallica* from Area A is noteworthy and suggests that the species may be breeding here, given that two males were seen in territorial pursuit. However, the aquatic survey did not detect larvae of this species in any waterbody. There are recent records of this dragonfly from several nearby sites, in particular Buchan Country Park on the southern edge of Crawley.
- 3.8 The Brown Hairstreak *Thecla betulae* is well known from the west of Ifield area and the current work confirms its continued presence. This generally very unobtrusive butterfly is likely to be found throughout the survey area wherever wide, unmanaged Blackthorn hedges are present, particularly if they have a warm and south-facing aspect and are in close proximity to Ash trees.
- 3.9 The Long-horned Bee *Eucera longicornis* was recorded as a single individual in the malaise trap. This method is an extremely effective means of sampling flying insects and the presence of just one

male does not suggest the existence of a breeding population inside the survey area, but rather an individual foraging some distance from its nesting site. The Long-horned Bee was discovered in the Gatwick area during 2014 (Buglife, 2020) and two large nesting aggregations have since been found along the River Mole on the northern side of the airport, where the species has been positively managed for as part of the airport's biodiversity remit (Bicker & Simpson, 2020). Nevertheless, the record indicates that suitable legume-rich foraging habitat exists in Area B, where abundant Large Bird's-foot Trefoil occurs close to Pond P5 and Meadow Vetchling is also present in the adjacent semi-improved neutral grassland.

- 3.10 While the watercourses of the River Mole and Ifield Brook do not support a raised invertebrate interest, the Near-threatened ground beetle *Amara strenua* was found in nearby floodplain grassland. This species has also been previously recorded fairly near Ifield (Dodd, 2016), when adults were found in restoration river floodplain grassland close to the Mole at Tinsley Green. It seems possible that the Gatwick area may hold important populations of this beetle and that these occur in superficially rather uninteresting floodplain grassland habitat. Like most beetles in the genus *Amara*, *A. strenua* is a difficult species to identify and is likely to be under recorded.
- 3.11 The leaf beetle *Pilemostoma fastuosa* is a Near-threatened species which has a stronghold in the Surrey and Sussex area. This species was found in Area B close to Pond P5, where the host plant Common Fleabane is particularly numerous. However Common Fleabane occurs widely in field margins in Area D, so the beetle is likely to be more widespread in the survey area. It is often a low density species that can be difficult to find.
- 3.12 In conclusion, we believe that the site under discussion supports an overall invertebrate interest that is of regional importance and that this level of invertebrate interest is probably also represented in each of the four survey areas. Most of this interest is associated with features and microhabitats which are spread throughout the site, such as mature oaks, south facing unmanaged blackthorn hedges, the network of ponds and floodplain grassland close to the River Mole.
- 3.13 The exception to the above concerns the tracts of improved grassland in Area C and the large block of arable cultivation in Area D. However, it should be stressed that even this latter area is not lacking in value to invertebrates, since the flower-rich margins provide an important forage resource for various pollinators, including species of conservation value such as the Squab Furrow Bee *Lasioglossum pauperatum* and Red Bartsia Bee *Melitta tricincta*.

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Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Asellus aquaticus</i>	Water Louse	LC		Ubiquitous. Tolerant of organically polluted waters, high salinities, low pH and high metal concentrations.	✓		✓	
<b>Oniscidae</b>								
<i>Oniscus asellus</i>		LC		Found in a very wide range of habitats but typically in damper habitats and in humid refugia within those habitats.	✓	✓	✓	✓
<b>Philosciidae</b>								
<i>Philoscia muscorum</i>	Common Striped Woodlouse	LC		Grasslands. Widespread in England and Wales, but becomes increasingly sparse further north.	✓	✓	✓	✓
<b>ARANEAE</b>	<b>SPIDERS</b>							
<b>Anyphaenidae</b>								
<i>Anyphaena accentuata</i>		LC		Associated with trees and bushes. Widespread and common in the south.	✓	✓		✓
<b>Araneidae</b>	<b>Orb-web spinners</b>							
<i>Agalenatea redii</i>		LC		Grasslands, web often on gorse. Widespread but local in southern England.		✓		✓
<i>Araneus sturmi</i>		LC		In evergreen trees and bushes, usually in old woodland. Widespread throughout Great Britain but uncommon, although sometimes locally abundant.	✓			
<i>Araniella cucurbitina</i>		LC		On trees and bushes. Widespread and common.		✓	✓	✓
<i>Araniella opisthographa</i>		LC		On trees and bushes. England north to Yorks, less common than the very similar <i>A. cucurbitina</i> .	✓	✓		✓
<i>Hypsosinga pygmaea</i>		LC		Low vegetation in damp places, especially on heathland. Widespread but very local throughout Britain.	✓			
<i>Larinioides cornutus</i>		LC		Watersides, on tall vegetation. Widespread throughout Britain.	✓	✓		
<i>Mangora acalypha</i>		LC		Grassland and low vegetation. Widespread in southern England.	✓	✓		✓
<b>Clubionidae</b>								
<i>Clubiona brevipes</i>		LC		On the foliage of oaks and other trees and bushes. Common in southern England.		✓	✓	✓
<i>Clubiona reclusa</i>		LC		Among low vegetation in wet places. Common and widespread.	✓	✓	✓	✓
<b>Corinnidae</b>								
<i>Phrurolithus festivus</i>		LC		Bare ground, often associated with ants which it resembles in movement. Widespread in southern England.		✓		
<b>Dictynidae</b>								
<i>Dictyna arundinacea</i>		LC		Common and widespread on low vegetation, especially that which is dry or dead.	✓		✓	✓
<i>Dictyna latens</i>		LC		On low vegetation and bushes, particularly on heather. Throughout southern Britain north to Yorkshire, but uncommon.	✓	✓	✓	✓
<i>Dictyna uncinata</i>		LC		In grassland and scrub. Common in southern Britain.		✓	✓	✓
<i>Lathys humilis</i>		LC		On trees and bushes. Widespread but local. Locally common in the south.				✓
<b>Linyphiidae</b>	<b>Money spiders</b>							
<i>Bathyphantes gracilis</i>		LC		Low vegetation; ubiquitous and widespread.		✓		
<i>Entelecara acuminata</i>		LC		On low bushes and trees. Locally abundant in the south, but more restricted in distribution in the north.				✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Erigone atra</i>		LC		Widespread and common throughout Britain in many habitats.				✓
<i>Erigone dentipalpis</i>		LC		Commonly found in a wide variety of habitats. Widespread in Britain.	✓	✓	✓	✓
<i>Erigone longipalpis</i>		LC		Coastal sites and, occasionally, on wet sites inland. Widespread, but uncommon.			✓	✓
<i>Gnathonarium dentatum</i>		LC		Widespread and common throughout Britain in wet, marshy situations by the side of streams.	✓			
<i>Gongylidium rufipes</i>		LC		Common and widespread throughout Britain, found on trees, bushes and tall plants in woods.			✓	✓
<i>Hypomma cornutum</i>		LC		Common and widespread throughout much of Britain, on trees, bushes and tall plants in woods.		✓		
<i>Microlinyphia pusilla</i>		LC		Widespread and common throughout the British Isles, occurring in grass and other low vegetation.	✓			
<i>Neriere clathrata</i>		LC		In hedges, near the ground and in low undergrowth throughout the British Isles; very common. .		✓		
<i>Neriere peltata</i>		LC		Common throughout Britain. Found on bushes and the lower foliage of trees.	✓			
<i>Pocadicnemis juncea</i>		LC		In a variety of habitats and probably widespread in Britain.		✓		✓
<i>Porrhomma microphthalmum</i>		LC		Under stones and in litter. No apparent habitat specificity. Widely distributed in Great Britain but not common.		✓		
<i>Tenuiphantes tenuis</i>		LC		In a wide range of habitats. Widespread and common throughout Britain.	✓	✓	✓	✓
<b>Lycosidae</b>	<b>Wolf spiders</b>							
<i>Arctosa leopardus</i>		LC		In marshy places among moss and detritus. Widespread but local in Wales and southern England.		✓		✓
<i>Pardosa amentata</i>		LC		In a variety of unshaded marshy habitats. Adults are found in the spring. Common and widespread in Britain.	✓	✓	✓	✓
<i>Pardosa prativaga</i>		LC		In fields, heaths and waste ground. Widespread and often locally abundant but less common in the north.		✓		✓
<i>Pardosa pullata</i>		LC		In various habitats. Widespread and common throughout Britain.	✓	✓	✓	✓
<i>Pirata piraticus</i>		LC		At the margins of ponds and streams and in marshes and other wetland habitats. Widespread throughout Britain.	✓			
<i>Piratula latitans</i>		LC		In fens and marshes. Widespread but not common in southern Britain.		✓		
<i>Piratula uliginosa</i>		LC		Shady woods and marshy places. Local but more common in the northern part of its range.				✓
<b>Philodromidae</b>								
<i>Philodromus albidus</i>		LC		On bushes, the lower branches of trees and long herbage, usually in wooded areas. Widespread in southern England.			✓	✓
<i>Philodromus aureolus</i>		LC		On trees and bushes. Common and widespread throughout much of Britain.	✓	✓	✓	✓
<i>Philodromus dispar</i>		LC		On trees and bushes. Common in southern Britain.		✓		✓
<i>Philodromus rufus</i>		NE		Recently recognised in Britain; very similar to P. albidus but appears to be much rarer with few confirmed records.				✓
<i>Tibellus oblongus</i>		LC		Grasses in damp places. Common throughout Britain.		✓		✓
<b>Pisauridae</b>								
<i>Pisaura mirabilis</i>	Nursery Web Spider	LC		Various open habitats. Very common and widespread.	✓	✓	✓	✓
<b>Salticidae</b>	<b>Jumping spiders</b>							
<i>Ballus chalybeius</i>		LC	NS	On bushes and trees. Mainly south east England.	✓	✓	✓	✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Euophrys frontalis</i>		LC		In low vegetation or under stones in woods, on heaths, etc. Common and widespread.	✓	✓	✓	
<i>Heliophanus flavipes</i>		LC		On low vegetation on rough, open ground. Widespread and common in southern England, but scarce in the north.	✓			
<i>Salticus scenicus</i>		LC		Common in Britain on bare sunny surfaces such as tree trunks and buildings.	✓			
<b>Tetragnathidae</b>								
<i>Metellina menzei</i>		LC		Various habitats. Common and widespread.	✓	✓		✓
<i>Tetragnatha extensa</i>		LC		Low vegetation in damp places. One of our commonest spiders.		✓		
<i>Tetragnatha montana</i>		LC		On trees and bushes, often but not always near water. Locally common throughout Britain.		✓	✓	✓
<b>Theridiidae</b>								
<i>Anelosimus vittatus</i>		LC		On trees and tall plants, especially oak. Widespread and frequent north to Scotland.	✓	✓	✓	✓
<i>Enoplognatha ovata</i>		LC		Grassland and low vegetation. Widespread throughout Britain.	✓	✓	✓	✓
<i>Phylloneta impressa</i>		LC		On bushes and low vegetation. Local throughout much of Britain.				✓
<i>Phylloneta sisypbia</i>		LC		Commonly found throughout Britain on shrubs and other low vegetation.	✓	✓		
<i>Platnickina tincta</i>		LC		On low vegetation, often in the webs of other spiders. Frequent in the southern half of Britain.	✓	✓		
<i>Robertus arundineti</i>		LC		In the undergrowth of woods and amongst heather on open moorland, also in marshes in southern England. Widespread but uncommon.				✓
<b>Thomisidae</b>								
<i>Misumena vatia</i>		LC		Various habitats. Common, especially in the south.	✓	✓		✓
<i>Xysticus cristatus</i>		LC		On the ground or in low vegetation. Common and widespread throughout much of Britain.	✓	✓		✓
<i>Xysticus kochi</i>		LC		Fairly common throughout Britain on bushes.		✓		
<i>Xysticus ulmi</i>		LC		Various wetland types. Widespread but uncommon.				✓
<b>Zoridae</b>								
<i>Zora spinimana</i>		LC		In detritus, moss and grass, particularly in damp places. Widespread and common.		✓		
<b>OPILIONES</b>	<b>HARVESTMEN</b>							
<b>Leiobunidae</b>								
<i>Dicranopalpus ramosus</i>		NE		Often around human habitation. Widespread.	✓	✓	✓	✓
<b>Phalangiidae</b>								
<i>Oligolophus tridens</i>		NE		In the ground layer in various habitats. Widely distributed.		✓	✓	✓
<i>Opilio parietinus</i>		NE		A widespread and highly synanthropic species; common on walls, fences, buildings and even found in the centre of London.		✓		
<b>COLEOPTERA</b>	<b>BETLES</b>							
<b>Anobiidae</b>	<b>Woodworm beetles</b>							

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Ochina ptinoides</i>		LC		In woody stems of ivy <i>Hedera helix</i> . Common in the southeast, local elsewhere.			✓	✓
<b>Apionidae</b>	<b>Weevils (part)</b>							
<i>Apion frumentarium</i>		NE		Various habitats, larvae develop in stem mines in the large species of <i>Rumex</i> . Common and widespread.	✓	✓	✓	✓
<i>Apion haematodes</i>		NE		In stems of Sheep's Sorrel <i>Rumex acetosella</i> , in sandy places.		✓		
<i>Aspidapion radiolus</i>		NE		On <i>Malva sylvestris</i> , the larvae living in the stems. Widespread in Britain.				✓
<i>Eutrichapion ervi</i>		NE		On vetches throughout Britain, the larvae developing in flower buds.		✓	✓	✓
<i>Eutrichapion viciae</i>		NE		On vetches throughout Britain, the larvae developing on flowers.	✓	✓		
<i>Ischnoptera pion loti</i>		NE		On <i>Lotus corniculatus</i> and <i>Lotus tenuis</i> in various habitats. Common and widespread.	✓	✓		✓
<i>Ischnoptera pion modestum</i>		NE		On <i>Lotus uliginosus</i> . Widespread in meadows and damp ground.		✓		✓
<i>Omphalapion hookerorum</i>		NE		In flowers of <i>Matricaria</i> and <i>Tripleurospermum</i> . Widespread in southern Britain.	✓			
<i>Perapion curtirostre</i>		NE		Widespread and abundant throughout Britain on a wide range of dock species.	✓	✓	✓	
<i>Perapion hydrolapathi</i>		NE		Larvae mine the stems of the larger species of <i>Rumex</i> . Very common.		✓		
<i>Perapion violaceum</i>		NE		In stem mines in docks <i>Rumex obtusifolius</i> etc. Very common.	✓	✓	✓	✓
<i>Protapion apricans</i>		NE		In seed heads of red clovers - various <i>Trifolium</i> spp. Very common.	✓	✓		
<i>Protapion fulvipes</i>		NE		On clovers. Widely distributed and common.	✓		✓	✓
<b>Buprestidae</b>	<b>Jewel beetles</b>							
<i>Agrilus angustulus</i>		LC	NS	Deciduous woodland, larvae in the dead wood of oaks. Local in southern England.	✓		✓	✓
<i>Agrilus sulcicollis</i>		NA		Deciduous woodland, larvae develop under bark of Oaks. Southern and central England.				✓
<b>Cantharidae</b>	<b>Soldier beetles</b>							
<i>Cantharis cryptica</i>		LC		Woodland edge, hedgerows or scrub. Predatory. Widespread throughout Britain.	✓	✓		✓
<i>Cantharis decipiens</i>		LC		Various habitats with some tree cover. Predatory. Widespread in England and Wales.	✓	✓	✓	✓
<i>Cantharis flavilabris</i>		LC		Lowland marshes and damp grassland. Predatory. Widespread in England and Wales.	✓	✓		✓
<i>Cantharis lateralis</i>		LC		Open marshy vegetation and damp grassland. Predatory. Widespread in England and Wales.	✓		✓	✓
<i>Cantharis rufa</i>		LC		Various habitats, primarily lowland marshy situations. Predatory. Widespread throughout Britain.	✓	✓		✓
<i>Cantharis rustica</i>		LC		Various lowland grasslands. Predatory. Widespread throughout Britain.		✓		
<i>Malthinus flaveolus</i>		LC		Most lowland countryside that includes trees and shrubs. Predatory. Widespread throughout Britain.	✓			✓
<i>Malthodes marginatus</i>		LC		Almost ubiquitous in situations with trees. Predatory. Widespread throughout Britain.	✓	✓	✓	
<i>Malthodes minimus</i>		LC		Woodlands; particularly abundant in woods on base-rich soils. Widespread throughout southern Britain.	✓			✓
<i>Rhagonycha fulva</i>		LC		Ubiquitous in habitat. Predatory. Widespread throughout Britain.	✓	✓	✓	✓
<i>Rhagonycha lignosa</i>		LC		Foliage of trees and shrubs. Predatory. Widespread throughout Britain.	✓	✓		

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Rhagonycha limbata</i>		LC		Open grasslands on dry, free-draining soils. Predatory. Widespread throughout Britain.	✓		✓	
<b>Carabidae</b>	<b>Ground beetles</b>							
<i>Acupalpus dubius</i>		LC		In litter, moss and tussocks near fresh water.		✓		✓
<i>Acupalpus exiguus</i>		LC	NS	In marshy sites with litter or tussocks, both inland and in salt marshes.		✓		✓
<i>Acupalpus parvulus</i>		LC		In damp habitats near vegetation.		✓		✓
<i>Agonum muelleri</i>		LC		In damp grasslands, fields, gardens, open woodland and dune slacks.		✓		
<i>Amara aenea</i>		LC		In dry grasslands, gardens, dunes and waste land.	✓	✓	✓	✓
<i>Amara communis</i>		LC		In grasslands and moorland, even if wet.		✓		
<i>Amara convexior</i>		LC		In dry, well drained sites with ruderal vegetation.		✓		✓
<i>Amara lunicollis</i>		LC		In most open or semi-open habitats, especially if well drained though not too dry.		✓		✓
<i>Amara similata</i>		LC		In open fields and gardens, often near water.				✓
<i>Amara strenua</i>		NT	NR	In coastal grasslands, also coastal flood refuse - extremely local in parts of England.		✓		
<i>Anisodactylus binotatus</i>		LC		In damp meadows and marshy habitats, as well as arable land on poorly-draining soils.		✓		
<i>Anthraxus consputus</i>		LC	NS	Muddy wetland margins. Widespread but local across southern England and Wales.		✓		
<i>Bembidion articulatum</i>		LC		In cracks on bare sand or mud near fresh water.		✓		
<i>Bembidion biguttatum</i>		LC		On open mud and silty ground near standing fresh water.		✓		✓
<i>Bembidion guttula</i>		LC		Ubiquitous in almost all habitats, especially near water.		✓	✓	✓
<i>Bembidion lampros</i>		LC		Ubiquitous in all dry, sunny habitats, especially gardens and agricultural land.	✓	✓	✓	✓
<i>Bembidion lunulatum</i>		LC		On damp bare ground near water.	✓	✓		
<i>Clivina fossor</i>		LC		In almost all open habitats, especially arable land, pasture and gardens.		✓		
<i>Harpalus affinis</i>		LC		In gardens, waste ground, arable fields and almost all dry, open situations.		✓		✓
<i>Harpalus rufipes</i>		LC		In open, dry situations on light soils, especially arable fields.		✓		✓
<i>Leistus spinibarbis</i>		LC		Amongst litter, in tussocks and under stones in woods and gardens mainly near the coast.	✓			
<i>Microlestes minutulus</i>		LC		On sandy and gravelly soils, often in open situations.		✓		
<i>Nebria brevicollis</i>		LC		A ubiquitous late summer and autumn species.	✓	✓	✓	✓
<i>Paradromius linearis</i>		LC		In dry grasslands, arable fields and dunes.			✓	✓
<i>Poecilus cupreus</i>		LC		In dry habitats and fields.		✓		
<i>Pterostichus madidus</i>		LC		In woodlands, gardens and dry grasslands.	✓	✓	✓	✓
<i>Pterostichus minor</i>		LC		In marshes and wet grasslands.			✓	
<i>Pterostichus nigrita</i>		LC		In almost all damp lowland habitats, especially near fresh water.		✓		
<i>Pterostichus strenuus</i>		LC		In almost all habitats except at high altitudes, especially grasslands.		✓		✓

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<i>Pterostichus vernalis</i>		LC		In most damp or shaded lowland habitats, especially grasslands.		✓		
<i>Stenolophus mixtus</i>		LC		In marshes and at the edges of standing water, especially on clay soils.		✓		
<i>Stenolophus teutonius</i>		LC	NS	On damp, open or disturbed ground near standing water.		✓		
<i>Syntomus foveatus</i>		LC		On dry heaths, waste ground, arable land, grasslands and dunes.			✓	✓
<i>Syntomus obscuroguttatus</i>		LC		In litter and moss, usually in damp situations or on clay soils.		✓	✓	✓
<b>Cerambycidae</b>	<b>Longhorn beetles</b>							
<i>Agapanthia villosoviridescens</i>		LC		Larvae in the stems of thistles and hogweed.		✓		
<i>Clytus arietis</i>		LC		Larvae in dead branches of deciduous trees; adult a wasp mimic; visits flowers.		✓		
<i>Grammoptera ruficornis</i>		LC		Larvae in fungus-infected twigs and small branches of deciduous trees; adults at flowers.	✓	✓	✓	✓
<i>Stenocorus meridianus</i>		LC		Larvae feed internally in dead roots of trees; adults at flowers.			✓	
<i>Stenurella melanura</i>		LC		Larvae in dead wood; adults at umbel flowers.		✓		
<i>Tetrops praeustus</i>		LC		Larvae in dead twigs of various rosaceous trees.	✓		✓	
<b>Cerylonidae</b>								
<i>Cerylon ferrugineum</i>		NE		Under dead bark of deciduous trees. Very common in southern England but indicative of old woodland in the north.	✓			
<i>Cerylon histeroideis</i>		NE		Under dead bark of broad leaved trees in old woodland. Local.	✓			
<b>Chrysomelidae</b>	<b>Leaf beetles</b>							
<i>Agelastica alni</i>	Alder Leaf Beetle	DD	NR	On alders, feeding on the leaves. Formerly very rare but now widespread and common in many parts of England.	✓	✓		✓
<i>Altica lythri</i>		LC		Wide range of mainly damp habitats; adults feed on various willowherbs. Widespread.	✓	✓		✓
<i>Altica oleracea</i>		LC		Various habitats; adults and larvae feed on leaves of a wide range of plant species.		✓		
<i>Altica palustris</i>		LC		Various habitats; adults and larvae feed on leaves of various willowherbs. Widespread.		✓		
<i>Aphthona euphorbiae</i>		LC		Wide range of habitats; adults feed on leaves of many herbaceous plants.	✓	✓	✓	✓
<i>Aphthona nonstriata</i>		LC		Various habitats, usually near water; feeds on yellow iris <i>Iris pseudacorus</i> .	✓			
<i>Batophila aerata</i>		LC		Various habitats; adults feed on the leaves of various Rosaceae especially brambles <i>Rubus</i> , larvae in the roots.				✓
<i>Bruchidius imbricornis</i>		NA		Recently (2012) established Ong goat's-rue <i>Galega officinalis</i> in southern England.		✓		✓
<i>Bruchus loti</i>		LC		Various habitats; adults feed mainly on pollen of legumes, larvae probably within legume seeds.	✓	✓		✓
<i>Bruchus rufimanus</i>		LC		Various habitats; adults feed on pollen of various plants, larvae develop within seeds of bean plants.		✓		✓
<i>Bruchus rufipes</i>		LC		Various habitats; adults feed on pollen of various plants (mainly Fabaceae), larvae develop within seeds of host plants.	✓	✓	✓	✓
<i>Cassida rubiginosa</i>		LC		Wide range of habitats; adults and larvae feed on leaves of Asteraceae.	✓	✓	✓	

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<i>Cassida vibex</i>		LC		Various habitats; adults and larvae feed on several species of Asteraceae.				✓
<i>Crepidodera aurata</i>		LC		Wide range of habitats; adults feed on leaves of Salix, larvae feed on the roots.	✓	✓	✓	
<i>Crepidodera aurea</i>		LC		Various habitats; adults feed on leaves Populus, larvae develop at the roots.		✓		
<i>Crepidodera fulvicornis</i>		LC		Wide range of habitats; adults feed on leaves of willows Salix (and possibly pollen and other trees), larvae feed on the roots.	✓	✓	✓	
<i>Crepidodera plutus</i>		LC		Wide range of habitats; adults feed on the leaves of willows Salix (possibly also other trees), larvae feed at the roots.		✓		
<i>Cryptocephalus fulvus</i>		LC		Various mainly open habitats; adults and larvae on various herbaceous plants.				✓
<i>Cryptocephalus moraei</i>		LC		Various habitats; adults and larvae feed on the leaves and flowers of St John's-worts Hypericum.		✓		
<i>Donacia impressa</i>		LC	NS	Vegetation at the margins of a variety of water bodies, larvae develop in Common Club-rush Schoenoplectus lacustris.	✓			
<i>Donacia simplex</i>		LC		Various aquatic habitats with bur-reeds Sparganium; adults feed on leaves, larvae probably on roots especially Branched Bur-reed S. erectum.	✓			
<i>Donacia vulgaris</i>		LC		Stands of vegetation including common reed Phragmites australis and bulrushes Typha in various water-bodies, larvae on roots and rhizomes.	✓			
<i>Epitrix pubescens</i>		LC		Wide range of habitats; adults feed on large leaves of Solanaceae (nightshades), larvae feed within the roots.	✓			
<i>Gastrophysa polygoni</i>		LC		Various habitats; adults and larvae feed on leaves of knotgrass Polygonum aviculare and other Polygonaceae.				✓
<i>Gastrophysa viridula</i>		LC		Wide range of habitats; adults and larvae feed on leaves of docks Rumex and other Polygonaceae.	✓		✓	✓
<i>Lema cyanella</i>		LC		Thistles, especially creeping thistle Cirsium arvense in various habitats; adults and larvae feed on leaves.				✓
<i>Longitarsus dorsalis</i>		LC		Various habitats, adults feed on the leaves of ragworts Senecio and other Asteraceae, larvae in the roots.		✓		
<i>Longitarsus luridus</i>		LC		Wide range of habitats; adults feed on numerous plants, larvae develop at roots.		✓		✓
<i>Oulema obscura</i>		LC		Farmland, gardens and many other habitats; adults and larvae feed on leaves of cereals and wild grasses.		✓		
<i>Phaedon armoraciae</i>		LC		Various habitats, mainly wetlands; adults feed on the leaves of a range of water plants.	✓	✓		
<i>Phratora vulgatissima</i>		LC		Various habitats; adults and larvae feed on the leaves of willows Salix and possibly poplars Populus and birches Betula.	✓			
<i>Phyllotreta cruciferae</i>		LC	NS	Wide range of habitats; adults feed on the leaves of many Brassicaceae, larvae feed on the roots.		✓		
<i>Phyllotreta exclamationis</i>		LC		Wide range of habitats with or near water; adults feed on leaves of Brassicaceae especially water-cresses Rorippa and bitter-cresses Cardamine, larvae feed at the roots.		✓		
<i>Phyllotreta tetrastigma</i>		LC		Various wet habitats, adults feed on leaves of water-cresses Rorippa, bitter-cresses Cardamine, garden radish Raphanus sativus; larvae are leaf-miners.		✓		
<i>Phyllotreta undulata</i>		LC		Wide range of habitats; adults feed on the leaves of many Brassicaceae, larvae feed on the roots.	✓	✓		✓
<i>Pilemostoma fastuosa</i>		NT	NR	Various habitats, feeding on Ploughman's Spikenard and Common Fleabane. Very local in southern England.		✓		

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<i>Plateumaris sericea</i>		LC		Margins of standing waters; adults usually on bur-reeds <i>Sparganium</i> but also other plants, larvae on roots.	✓			
<i>Podagrica fuscicornis</i>		LC	NS	Various habitats; adults feed on Malvaceae (mallows).				✓
<i>Psylliodes affinis</i>		LC		Wide variety of habitats; adults feed on leaves of wild and cultivated Solanaceae, larvae feed on roots.		✓	✓	
<i>Psylliodes chrysocephala</i>		LC		Wide range of habitats; adults feed on Brassicaceae, and sometimes plants in other families, larvae mine the stems.		✓	✓	✓
<b>Cisidae</b>								
<i>Cis boleti</i>		NE		Excavates galleries in various fungi, including many cap and bracket fungi. Widespread and common.	✓			
<b>Cleridae</b>								
<i>Korynetes caeruleus</i>		LC	NS	In old woodland; larvae feed on woodworm beetles. Local in southern Britain.			✓	✓
<b>Coccinellidae</b>	<b>Ladybirds</b>							
<i>Adalia decempunctata</i>	10-spot ladybird	NE		A ubiquitous species associated with a wide variety of deciduous trees.	✓	✓	✓	✓
<i>Anisosticta novemdecimpunctata</i>	Water ladybird	NE		In reed-beds and grasslands in marshy or wet locations.	✓			
<i>Calvia quattuordecimguttata</i>	Cream-spot ladybird	NE		Associated with deciduous trees and most commonly found in woodland.	✓	✓		
<i>Coccinella septempunctata</i>	7-spot ladybird	NE		A ubiquitous species.	✓	✓	✓	✓
<i>Exochomus quadripustulatus</i>	Pine ladybird	NE		Not restricted to pine, common on a variety of plants in all habitats including urban.	✓		✓	✓
<i>Halyzia sedecimguttata</i>	Orange ladybird	NE		Woodlands and on trees in other habitats. Feeds on mildew. Widespread throughout much of Britain.		✓		✓
<i>Harmonia axyridis</i>	Harlequin ladybird	NE		A recent arrival (2003) that has rapidly spread - a ubiquitous generalist species.	✓	✓	✓	✓
<i>Harmonia quadripunctata</i>	Cream-streaked ladybird	NE		A conifer specialist but also found in heathland, scrub, grassland and dune systems.	✓			
<i>Myrrha octodecimguttata</i>	18-spot ladybird	NE		A conifer specialist found in all habitats where conifers are present.	✓			
<i>Propylea 14-punctata</i>	14-spot ladybird	NE		A ubiquitous species.		✓	✓	✓
<i>Rhyzobius litura</i>		NE		A widespread grassland species.	✓	✓	✓	✓
<i>Scymnus auritus</i>		NE		Usually found on oak in any habitat where oak occurs.				✓
<i>Subcoccinella 24-punctata</i>	24-spot ladybird	NE		A grassland species but also recorded from marshy sites and scrub.	✓	✓		
<i>Tytthaspis sedecimpunctata</i>	16-spot ladybird	NE		Primarily a grassland species but also found in scrub, saltmarsh and dunes.	✓	✓		✓
<b>Colydiidae</b>								

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					A	B	C	D
<i>Bitoma crenata</i>		LC		In woods, under the bark of various deciduous trees feeding on fungi. Widespread and common.	✓			
<i>Pycnomerus fuliginosus</i>		NA		In woods, under the bark of various deciduous trees feeding on fungi. Widespread in south east England.				✓
<b>Curculionidae</b>	<b>Weevils (part)</b>							
<i>Anthonomus rubi</i>		NE		Develops in fruits of bramble, raspberry and strawberry. Widespread and common.	✓	✓	✓	✓
<i>Archarius salicivorus</i>		NE		On Salix in damp habitats, larvae in galls. Widespread and common throughout Britain.	✓	✓	✓	✓
<i>Ceutorhynchus erysimi</i>		NE		On Shepherd's-purse. Widespread throughout Britain.				✓
<i>Ceutorhynchus obstrictus</i>		NE		On a range of Brassicaceae. Widely distributed and common.		✓		✓
<i>Ceutorhynchus typhae</i>		NE		On a range of Brassicaceae. Widely distributed and common.				✓
<i>Cionus alauda</i>		NE		On figworts but also mullein. Widespread throughout Britain.		✓		
<i>Cionus hortulanus</i>		NE		On figworts but also mullein. Widespread in southern Britain.		✓		
<i>Coeliodes transversealbofasciatus</i>		NE	NS(Nb)	In woods, on oak. Larvae develop in female flowers. Widespread but local.		✓	✓	✓
<i>Coelositona cambricus</i>		NE		On Lotus pedunculatus in damp habitats. Widespread throughout Britain.		✓		✓
<i>Curculio glandium</i>		NE		On oak, larvae in acorns. Widespread in southern and central England.	✓	✓	✓	✓
<i>Curculio venosus</i>		NE		On oak, larvae in acorns. Widespread in southern and central England.	✓	✓	✓	✓
<i>Dorytomus dejeani</i>		NE		Larvae in maturing catkins of aspen and other species of Populus. Widespread but local throughout Britain.		✓		
<i>Dorytomus rufatus</i>		NE		Larvae in female catkins of broad-leaved willows. Widespread.				✓
<i>Dorytomus tortrix</i>		NE		Larvae in aspen catkins. Common in most of England, more local in the north.		✓		
<i>Exomias pellucidus</i>		NE		Among leaf litter and in dry grassland. Apparently polyphagous. Widespread and generally common.	✓	✓		
<i>Hypera melancholica</i>		NE	NS(Nb)	Uncommon weevil found on Medicago, Melilotus or Trifolium in ruderal habitats. Widespread but local.		✓		
<i>Hypera nigrirostris</i>		NE		On Trifolium, usually T. pratense. Common throughout Britain.		✓		
<i>Hypera plantaginis</i>		NE		On the flowers of Lotus corniculatus. Widespread throughout Britain.	✓	✓		
<i>Hypera rumicis</i>		NE		On various species of Rumex. Widespread and common in grassy and ruderal places.		✓		✓
<i>Magdalis armigera</i>		NE		On elms. Widespread in England, local in Wales.		✓		
<i>Magdalis cerasi</i>		NE	NS(Nb)	Woodland edge and hedgerows on oaks, hawthorn and apple. Local in southern Britain.	✓	✓		✓
<i>Mecinus pascuorum</i>		NE		On Plantago lanceolata. Widespread and often common.		✓	✓	✓
<i>Mecinus pyrae</i>		NE		Feeds on common species of plantain in grassy places. Widespread and common.		✓		
<i>Microplontus melanostigma</i>		NE		Various open habitats on Matricaria and Tripleurospermum. Widespread throughout much of Britain.		✓		✓
<i>Nedyus quadrimaculatus</i>		NE		On nettle Urtica dioica. Very common wherever nettles grow.	✓	✓	✓	
<i>Orchestes pilosus</i>		NE		Larvae mine the foliage of oak. It is widely distributed and common in southern England, but less frequent further north.		✓		✓

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<i>Orchestes quercus</i>		NE		Larvae mine the leaves of oak. Common throughout England and probably Wales.		✓	✓	✓
<i>Orchestes signifer</i>		NE		Usually on oak species. Fairly common and widely distributed in southern England and Wales.		✓	✓	✓
<i>Phyllobius pomaceus</i>		NE		On nettle <i>Urtica dioica</i> . Widespread throughout England and Wales, local further north.				✓
<i>Phyllobius pyri</i>		NE		Hedgerows, woodland and scrub, on the foliage of various trees and shrubs. Widespread throughout Britain.	✓		✓	✓
<i>Phyllobius roboretanus</i>		NE		On various herbaceous plants, shrubs and trees. Widespread in England and Wales, local further north.	✓		✓	
<i>Polydrusus cervinus</i>		NE		On the foliage of various trees and shrubs. Widespread and common.	✓		✓	✓
<i>Rhamphus pulicarius</i>		NE		Mines the leaves of willow, birch and sweet gale. Widespread and common throughout Britain.		✓		
<i>Rhinocyllus conicus</i>		NE	NS(Na)	Various open habitats on thistles. Local in southern and central England.		✓		
<i>Rhinoncus pericarpus</i>		NE		On knotgrass and docks in dry situations. Widespread in England and Wales, local further north.	✓	✓	✓	
<i>Sitona lineatus</i>		NE		On most species of leguminosae mainly in grassland. Very common and widespread.	✓	✓	✓	✓
<i>Sitona obsoletus</i>		NE		Associated with leguminous plants, including clovers. Widespread in England and Wales, local further north.	✓			
<i>Sitona suturalis</i>		NE		On various Leguminosae, especially meadow vetchling <i>Lathyrus pratensis</i> . Widespread in England and Wales, local further north.	✓			✓
<i>Strophosoma melanogrammum</i>		NE		Feeds on the foliage of various trees and shrubs, particularly hazel. Very common.	✓	✓	✓	✓
<i>Tachyerges salicis</i>		NE		On various species of broad and narrow leaved <i>Salix</i> spp., larvae mine the leaves. Widespread in England and Wales, local further north.		✓		
<i>Trichosirocalus troglodytes</i>		NE		On ribwort plantain <i>Plantago lanceolata</i> . Widespread and common throughout much of Britain.		✓		✓
<i>Tychius picirostris</i>		NE		In grassy places on white clover <i>Trifolium repens</i> . Widespread in England and Wales, local further north.	✓	✓	✓	
<b>Dasytidae</b>								
<i>Dasytes niger</i>		LC	NR	Larvae in dead wood. Very local in southern Britain.		✓	✓	✓
<b>Dermestidae</b>								
<i>Anthrenus verbasci</i>		NA		Larvae feed on the dry remains of insects and are a notorious pest in museum collections. Adults often on flowers. Widespread and common.	✓		✓	✓
<b>Dryopidae</b>								
<i>Dryops luridus</i>		LC		In mud at the edges of water bodies; widespread and common.		✓		
<b>Dytiscidae</b>	<b>Diving beetles</b>							
<i>Acilius sulcatus</i>		LC		Typical of steep-sided pools, often ranging into depth and clear water in the absence of fish.	✓			
<i>Agabus bipustulatus</i>		LC		A strong flier that is ubiquitous in stagnant water, even horse troughs and water butts.	✓	✓		
<i>Agabus nebulosus</i>		LC		An early coloniser of sparsely vegetated silt ponds, also found in horse troughs.		✓		
<i>Agabus sturmii</i>		LC		Abundant in ponds and riverside situations where there is detritus.		✓		

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<i>Dytiscus marginalis</i>		LC		Typically in small ponds but can occur in almost any aquatic habitat.		✓		
<i>Hydroglyphus geminus</i>		LC		In still lowland waters with a disturbed and exposed substratum of clay.		✓		
<i>Hydroporus angustatus</i>		LC		Associated with permanently flooded fens, usually in mesotrophic but also enriched sites - common.	✓		✓	
<i>Hydroporus palustris</i>		LC		Common in almost any still or slow-flowing water.	✓			
<i>Hydroporus planus</i>		LC		In temporary grassy ponds but, as it flies freely, is found in other water bodies.		✓		
<i>Hydroporus pubescens</i>		LC		Very common in all types of temporary water, often also in permanent acid waters.		✓		
<i>Hygrotus impressopunctatus</i>		LC		In rich fen in lowland lakes, ponds and ditches - usually amongst Sphagnum.		✓		
<i>Hygrotus inaequalis</i>		LC		In a wide range of permanent habitats, often in very shallow water.		✓		
<i>Hyphydrus ovatus</i>		LC		In deep and richly vegetated permanent lakes, ponds, ditches, canals and occasionally river backwaters.		✓		
<i>Ilybius montanus</i>		LC		In shallow water amongst flooded grasses, but sometimes also in pools with exposed peat.	✓		✓	
<i>Laccophilus minutus</i>		LC		A common species of lowland ponds, lakes and ditches, rarely found in slow running water.		✓		
<i>Liopterus haemorrhoidalis</i>		LC		In richly vegetated lowland ponds and ditches, usually with mosses and often cool, shaded or spring-fed.	✓	✓		
<i>Platambus maculatus</i>		LC		In permanent rivers and streams, often amongst submerged parts of overhanging vegetation.				✓
<b>Elateridae</b>	<b>Click beetles</b>							
<i>Adrastus pallens</i>		NE		Ecology uncertain, probably developing in soil. Common in grassland and hedgerows in most of lowland Britain.				✓
<i>Agriotes acuminatus</i>		NE		Larvae develop in grass roots. Common in the south; local north of the Midlands.		✓		✓
<i>Agriotes lineatus</i>		NE		Larvae develop in grass roots. Common in the south; local north of the Midlands.	✓	✓	✓	
<i>Agriotes obscurus</i>		NE		Larvae develop in grass roots. Widespread and common throughout much of Britain.	✓	✓		
<i>Agriotes pallidulus</i>		NE		Larvae develop in grass roots. Widespread and common throughout much of Britain.	✓			✓
<i>Athous haemorrhoidalis</i>		NE		Larvae develop in grass roots. Widespread and common throughout much of Britain.	✓	✓	✓	✓
<b>Elmidae</b>								
<i>Elmis aenea</i>		LC		Under stones in flowing rivers. Widespread.			✓	✓
<b>Gyrinidae</b>	<b>Whirlygig beetles</b>							
<i>Gyrinus substriatus</i>		LC		Common on almost any man-made ditch or pool and reported throughout the year, peaking in July.	✓	✓		
<b>Haliplidae</b>								
<i>Halipus heydeni</i>		LC		A southern species of small ponds, often in part shade.	✓			
<i>Halipus ruficollis</i>		LC		The commonest species of Halipus in all types of water.	✓			
<b>Helophoridae</b>								
<i>Helophorus aequalis</i>		LC		Summer adults are found in almost any habitat, but breeding confined to stagnant freshwater amongst grass.		✓		
<i>Helophorus brevipalpis</i>		LC		Ubiquitous in almost any aquatic habitat but breeds in exposed muddy edges of pools and streams.		✓		✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Helophorus grandis</i>		LC		In grassy pools and ditches - ecology as <i>H. aequalis</i> (above).	✓			
<i>Helophorus minutus</i>		LC		A more or less ubiquitous water beetle found in grassy-edged pools, lakes and slow rivers.	✓	✓		
<i>Helophorus obscurus</i>		LC		In muddy bottomed water bodies, both neutral and alkaline.		✓		
<i>Heterocerus fenestratus</i>		LC		In mud at the edges of water bodies; widespread and common.		✓		
<b>Hydraenidae</b>								
<i>Ochthebius minimus</i>		LC		In canals, ditches, lakes, ponds and pools in both brackish and fresh water.			✓	
<b>Hydrochidae</b>								
<i>Hydrochus angustatus</i>		LC	NS	In a wide range of lowland, permanent still waters with some exposed mud or peat.	✓	✓		
<b>Hydrophilidae</b>								
<i>Anacaena limbata</i>		LC		In mud and decaying vegetation at the edge of well-vegetated, eutrophic, still waters.	✓		✓	
<i>Anacaena lutescens</i>		LC		In well-vegetated still waters, also amongst Sphagnum and also in woodland pools amongst dead leaves.	✓			
<i>Coelostoma orbiculare</i>		LC		Typical of moss in floating rafts of vegetation but also at the edges of ponds and ditches with moss.	✓	✓		
<i>Enochrus testaceus</i>		LC		In fens and richly vegetated ponds, lakes and ditches.	✓			
<i>Helochaeres lividus</i>		LC		In vegetated lowland freshwaters, often in areas with a brackish influence.	✓	✓		
<i>Laccobius bipunctatus</i>		LC		In muddy shallows wherever these might occur on low ground.	✓			
<i>Sphaeridium scarabaeoides</i>		NE		Associated with horse and cow dung, also in carcasses, compost and other debris.			✓	✓
<b>Kateretidae</b>								
<i>Brachypterus urticae</i>		NE		Feeds on pollen in nettle flowers. Very common.	✓	✓		
<i>Kateretes rufilabris</i>		NE		On tall vegetation in marshland. Generally common in wet places.		✓		
<b>Lampyridae</b>								
<i>Lampyris noctiluca</i>	Glow-worm	LC		Various habitats; larvae are specialist predators on snails. Local throughout lowland Britain.		✓		
<b>Latridiidae</b>								
<i>Corticarina minuta</i>		NE		In plant litter. Widespread and common.		✓		
<i>Corticinara gibbosa</i>		NE		Leaf and grass litter, moss etc. Very common in most habitats.	✓	✓	✓	✓
<b>Malachiidae</b>								
<i>Anthocomus fasciatus</i>		LC	NS	Usually in or near old woodland, larvae in dead wood or plant stems. Local in southern Britain.	✓	✓		✓
<i>Axinotarsus marginalis</i>		NA		Deciduous woodland, larvae in dead wood. Adults feed on pollen. Southern and central England.		✓	✓	
<i>Cordylepherus viridis</i>		LC		Adults feed on pollen and nectar; larvae in dead stems. Widespread in England; coastal in Wales.	✓	✓		
<i>Malachius bipustulatus</i>		LC		Adults feed on pollen and nectar; larvae are active predators on tree trunks. Widespread in England and Wales.	✓	✓	✓	✓
<b>Mordellidae</b>								
<i>Mordellochroa</i>		LC		Woodlands and scrub. Larvae saproxylic, adults frequently on blossom. Widespread in England.				✓

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					A	B	C	D
<i>abdominalis</i>								
<b>Nitidulidae</b>								
<i>Epuraea aestiva</i>		NE		Larval ecology apparently unknown, although has been found in bumble bee nests. Adults on flowers, at sap runs and in fungi. Very common.	✓	✓	✓	
<i>Meligethes aeneus</i>		NE		A small pollen beetle. Very common species, feeding in a very wide variety of Brassicaceae.	✓	✓	✓	✓
<i>Meligethes atratus</i>		NE		A small pollen beetle associated with Rosa species. Very common.		✓		
<i>Meligethes carinulatus</i>		NE		In the flowers of Lotus corniculatus. Widespread and common.	✓			
<i>Meligethes gagathinus</i>		NE	NS(Nb)	Associated with mints Mentha species.		✓		
<i>Meligethes ochropus</i>		NE	NS(Nb)	Associated with Marsh Woundwort. Local and uncommon.	✓	✓		
<b>Noteridae</b>								
<i>Noterus clavicornis</i>		LC		Common in permanent, base-rich, lowland ponds in England, Ireland and Wales.	✓			
<b>Oedemeridae</b>								
<i>Oedemera lurida</i>		LC		The larvae develop in the old stems of various plants. Widespread and common throughout England and Wales.	✓	✓	✓	✓
<i>Oedemera nobilis</i>		LC		The larvae develop in the old stems of various plants. Widespread and common throughout England and Wales.	✓	✓	✓	✓
<b>Phalacridae</b>								
<i>Olibrus affinis</i>		LC		Larvae develop on various composites, particularly Tragopogon and Hypochaeris, adults feeding on pollen. Primarily southern.		✓		✓
<b>Pyrochroidae</b>								
<i>Pyrochroa coccinea</i>		LC		In deciduous woodland; larvae develop under bark. Widespread and common.	✓	✓		
<b>Rynchitidae</b>								
<i>Rhynchites aequatus</i>		NE		On rosaceous shrubs including hawthorn and blackthorn, larvae in fruits. Widespread in southern Britain.	✓			✓
<i>Temnocerus coeruleus</i>		NE	NS(Nb)	On various deciduous trees. A widespread but uncommon species.		✓		
<b>Scirtidae</b>								
<i>Contacyphon coarctatus</i>		LC		Usually amongst vegetation near water.	✓	✓	✓	
<i>Contacyphon ochraceus</i>		LC		Marshes and fens.	✓	✓		
<i>Contacyphon padi</i>		LC		Breeds in wet moss, especially in acid waters. Adults found on emergent vegetation.	✓	✓		
<i>Elodes minuta</i>		LC	NS	Larvae aquatic in fresh water, adults on foliage. Local throughout much of Britain.	✓			
<i>Microcara testacea</i>		LC		Larva develops wet moss in fens, marsh or seepages.	✓	✓		
<b>Scaptiidae</b>								
<i>Anaspis fasciata</i>		LC		Larvae in dead wood, adults frequently on hawthorn blossom. Widespread in England and Wales.	✓	✓	✓	✓
<i>Anaspis frontalis</i>		LC		Has been reared from decaying wood of oak and maple in Sweden; frequently found at hawthorn blossom.	✓	✓	✓	✓

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					A	B	C	D
<i>Anaspis garneysi</i>		LC		Has been reared from dry wood mould of oak, beech & larch (Levey 2009).		✓		
<i>Anaspis maculata</i>		LC		Larvae in dead wood, adults frequently on hawthorn blossom. Widespread in England and Wales.	✓	✓	✓	✓
<b>Silvanidae</b>								
<i>Silvanus unidentatus</i>		NE		Small flattened brown beetle found under dead bark of broad leaved trees. Widespread but local.	✓			
<b>Staphylinidae</b>	<b>Rove beetles</b>							
<i>Aloconota gregaria</i>		NE		In plant litter. Very common.		✓		
<i>Anotylus inustus</i>		LC		Dung and litter; bare ground.	✓			✓
<i>Cordalia obscura</i>		NE				✓		
<i>Cypha longicornis</i>		NE				✓		
<i>Drusilla canaliculata</i>		NE		Under stones, in litter and moss, most often in grassland. Very common.		✓		✓
<i>Gabrius breviventer</i>		LC		Marshes and damp grassland; widespread.		✓		
<i>Lathrobium elongatum</i>		LC		A variety of wetlands from permanently wet marsh to damp woodland. Widespread.		✓		
<i>Lathrobium geminum</i>		LC		Damp soils in open habitats.		✓		
<i>Myllaena intermedia</i>		NE		A dull yellowish to almost black rove beetle, 2 to 2.5mm. long, found in wet places. Widely distributed but local.		✓		
<i>Oxyptoda elongatula</i>		NE						✓
<i>Oxytelus laqueatus</i>		LC		In animal dung. Very common.			✓	✓
<i>Philonthus cognatus</i>		LC		Damp soils; grassland and woodland. Very common in most habitats.		✓	✓	
<i>Quedius cruentus</i>		LC		Decaying plant litter, tussocks and under bark and in rotting wood. .				✓
<i>Quedius fuliginosus</i>		LC		A variety of habitats including wetlands, grassland and woodland.		✓		
<i>Quedius semiobscurus</i>		LC		In open habitats on dry soils.		✓		
<i>Scaphisoma agaricinum</i>		LC			✓			
<i>Stenus aceris</i>		NE		Lowland tussocky grasslands.	✓	✓	✓	
<i>Stenus bifoveolatus</i>		NE		Various wetlands amongst low vegetation.	✓			
<i>Stenus boops</i>		NE		Various wetlands amongst low vegetation.		✓		
<i>Stenus cicindeloides</i>		NE		Various wetlands amongst tall emergent vegetation; including seasonally wet habitats.	✓	✓	✓	
<i>Stenus clavicornis</i>		NE		Various dry and damp habitats; avoids very wet areas.		✓	✓	✓
<i>Stenus flavipes</i>		NE		In litter in wet woodland and carr.	✓	✓		
<i>Stenus fulvicornis</i>		NE		Moss and litter in wet pastures and marshy areas, including pools in woodlands.	✓	✓	✓	✓
<i>Stenus juno</i>		NE		A wide range of wetland habitats including reed beds.		✓		
<i>Stenus ossium</i>		NE		Damp habitats in, grassland, dunes, and marshy but rarely in very wet areas.	✓	✓		✓
<i>Stenus pallipes</i>		NE		Well vegetated fens, dyke margins, and richer mire areas, avoiding acidic bogs.		✓		

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<i>Stenus picipes</i>		NE		Dry and wet grasslands including grazing levels.		✓		
<i>Stenus providus</i>		NE		Grasslands, grazing marsh, richer mires, lakeshores and riparian habitats.		✓		✓
<i>Tachinus rufipes</i>		LC		Grass litter, tussocks also in dung. Very common.				✓
<i>Tachyporus chrysomelinus</i>		LC		Moss, leaf litter, grass tussocks on heavier or less well drained soils.	✓	✓	✓	✓
<i>Tachyporus hypnorum</i>		LC		In moss, leaf litter, grass tussocks etc. Very common in most habitats.	✓	✓	✓	✓
<i>Tachyporus nitidulus</i>		LC		Moss, leaf litter and grass tussocks etc. Very common in most habitats.	✓	✓		
<i>Xantholinus longiventris</i>		LC		Grass tussocks, leaf litter, loose bark etc. Common throughout Britain.		✓		✓
<b>Tenebrionidae</b>								
<i>Lagria hirta</i>		LC		Larvae in soil. Widespread and common.			✓	✓
<b>DERMAPTERA</b>	<b>EARWIGS</b>							
<b>Forficulidae</b>								
<i>Forficula auricularia</i>	Common Earwig	LC		Ubiquitous.	✓	✓	✓	✓
<b>DICTYOPTERA</b>	<b>COCKROACHES</b>							
<b>Pseudomopidae</b>								
<i>Ectobius lapponicus</i>	Dusky Cockroach	LC	NS	Various open habitats. Local in southern England.	✓	✓		✓
<b>DIPTERA</b>	<b>FLIES</b>							
<b>Asilidae</b>	<b>Robber flies</b>							
<i>Dioctria baumhaueri</i>		LC		Predatory; woodland edge and scrub, widespread in southern Britain but rare in Wales.				✓
<i>Leptogaster cylindrica</i>		LC		Predatory; dry grassland, larvae in sandy soil. Widespread in southern Britain.		✓		✓
<b>Bibionidae</b>								
<i>Bibio marci</i>		NE		Larvae feed on the roots of grasses and are occasionally cereal pests. Widespread and common.	✓		✓	
<i>Dilophus febrilis</i>		NE		Various open habitats; the larvae are root feeders on grasses. Widespread and common.	✓	✓	✓	✓
<i>Dilophus femoratus</i>		NE		Larvae feed on plant roots and vegetable debris. Widespread and common.		✓	✓	✓
<b>Bombyliidae</b>								
<i>Bombylius major</i>		LC		Various habitats, larvae are parasitoids in the nests of Andrena bees. Widespread throughout Britain.	✓			
<b>Conopidae</b>								
<i>Sicus ferrugineus</i>		NE		Various habitats, larvae are parasites of various Bombus species. Widespread throughout Britain.		✓		
<b>Dolichopodidae</b>								
<i>Dolichopus wahlbergi</i>		NE		In fairly wet places. Widely distributed, but rather local.	✓			
<i>Poecilobothrus nobilitatus</i>		NE		Often abundant on soft wet mud. Very common in the south of England, more local in the north. .		✓		
<b>Empididae</b>								

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					A	B	C	D
<i>Empis livida</i>		NE		Predatory. On flowers in grassland, hedgerow and woodland edge situations. A widespread and fairly common species in the southern half of Britain.	✓		✓	
<i>Empis lutea</i>		NE		Predatory. On flowers in grassland, hedgerow and woodland edge situations. A widespread and fairly common species in the southern half of Britain.	✓	✓		✓
<i>Empis stercorea</i>		NE		Predatory. Abundant in rough grassland. Widespread and common.	✓	✓		
<i>Empis tessellata</i>		NE		Predatory, various habitats, occurs widely throughout Britain and is often common.	✓	✓	✓	
<i>Hilara maura</i>		NE		Predatory. A very widespread and common species over still and slow moving water.			✓	
<b>Lauxaniidae</b>								
<i>Minettia inusta</i>		NE				✓		
<i>Peplomyza litura</i>		NE		in damp, grassy places amongst scrub or near woodland edge; larvae in decaying organic matter. Widespread in southern Britain.		✓		✓
<b>Opomyzidae</b>								
<i>Opomyza germinationis</i>		NE		Larvae are stem borers in grasses. Extremely abundant in grassy places throughout Britain.	✓	✓	✓	
<b>Pallopteridae</b>								
<i>Paloptera umbellatarum</i>		NE		Larvae in flower heads of thistles. Widespread and common.				✓
<b>Pipunculidae</b>								
<i>Dorylomorpha hungarica</i>		NE		Larvae of this family are internal parasites of Homoptera. Mainly found in fens. Uncommon in southern Britain.		✓		
<i>Eudorylas fuscipes</i>		NE		Larvae of this family are internal parasites of Homoptera. Damp grassland, locally abundant.				✓
<i>Tomosvaryella kuthyi</i>		NE		Larvae of this family are internal parasites of Homoptera. Damp grassland, locally abundant.		✓		
<i>Tomosvaryella nigrifula</i>		NE		Larvae of this family are internal parasites of Homoptera. Damp grassland, locally abundant.		✓		
<i>Tomosvaryella sylvatica</i>		NE				✓		
<b>Platystomatidae</b>								
<i>Rivellia syngenesiae</i>		NE		In fens and damp meadows. Larvae of the family are believed to develop in wet rotting litter. Locally abundant in wetland habitats.		✓		✓
<b>Psilidae</b>								
<i>Loxocera albiseta</i>		NE		Associated with rushes <i>Juncus</i> species and occurs widely in wetlands and damp habitats.		✓		
<b>Ptychopteridae</b>	<b>Craneflies (part)</b>							
<i>Ptychoptera contaminata</i>		NE		Water margins, ditches, ponds, lakes, and sluggish rivers, larvae aquatic. Local in England (mainly southern) and Wales.	✓			
<b>Rhagionidae</b>								
<i>Chrysopilus asiliformis</i>		LC		Lush damp vegetation, often near streams or ponds. Local abundant in the south, scarce in the north.		✓		

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					A	B	C	D
<i>Chrysopilus cristatus</i>		LC		Lush vegetation in damp places, larvae in extremely rotten wood and other rotting vegetable matter. Common and widespread.	✓			
<i>Rhagio scolopaceus</i>		LC		Various habitats, larvae in soil, rotting wood and ground litter. Widespread throughout Britain.		✓	✓	
<b>Scathophagidae</b>								
<i>Cordilura pubera</i>		NE		Common in wet places throughout Britain. The larvae of this genus mine the stems or leaf bases of Carex and Juncus.	✓			
<i>Norellisoma spinimanum</i>		NE			✓			
<i>Scathophaga stercoraria</i>		NE		Abundant predatory fly which breeds in dung. Widespread throughout Britain.	✓	✓	✓	✓
<b>Sciomyzidae</b>	<b>Snail-killing flies</b>							
<i>Elgiva sollicita</i>		NE		Near freshwater where the larvae feed on aquatic pulmonate snails. Widely distributed and not uncommon in a variety of wetland situations in England and Wales.	✓	✓		
<i>Ilione albiseta</i>		NE		In a wide variety of wetland situations including bogs providing that conditions are not very acid. Widespread and common.		✓		
<i>Limnia unguicornis</i>		NE		Various open habitats, larvae feed on aquatic snails. Widely distributed and generally common on Britain.	✓	✓	✓	✓
<i>Sepedon spehega</i>		NE		Open situations near ponds and in marshes. Larvae are vigorous aquatic predators feeding on a variety of snails. Widespread.		✓		
<b>Sepsidae</b>								
<i>Sepsis fulgens</i>		NE		Larvae in all types of dung. Widespread and common.		✓	✓	
<b>Stratiomyidae</b>	<b>Soldier flies</b>							
<i>Beris chalybata</i>		LC		Scrub, hedges or woodland edge, larvae are found in decaying vegetable matter. Widespread and common.	✓	✓		✓
<i>Chloromyia formosa</i>		LC		Woods, hedges, parks and gardens, larvae in rotting vegetable matter in damp soil, rotting bark and leaf litter. Widespread throughout much of Britain.	✓	✓	✓	✓
<i>Chorisops tibialis</i>		LC		Hedgerows and scrub, larvae terrestrial, living in rotting vegetable matter. Fairly common in southern Britain.		✓		✓
<i>Microchrysa flavicornis</i>		LC		Grassland, woodland edge, hedgerows and gardens, larvae in rotting vegetable material and commonly occur in compost heaps. Widespread.			✓	
<i>Microchrysa polita</i>		LC		Grassland, scrub, hedgerows and woodland margins, larvae in rotting vegetable matter. Widespread and common.		✓	✓	
<i>Odontomyia tigrina</i>		LC		Local in fens and marshes, with most records from southern England. Larvae develop in shallow water in ponds and marshes amongst vegetable matter. .	✓			
<i>Oxycera nigricornis</i>		LC		Fens and marshes or sedge margins of old silted up pools, larvae are aquatic.		✓		
<i>Sargus iridatus</i>		LC		Woodland margins, larvae in rotting vegetation and dung. Widespread and common.		✓		
<b>Syrphidae</b>	<b>Hoverflies</b>							

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					A	B	C	D
<i>Cheilosia albitarsis</i>		LC		Marshes, damp meadows and woodland clearings; larvae in buttercups. Widespread throughout Britain.		✓		✓
<i>Chrysotoxum bicinctum</i>		LC		Warm, open habitats; larvae feed on aphids in ants nests. Widespread throughout Britain.		✓		
<i>Epistrophe eligans</i>		LC		Various habitats, larvae predatory on aphids on trees. Widespread throughout Britain.		✓	✓	
<i>Episyrphus balteatus</i>		LC		Various habitats, larvae predatory on aphids. Very common and widespread.	✓	✓	✓	✓
<i>Eristalis arbustorum</i>		LC		Various habitats, larvae aquatic. Widespread throughout Britain.	✓		✓	✓
<i>Eristalis intricaria</i>		LC		Woodland margins especially near marshy areas, larvae aquatic. Widespread throughout Britain.		✓		
<i>Eristalis nemorum</i>		LC		Various habitats, larvae aquatic. Widespread throughout Britain.	✓			
<i>Eristalis pertinax</i>		LC		Various habitats, larvae aquatic. Widespread throughout Britain.	✓		✓	✓
<i>Eristalis tenax</i>		LC		Various habitats, larvae aquatic. Widespread throughout Britain.	✓		✓	✓
<i>Eupeodes corollae</i>		LC		Gardens, grassland, hedgerows and woodland edge. Larvae predatory on aphids. Widespread throughout Britain.		✓	✓	✓
<i>Eupeodes luniger</i>		LC		Gardens, grassland, hedgerows and woodland edge. Larvae predatory on aphids. Widespread throughout Britain.	✓	✓	✓	✓
<i>Helophilus pendulus</i>		LC		Various habitats, larvae aquatic in wet decaying vegetation. Widespread throughout Britain.	✓	✓		✓
<i>Melanostoma mellinum</i>		LC		Grassy places throughout Britain. The larvae are predatory on aphids.		✓	✓	
<i>Melanostoma scalare</i>		LC		Grassy places throughout Britain but scarce in the uplands. The larvae feed on aphids.	✓	✓	✓	✓
<i>Merodon equestris</i>		LC		Various habitats, including gardens. Larvae in bulbs of various plants, including Narcissus. Widespread and common.	✓	✓		
<i>Myathropa florea</i>		LC		gardens, hedgerows and woodland edges. larvae aquatic in wet hollows. Widespread throughout Britain.	✓	✓		✓
<i>Neoscia tenur</i>		LC		Lush marshes and water-edges, larvae are probably semi-aquatic. Widespread throughout Britain.	✓			
<i>Pipizella viduata</i>		LC		Various dry habitats, associated with various root aphids. Widespread throughout Britain.		✓		✓
<i>Pipizella virens</i>		LC		Various habitats, larvae feed on aphids at roots of Umbelliferae. Local in southern Britain.		✓		✓
<i>Platycheirus clypeatus</i>		LC		Damp grassland, marshes and bogs, larvae are predatory on aphids. Widespread and common throughout Britain.		✓		
<i>Platycheirus scutatus</i>		LC		Woodland margins, hedgerows and scrub, the larvae are predatory on aphids. Widespread throughout Britain.	✓	✓	✓	✓
<i>Rhingia campestris</i>		LC		Various habitats, larvae develop in cow dung. Widely distributed and generally common.				✓
<i>Scaeva selenitica</i>		LC		A migrant. It seems to be mainly associated with conifers; larvae are predatory on aphids. Very widespread, but rather scarce. .		✓		
<i>Sphaerophoria scripta</i>		LC		Various grasslands, larvae feeding on aphids on herbaceous plants. Widespread in southern Britain.		✓	✓	✓
<i>Syritta pipiens</i>		LC		Various habitats including urban areas, larvae develop in rotting organic matter. Widespread throughout Britain.	✓		✓	✓
<i>Syrphus ribesii</i>		LC		Various habitats, larvae are aphidophagous on herbaceous plants. Widespread throughout Britain.	✓	✓	✓	✓
<i>Syrphus vitripennis</i>		LC		Various habitats, larvae are aphidophagous on herbaceous plants. Widespread throughout Britain.				✓
<i>Xylota segnis</i>		LC		Hedgerows and woodland, larvae in very rotten dead wood. Widespread throughout Britain.		✓		
<b>Tabanidae</b>	<b>Horse flies</b>							
<i>Haematopota pluvialis</i>		LC		Damp habitats, larvae in wet soil, often congregated beneath dung. Common throughout Britain.		✓		

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					A	B	C	D
<i>Tabanus bromius</i>		LC		Larvae are probably predatory; confined to grazing marsh in south east England.		✓		
<b>Tachinidae</b>								
<i>Eriothrix rufomaculata</i>		NE		Various grassland habitats, parasitic on the crambid moth <i>Crysoteuchia culmella</i> . Generally distributed and very common.	✓	✓		✓
<i>Gymnosoma rotundatum</i>		NE	RDB3	Larvae are parasitoids of pentatomid shieldbugs, in particular <i>Palomena prasina</i> . Confined to southeast England.				✓
<i>Tachina fera</i>		NE		Various habitats, larvae are parasitoids of various larger moths. Southern Britain.		✓		
<b>Tephritidae</b>	<b>Picture-winged flies</b>							
<i>Chaetorellia jaceae</i>		NE		Various grasslands, larvae in the flower-heads of <i>Centaurea nigra</i> and probably <i>C. debeauxii</i> . Widespread in southern and central England.	✓	✓		✓
<i>Merzomyia westermanni</i>		NE	NS(Nb)	Open habitats, larvae in the flower heads of ragworts <i>Senecio</i> species. Local in southern and central England.		✓		
<i>Myopites inulaedysentericae</i>		NE	RDB3	Larvae feed on the flower heads of Common Fleabane. Local in southern and central England.		✓		✓
<i>Tephritis divisa</i>		NE		Open habitats, larvae in the flower head of <i>Picris echioides</i> . Southern England.		✓		
<i>Tephritis formosa</i>		NE		Open habitats, larvae in a swelling in the capitula of <i>Sonchus</i> species. Southern Britain.		✓		✓
<i>Tephritis vespertina</i>		NE		Various open habitats, larvae form a gall in the flower head of <i>Hypochoeris radicata</i> . Throughout Britain.		✓		✓
<i>Urophora quadrifasciata</i>		NE		Various grasslands, larvae develop in the flower head of <i>Centaurea nigra</i> and probably <i>C. debeauxii</i> . Southern Britain.	✓	✓		✓
<b>Tipulidae</b>	<b>Craneflies (part)</b>							
<i>Dicranomyia chorea</i>		NE		Widespread and common in various wooded and open habitats, including grassland.		✓		
<i>Limonia nubeculosa</i>		NE		In woodland and hedgerows, the larvae feed in leaf litter. Common and widespread.		✓		
<i>Limonia nubeculosa</i>		NE		Usually in woodland and hedgerows; larvae feed in leaf litter. Widespread and common.	✓			
<i>Nephrotoma appendiculata</i>		NE		Dry, open grasslands on rich soils. Common and widely distributed in England and Wales.	✓	✓	✓	✓
<i>Nephrotoma flavescens</i>		NE		Dry, open grasslands, larvae feeding on roots. Widespread throughout Britain.		✓	✓	✓
<i>Nephrotoma questfalconi</i>		NE		A cranefly of sandy river banks. A strong southern and eastern bias is evident in the distribution, although records extend northwards to Scotland.		✓		
<i>Nephrotoma quadrifaria</i>		NE		Marshes and damp woodland, larvae are semi-aquatic. Widespread throughout Britain.		✓	✓	✓
<i>Phylidorea ferruginea</i>		NE		in various wetlands; larvae are semi-aquatic. Widespread and common.		✓		
<i>Pseudolimnophila lucorum</i>		NE		A grey cranefly found in places where there is wet mud with grassy edges such as carr, wooded streamsides and seepages. Larvae semi-aquatic in marshy soil.	✓			
<i>Tipula fascipennis</i>		NE		Open habitats on dry sandy soils, larvae in soil. Widespread in much of Britain.		✓		
<i>Tipula paludosa</i>		NE		Grasslands, larva feeds on roots. Widespread throughout Britain.				✓

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					A	B	C	D
<i>Tipula vernalis</i>		NE		Dry or wet grassland, mainly confined to lowland areas. Larvae in soil. Common.	✓	✓	✓	✓
<b>Ulidiidae</b>								
<i>Seioptera vibrans</i>		NE		On low vegetation and shrubs, larvae occur in rotting vegetable matter. Common and widespread.			✓	✓
<b>EPHEMEROPTERA</b>	<b>MAYFLIES</b>							
<b>Baetidae</b>								
<i>Cloeon dipterum</i>		LC		Shallow standing or slow-flowing productive water. It is widely distributed and generally common. Adults are on the wing from May to October.	✓			
<b>Leptophlebiae</b>								
<i>Habrophlebia fusca</i>		LC		A variety of running waters, including very small woodland streams. Larvae tend to be associated with leaf packets. The flight period is May to September.			✓	
<b>HEMIPTERA</b>	<b>TRUE BUGS</b>							
<b>Anthocoridae</b>								
<i>Anthocoris confusus</i>		NE		Predatory species, on a range of deciduous trees, particularly Quercus.	✓	✓	✓	✓
<i>Anthocoris nemoralis</i>		NE		Predatory species, on a range of deciduous trees.	✓	✓		✓
<i>Anthocoris nemorum</i>		NE		Predatory species, on a range of deciduous tree and herbs, particularly Urtica dioica.	✓	✓		✓
<i>Xylocoris cursitans</i>		NE		Predatory species, usually under bark.	✓			
<b>Coreidae</b>	<b>Shieldbugs &amp; allies (part)</b>							
<i>Ceraleptus lividus</i>	Slender-horned Leatherbug	LC	NS	Mainly ground-dwelling. Sparsely-vegetated soils on sand or chalk; associated with various legumes.		✓		
<i>Coreus marginatus</i>	Dock Bug	LC		Grasslands and ruderal habitats, feeding principally on Rumex, but other species of Polygonaceae are also used.	✓	✓	✓	✓
<i>Coriomeris denticulatus</i>	Denticulate Leatherbug	LC		Mainly ground-dwelling. Sparsely-vegetated dry grasslands and ruderal habitats, principally on Medicago and other legumes.		✓		
<b>Corixidae</b>								
<i>Corixa punctata</i>		LC		In a wide range of still or gently-flowing water bodies, although it is rare in the uplands of North Wales and the Lake District. .		✓		
<i>Hesperocorixa linnaei</i>		LC		In still, sometimes slightly saline, waters, generally with extensive emergent vegetation.		✓		
<i>Hesperocorixa sahlbergi</i>		LC		Particularly associated with densely vegetated or heavily shaded pools with a bottom of mud or dead leaves.	✓	✓	✓	
<i>Sigara distincta</i>		LC			✓			
<i>Sigara fossarum</i>		LC			✓			
<i>Sigara nigrolineata</i>		LC		Typically an inhabitant of small weedy ponds in the lowlands and of small dystrophic pools in the uplands, but also found in a range of other water bodies.		✓		

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					A	B	C	D
<b>Gerridae</b>								
<i>Gerris lacustris</i>		LC		On most still or slow-flowing waters. Widespread throughout Britain.	✓			
<b>Hydrometridae</b>								
<i>Hydrometra stagnorum</i>	Water Measurer	LC		Found at vegetated margins of all types of water body, providing there are vertical emergent plant stems available as egg-laying sites. .		✓		
<b>Lygaeidae</b>	<b>Ground bugs</b>							
<i>Cymus glandicolor</i>		NE		On various Carex species.	✓	✓		
<i>Cymus melanocephalus</i>		NE		On various Juncus species.	✓	✓		✓
<i>Heterogaster urticae</i>		NE		On Urtica dioica in dry, warm situations.		✓		
<i>Ischnodemus sabuleti</i>		NE		Polyphagous on a range of grasses.	✓		✓	✓
<i>Kleidocerys resedae</i>		NE		On Betula, Alnus and occasionally Rhododendron.	✓			✓
<i>Megalonotus chiragra</i>		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats.		✓		
<i>Megalonotus emarginatus</i>		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats.		✓		
<i>Metopoplax ditomoides</i>		NE		Strongly ground-dwelling, in sparsely vegetated situations on Matricaria species.		✓		✓
<i>Nysius senecionis</i>		NE		Wet and dry grasslands on Asteraceae, particularly Senecio jacobaea and Pulicaria dysenterica.	✓	✓		✓
<i>Nysius thymi</i>		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats.		✓		
<i>Peritrechus geniculatus</i>		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats. Probably polyphagous on various plant species.	✓	✓		
<i>Peritrechus nubilus</i>		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats. Probably polyphagous on various plant species.	✓			
<i>Scolopostethus affinis</i>		NE		A variety of habitats, frequently associated with Urtica dioica.	✓	✓		
<i>Scolopostethus thomsoni</i>		NE		A variety of habitats, frequently associated with Urtica dioica.	✓	✓	✓	
<b>Miridae</b>	<b>Plant bugs</b>							
<i>Acetropis gimmerthalii</i>		NE		Dry grassland on fine-leaved grasses, particularly Anthoxanthum odoratum.				✓
<i>Amblytylus nasutus</i>		NE		Dry grasslands; polyphagous on a range of grasses.		✓		✓
<i>Atractotomus mali</i>		NE		On Malus and Crataegus.				✓
<i>Blepharidopterus angulatus</i>		NE		On deciduous trees, particularly Alnus and Betula.		✓		✓
<i>Campyloneura virgula</i>		NE		On various deciduous trees.	✓	✓	✓	✓
<i>Capsus ater</i>		NE		Dry grassland, polyphagous on a range of grasses.	✓	✓	✓	✓
<i>Closterotomus</i>		NE		Polyphagous on various herbaceous plants in various open habitats.		✓		✓

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					A	B	C	D
<i>norwegicus</i>								
<i>Cyllecoris histrionius</i>		NE		On Quercus.	✓	✓		✓
<i>Deraeocoris flavilinea</i>		NE		Predatory species. On various deciduous trees.		✓	✓	✓
<i>Deraeocoris lutescens</i>		NE		Predatory species. On various deciduous trees.	✓	✓	✓	✓
<i>Deraeocoris ruber</i>		NE		Predatory species in a range of grassland habitats.		✓		✓
<i>Dicyphus pallidus</i>		NE		On <i>Stachys sylvatica</i> along shaded woodland paths and margins.		✓		✓
<i>Dryophilocoris flavoquadrimaculatus</i>		NE		On Quercus.	✓	✓		✓
<i>Grypocoris stysi</i>		NE		On <i>Urtica dioica</i> .	✓	✓		✓
<i>Harpocera thoracica</i>		NE		On Quercus.	✓	✓	✓	✓
<i>Heterotoma planicornis</i>		NE		Ubiquitous on <i>Urtica dioica</i> .	✓	✓	✓	✓
<i>Leptopterna dolabrata</i>		NE		Ubiquitous in various grassland habitats and polyphagous on a range of grass species.	✓	✓	✓	✓
<i>Liocoris tripustulatus</i>		NE		Ubiquitous on <i>Urtica dioica</i> .	✓	✓		
<i>Lygocoris pabulinus</i>		NE		On various herbaceous plants, particularly <i>Urtica dioica</i> .	✓			✓
<i>Lygocoris rugicollis</i>		NE		On <i>Salix</i> and <i>Malus</i> species.	✓			
<i>Lygus pratensis</i>		NE	RDB3	In dry open habitats on a range of Asteraceae.	✓	✓		✓
<i>Lygus rugulipennis</i>		NE		In dry open habitats on a range of Asteraceae.				✓
<i>Megaloceroea recticornis</i>		NE		In dry grasslands; polyphagous on a range of grass species.	✓	✓		✓
<i>Miris striatus</i>		NE		Predatory species; frequently associated with <i>Crataegus</i> and <i>Quercus</i> .	✓	✓	✓	✓
<i>Neolygus viridis</i>		NE		On a variety of deciduous trees, particularly <i>Tilia</i> species.				✓
<i>Oncotylus viridiflavus</i>		NE		On <i>Centaurea nigra</i> in dry, open habitats.		✓		✓
<i>Orthops campestris</i>		NE		On various species of Apiaceae.	✓	✓		✓
<i>Orthotylus flavinervis</i>		NE		On <i>Alnus</i> and also <i>Acer pseudoplatanus</i> .				✓
<i>Orthotylus marginalis</i>		NE		On <i>Salix</i> species.	✓	✓		✓
<i>Orthotylus ochrotrichus</i>		NE		Principally on <i>Ulmus</i> and <i>Urtica dioica</i> .		✓		
<i>Orthotylus prasinus</i>		NE		On <i>Ulmus</i> .				✓
<i>Orthotylus tenellus</i>		NE		On a range of deciduous trees, particularly <i>Quercus</i> .	✓	✓		✓
<i>Phoenicocoris obscurellus</i>		NE		On <i>Pinus sylvestris</i> .	✓			
<i>Phylus coryli</i>		NE		On <i>Corylus avellana</i> .		✓		✓
<i>Phylus melanocephalus</i>		NE		On <i>Quercus</i> species.	✓	✓	✓	✓
<i>Pinalitus cervinus</i>		NE		On a variety of deciduous trees and <i>Hedera helix</i> .		✓	✓	✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Pithanus maerkelii</i>		NE		Dry and damp grasslands; probably partly predatory.	✓	✓		✓
<i>Plagiognathus arbustorum</i>		NE		Ubiquitous on <i>Urtica dioica</i> .		✓		✓
<i>Plagiognathus chrysanthemii</i>		NE		Polyphagous on a range of herbaceous plants.		✓	✓	✓
<i>Psallus ambiguus</i>		NE		On a variety of deciduous trees, including <i>Malus</i> , <i>Crataegus</i> and <i>Alnus</i> .				✓
<i>Psallus assimilis</i>		NE		On <i>Acer campestre</i> .			✓	✓
<i>Psallus perrisi</i>		NE		On <i>Quercus</i> species.	✓	✓	✓	✓
<i>Psallus varians</i>		NE		On <i>Quercus</i> species.	✓	✓	✓	✓
<i>Rhabdomiris striatellus</i>		NE		On <i>Quercus</i> species.	✓	✓	✓	✓
<i>Stenodema calcarata</i>		NE		Polyphagous on various grasses.		✓		✓
<i>Stenodema laevigata</i>		NE		Polyphagous on various grasses.	✓	✓	✓	✓
<i>Stenotus binotatus</i>		NE		Polyphagous on various grasses.		✓		✓
<i>Trigonotylus ruficornis</i>		NE		Primarily in dry grasslands; probably polyphagous on a range of grasses.		✓		
<b>Nabidae</b>	<b>Damsel bugs</b>							
<i>Himacerus mirmicoides</i>		NE		Strongly ground-dwelling. Predatory species in a range of dry, open habitats, often with sparse vegetation.		✓		
<i>Nabis rugosus</i>		NE		Predatory species in a range of grasslands.	✓	✓	✓	✓
<b>Naucoridae</b>								
<i>Ilyocoris cimicoides</i>	Saucer Bug	LC		In still water, living on or near the bottom, often amongst dense vegetation. Predacious.	✓			
<b>Nepidae</b>								
<i>Nepa cinerea</i>	Water Scorpion	LC		A large predacious water bug of clean well-vegetated ponds and other still or gently flowing water.		✓		
<b>Notonectidae</b>								
<i>Notonecta glauca</i>	Common Backswimmer	LC		In still or slow-flowing lowland waters where there is some vegetation. Predacious.		✓		
<b>Pentatomidae</b>	<b>Shieldbugs &amp; allies (part)</b>							
<i>Aelia acuminata</i>	Bishop's Mitre Shieldbug	LC		Dry grasslands, polyphagous on a range of grass species.	✓	✓		✓
<i>Dolycoris baccarum</i>	Hairy Shieldbug	LC		Ruderal habitats; polyphagous on a wide range of herbaceous plants.	✓	✓		✓
<i>Eysarcoris venustissimus</i>	Woundwort Shieldbug	LC		Grasslands and ruderal habitats on Lamiaceae and Urticaceae, particularly <i>Stachys sylvatica</i> , <i>Ballota nigra</i> and <i>Urtica dioica</i> .		✓		

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					A	B	C	D
<i>Palomena prasina</i>	Common Green Shieldbug	LC		Grasslands and scrub, polyphagous on a very wide range of plants.		✓		✓
<i>Pentatoma rufipes</i>	Red-Legged Shieldbug	LC		Deciduous woodland and scrub; polyphagous but particularly associated with Quercus.	✓	✓	✓	✓
<i>Podops inunctus</i>	Turtle Shieldbug	LC		Mainly ground-dwelling. Dry grasslands; polyphagous on grasses.		✓		
<b>Pleidae</b>								
<i>Plea minutissima</i>		LC		A predator, living amongst dense weed in ponds and ditches, or at the margins of larger pools and lakes or slow rivers.	✓	✓		✓
<b>Rhopalidae</b>								
<b>Shieldbugs &amp; allies (part)</b>								
<i>Brachycarenum tigrinus</i>		NA		Ruderal habitats, polyphagous on a range of composites.				✓
<i>Corizus hyoscyami</i>		LC		Ruderal habitats, polyphagous on a range of composites.				✓
<i>Rhopalus subrufus</i>		LC		Grasslands and ruderal habitats on a variety of herbs, including Hypericum, Geranium and Marjorum.		✓		
<i>Stictopleurus punctatonevrosus</i>		NA		Ruderal habitats, polyphagous on a range of composites.				✓
<b>Scutelleridae</b>								
<b>Shieldbugs &amp; allies (part)</b>								
<i>Eurygaster testudinaria</i>	Tortoise Shieldbug	LC		Grasslands and ruderal habitats; polyphagous on a range of grasses and composites. .	✓	✓		✓
<b>Tingidae</b>								
<i>Tingis ampliata</i>		NE		Various habitats, monophagous on Cirsium arvense.		✓	✓	✓
<b>Veliidae</b>								
<i>Velia caprai</i>		LC		Associated with rivers and streams, but also found on slow-flowing and still waters,. Widespread and common.	✓		✓	✓
<b>Aphrophoridae</b>								
<b>Froghoppers</b>								
<i>Aphrophora alni</i>		NE		Adults are found on a wide range of trees and shrubs and low vegetation; nymphs feed in froth-lumps on a wide range of plants. .	✓	✓		✓
<i>Neophilaenus campestris</i>		NE		On grasses in dry open habitats. .		✓		✓
<i>Neophilaenus lineatus</i>		NE		on grasses in a wide range of habitats. .	✓	✓		
<i>Philaenus spumarius</i>	Common Froghopper	NE		Ubiquitous on a very wide range of herbaceous plants.	✓	✓	✓	✓
<b>Cicadellidae</b>								
<b>Leafhoppers</b>								
<i>Acericerus vittifrons</i>		NE		On field maple .				✓
<i>Alebra albostrigata</i>		NE		On oak.	✓	✓		✓
<i>Allygus mixtus</i>		NE		On various deciduous trees; nymphs on grasses.		✓	✓	✓
<i>Allygus modestus</i>		NE		On various deciduous trees; nymphs on grasses.		✓		✓

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					A	B	C	D
<i>Aphrodes makarovi</i>		NE		On herbs in moist eutrophic habitats, particularly <i>Urtica dioica</i> .	✓	✓	✓	✓
<i>Arthaldeus pascuellus</i>		NE		In moist grasslands on a range of grasses.				✓
<i>Batracomorphus allionii</i>		NE		On various Fabaceae including <i>Genista tinctoria</i> .		✓		
<i>Cicadella viridis</i>		NE		On <i>Juncus</i> in damp grasslands and marshes.		✓	✓	✓
<i>Eupteryx aurata</i>		NE		On a wide range of low-growing plants, including <i>Urtica dioica</i> .	✓	✓		
<i>Eupteryx vittata</i>		NE		On a wide range of low-growing plants, including <i>Glechoma hederacea</i> , mints and buttercups.		✓		
<i>Euscelis incisus</i>		NE		On various grasses in a wide range of situations.	✓	✓	✓	✓
<i>Iassus lanio</i>		NE		Usually on oaks.	✓	✓	✓	✓
<i>Kybos populi</i>		NE		On poplars.		✓		
<i>Kybos virgator</i>		NE		On various <i>Salix</i> species.		✓		
<i>Macropsis cerea</i>		NE		On various <i>Salix</i> species.				✓
<i>Macropsis fuscinervis</i>		NE		On <i>Populus tremula</i> .		✓		
<i>Macustus grisescens</i>		NE		on grasses in a wide range of situations, particularly long grass in fairly damp places.				✓
<i>Oncopsis avellanae</i>		NE		On hazel.		✓		
<i>Oncopsis subangulata</i>		NE		On birches.	✓			
<i>Populicerus confusus</i>		NE		On various <i>Salix</i> species.		✓		✓
<i>Populicerus populi</i>		NE		On <i>Populus tremula</i> .		✓		
<i>Thamnotettix dilutior</i>		NE		Usually on oaks; nymphs on grasses.	✓	✓	✓	✓
<i>Tremulicerus vitreus</i>		NE		On <i>Populus nigra</i> and hybrids.		✓		
<i>Viridicerus ustulatus</i>		NE		On <i>Populus alba</i> .		✓		
<b>Cixiidae</b>	<b>Planthoppers (part)</b>							
<i>Cixius distinguendus</i>		NE		Usually found in woods; nymphs at the base of vegetation, adults on low vegetation, trees and bushes.		✓		
<i>Cixius nervosus</i>		NE		In a wide range of habitat types, but most frequent in woods.		✓	✓	
<i>Reptalus quinquecostatus</i>		NE	NS(Nb)	Associated with grasslands in which the ground has a tendency to crack during the summer. Local in south east England.	✓	✓		✓
<i>Tachycixius pilosus</i>		NE		Nymphs develop at the base of grasses in dry places, adults on low vegetation, bushes and trees.	✓	✓	✓	✓
<b>Delphacidae</b>	<b>Planthoppers (part)</b>							
<i>Criomorphus albomarginatus</i>		NE		On various grasses in a wide range of situations, including woodland rides and open grassland.				✓
<i>Criomorphus williamsi</i>		NE	NS(Nb)	On grasses, usually in damp places.		✓		
<i>Delphacinus mesomelas</i>		NE		On grasses in dry grassland and heathland, sometimes at woodland edges.	✓			
<i>Dicranotropis hamata</i>		NE		On various grasses in a wide range of situations.	✓	✓		

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Ditropis pteridis</i>		NE		On bracken.				✓
<i>Javesella dubia</i>		NE		On grasses in a wide range of situations.	✓		✓	✓
<i>Javesella pellucida</i>		NE		On grasses in a wide range of situations.	✓	✓	✓	✓
<i>Stenocranus minutus</i>		NE		Various dry grasslands on a range of grasses.				✓
<b>Membracidae</b>	<b>Treehoppers</b>							
<i>Centrotus cornutus</i>		NE		Frequently found on young oaks in woodlands, but recorded from many other habitats. Nymphs may be ant-associated.	✓	✓		
<b>Triozidae</b>								
<i>Triozia urticae</i>		NE		Feeds on nettle. It is widespread and very common throughout Britain.	✓	✓		✓
<b>HYMENOPTERA</b>	<b>BEEES &amp; ALLIES</b>							
<b>Argidae</b>	<b>Sawflies (part)</b>							
<i>Arge cyanocrocea</i>		NE		Common in England and Ireland on Umbelliferae. Larvae feed on Rubus.			✓	✓
<b>Cephidae</b>	<b>Sawflies (part)</b>							
<i>Calameuta pallipes</i>		NE		Widely distributed in England and Wales and occurring as far north as central Scotland. Larvae have not been recorded so the foodplant is not known.	✓			✓
<i>Cephus nigrinus</i>		NE		Larvae on <i>Poa pratensis</i> in woodland. Scattered records, mainly in the south of England.	✓	✓		
<i>Cephus pygmaeus</i>		NE		Found in pastures and cornfields in southern England and Wales. The larvae can a serious pest of wheat, rye, oats and various forage grasses.	✓	✓	✓	
<i>Cephus spinipes</i>		NE		Common in southern England but much more scarce in the north. The larvae are stem borers of various common grasses. .	✓	✓	✓	✓
<i>Phylloecus linearis</i>		NE		Larvae bore into the stems of <i>Agrimonia eupatoria</i> . Southern England to Yorkshire, also in Wales.		✓		
<b>Tenthredinidae</b>	<b>Sawflies (part)</b>							
<i>Aneugmenus padi</i>		NE		Larvae on <i>Pteridium aquilinum</i> as well as other ferns. Widespread and common throughout Britain.		✓		
<i>Athalia ancilla</i>		NE		Larvae on various Cruciferae such as <i>Alliaria</i> , <i>Erysimum</i> , <i>Raphanus</i> and <i>Sisymbrium</i> . Very common throughout Britain, especially in wet habitats.	✓			
<i>Athalia circularis</i>		NE		Larvae indistinguishable from those of <i>Athalia rosae</i> - on <i>Glechoma hederaceum</i> , <i>Lycopus</i> , <i>Plantago</i> and <i>Veronica</i> . Common throughout Britain, especially in damp places.		✓		
<i>Athalia lugens</i>		NE		Larvae on various Cruciferae. Throughout Britain, especially in damp places.	✓	✓		
<i>Athalia rosae</i>		NE		Larvae periodically a pest of turnips, radish and other Cruciferae. Population fluctuates but commonest in southern Britain.		✓		
<i>Dolerus fumosus</i>		NE		Larvae possibly feed on Gramnieae. Common and widely distributed throughout - the all-black British form is regarded as endemic.				✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Dolerus haematodes</i>		NE		Larvae on Cyperaceae (Carex and Scirpus) and Gramineae (Avena, Poa and Triticum). Widely distributed throughout Britain.		✓		
<i>Dolerus niger</i>		NE		Larvae on Gramineae. Common throughout Britain - males often seen swarming around trees and margins of fields and pastures.		✓	✓	✓
<i>Dolerus nigratus</i>		NE		Larvae on Gramineae. Widely distributed and common throughout Britain.		✓		✓
<i>Dolerus triplicatus</i>		NE		Larvae on Juncus. Local in southern Britain.	✓			
<i>Dolerus varispinus</i>		NE		Larvae on Gramineae. Widely distributed throughout Britain.		✓		
<i>Empria pallimaculata</i>		NE		Larvae on Filipendula ulmaria. Common throughout Britain.		✓		
<i>Halidamia affinis</i>		NE		Larvae on Galium aparine and G. mollugo. Local throughout Britain.		✓		
<i>Macrophya annulata</i>		NE		Larvae on Potentilla repens. Very common in England south of the Wash / Severn line but more local north into Scotland.		✓	✓	
<i>Nematus lucidus</i>		NE		Larvae gregarious on Crataegus and Prunus spinosus. Widespread and often abundant throughout Britain especially in the south.		✓		
<i>Pachynematus clitellatus</i>		NE		Larvae on Gramineae. Widespread in Britain.		✓		
<i>Pristiphora armata</i>		NE		Larvae on Crataegus. Widespread in Britain.		✓		
<i>Rhadinoceraea micans</i>		NE		Larvae on Iris pseudacorus and has been recorded occasionally on garden irises. Very local, mainly in southern Britain but isolated populations in Lancs, Cheshire and Yorks.	✓			
<i>Rhogogaster scalaris</i>		NE		Larvae on Alnus and probably other plants. Widespread and common throughout Britain.		✓		
<i>Selandria serva</i>		NE		Larvae on various Cyperaceae, Gramineae and Juncaceae. Widespread and common in marshy places throughout.	✓	✓	✓	✓
<i>Tenthredo atra</i>		NE		Larvae on Brassica napus, Lamium, Mentha, Plantago, Ranunculus, Sedum, Solanum tuberosum, Succisa pratensis etc. Common throughout Britain.		✓		
<i>Tenthredopsis litterata</i>		NE		Larvae on Gramineae, especially Dactylis glomerata. Found throughout Britain, commoner in the south.			✓	✓
<i>Tenthredopsis nassata</i>		NE		Larvae on Gramineae, especially Dactylis glomerata, but also Deschampsia caespitosa, D. flexuosa etc and various Cyperaceae. One of the commonest sawflies, occurs throughout Britain.			✓	
<i>Tenthredopsis scutellaris</i>		NE					✓	✓
<b>Formicidae</b>	<b>Ants</b>							
<i>Lasius brunneus</i>		NE	NS(Na)	Nests in mature trees, in particular oaks. Mainly central and southern England. .	✓	✓	✓	✓
<i>Lasius fuliginosus</i>		NE		Southern England north to Lincs/Lancs, but with occasional localities further north. Nests in tree stumps, walls and on sand dunes.				✓
<i>Lasius niger</i>		NE		Numerous habitats including gardens. Widely distributed, but absent from some parts of Scotland.	✓	✓	✓	✓
<i>Myrmica rubra</i>		NE		Various habitats including damp sites. Widespread in Britain.		✓		✓
<i>Myrmica ruginodis</i>		NE		Various habitats including shaded sites. Widespread in Britain.	✓	✓	✓	✓

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					A	B	C	D
<i>Myrmica sabuleti</i>		NE		Various open, warm habitats. Widespread but local in Britain, rarer in the north of England and Scotland.	✓			
<i>Myrmica scabrinodis</i>		NE		Various open habitats which are not too dry. Widespread in Britain.	✓	✓	✓	✓
<b>Apidae</b>	<b>Bees</b>							
<i>Andrena flavipes</i>	Yellow-legged Mining Bee	NE		Various habitats on light soils; nesting in large but very compact aggregations in the ground. Double brooded. Locally common in southern Britain.				✓
<i>Andrena fulvago</i>	Hawk's-Beard Mining Bee	NE	NS(Na)	Widespread but very local in southern England, mainly on calcareous soils.		✓		
<i>Andrena haemorrhoa</i>	Orange-tailed Mining Bee	NE		Visits numerous spring flowers and nests in many habitats. Widespread and common.	✓	✓	✓	✓
<i>Andrena minutula</i>	Common Mini-miner	NE		Nests in the ground in a range of open, particularly disturbed, sites. Double brooded. Widespread and common.	✓	✓		✓
<i>Andrena nitida</i>	Grey-patched Mining Bee	NE		Nests in the ground in a variety of habitats. Widespread and common in southern Britain.	✓	✓	✓	✓
<i>Andrena semilaevis</i>	Shiny-margined Mini-miner	NE		Nests in the ground in a range of open, particularly disturbed, sites. Double brooded. Widespread and common in southern Britain.				✓
<i>Apis mellifera</i>	Honey Bee	NE		A domesticated species, although colonies may persist in the wild for a few years in hollow trees and other structures.	✓	✓	✓	✓
<i>Bombus lapidarius</i>	Red-tailed Bumble Bee	NE		Various habitats, nesting underground. Very widespread and common throughout Britain.	✓	✓	✓	✓
<i>Bombus pascuorum</i>	Common Carder Bee	NE		Various habitats, nesting under dense vegetation. Very common and widespread throughout Britain.	✓	✓	✓	✓
<i>Bombus pratorum</i>	Early Bumblebee	NE		Widely distributed and common.		✓		
<i>Bombus terrestris</i>	Buff-tailed Bumblebee	NE		Various habitats, nesting underground. Very widespread and common in lowland Britain.	✓	✓	✓	✓
<i>Eucera longicornis</i>	Long-horned Bee	NE	NS(Na), S41	Various open habitats with abundant legumes; nests in bare sloping ground. Very local and much declined in southern England .		✓		
<i>Nomada flava</i>	Flavous Nomad Bee	NE		Cuckoo bee of <i>Andrena scotica</i> . Generally common, becoming scarcer in the north.				✓
<i>Nomada flavoguttata</i>	Little Nomad Bee	NE		Cuckoo bee of smaller <i>Andrena</i> species (eg. <i>A. minutula</i> ). Widespread and locally common.		✓		
<i>Nomada marshamella</i>	Marsham's Nomad Bee	NE		Cuckoo bee of the common solitary bee <i>Andrena scotica</i> , and also some of its scarcer relatives. Widespread and common.		✓		
<i>Nomada panzeri</i>	Panzer's Nomad Bee	NE		Cuckoo bee of various <i>Andrena</i> species including <i>A. fulva</i> . Widespread.				✓
<i>Colletes daviesanus</i>	Davies' Colletes	NE		A range of coastal and inland habitats, visiting numerous composites. Widespread.				✓
<i>Hylaeus communis</i>	Common Yellow-face Bee	NE		A wide range of lowland habitats, nesting in holes and dead stems. Widespread in southern Britain.	✓			

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Halictus tumulorum</i>	Bronze Furrow Bee	NE		A ground-nesting species, exploiting various habitats on light soils. Widespread and common.				✓
<i>Lasioglossum lativentre</i>	Furry-claspered Furrow Bee	NE		Various open habitats, nesting in light soils. Widespread in southern Britain.		✓		✓
<i>Lasioglossum malachurum</i>	Sharp-collared Flower Bee	NE	NS(Nb)	Various habitats, using a variety of plants as pollen sources. Formerly scarce, but now widespread in southern and central England.	✓	✓		✓
<i>Lasioglossum minutissimum</i>	Least Furrow Bee	NE		Various habitats, favouring sandy soils and nesting in the ground. Visits a range of flowers. Widespread but local in southern Britain.		✓		
<i>Lasioglossum morio</i>	Green Furrow Bee	NE		Various open habitats, nesting in south-facing slopes and visiting a range of flowers. Widespread in southern Britain.	✓	✓	✓	✓
<i>Lasioglossum pauperatum</i>	Squat Furrow Bee	NE	RDB3	Various open habitats on sandy soils. Very local in southern England.				✓
<i>Lasioglossum pauxillum</i>	Lobe-spurred Furrow Bee	NE	NS(Na)	Various open habitats on light soils. Southern and central England.	✓	✓	✓	✓
<i>Lasioglossum puncticolle</i>	Ridge-cheeked Furrow Bee	NE	NS(Na)	Various open habitats on dry soils. Local in south-east England.		✓		
<i>Lasioglossum villosulum</i>	Shaggy Furrow Bee	NE		Various habitats, nesting in cliffs, slopes and old walls. Widespread but local in southern Britain.		✓		
<i>Lasioglossum zonulum</i>	Bull-headed Furrow Bee	NE		Various habitats, favouring damp lush vegetation for foraging and nesting in dry soils. Widespread but local in southern England.		✓		
<i>Heriades truncorum</i>	Large-headed Resin Bee	NE	RDBK	Nests in dead wood and collects pollen from yellow composites. Local in south east England.				✓
<i>Hoplitis claviventris</i>	Welled Lesser Mason Bee	NE		Various habitats, nesting in dead stems and usually collecting pollen from legumes. Widespread but local in southern Britain.		✓		
<i>Megachile centuncularis</i>	Patchwork Leafcutter Bee	NE		Leafcutter. Various habitats including gardens, nesting in holes in dead wood. Widespread in southern Britain.		✓		
<i>Osmia caerulescens</i>	Blue Mason Bee	NE		Various habitats including urban areas, nesting in holes. Widespread but local in southern Britain.	✓			
<i>Osmia leaiana</i>	Orange-vented Mason Bee	NE		Various habitats including urban areas, nesting in holes. Widespread in southern Britain.	✓	✓		
<i>Melitta tricincta</i>	Red Bartsia Bee	NE	NS(Nb)	Various calcareous habitats, collecting pollen exclusively from Red Bartsia. Local in southern England.				✓
<b>Chrysididae</b>	<b>Ruby-tailed wasps</b>							
<i>Pseudomalus violaceus</i>		NE	NS(Nb)	A parasitoid of small crabronid wasps including Pempredon lugubris. Local in southern Britain.				✓
<b>Crabronidae</b>	<b>Digger wasps</b>							
<i>Astata boops</i>		NE		Various open habitats, ground-nesting. Nests stocked with the nymphs of shieldbugs. Local in southern Britain.		✓		

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					A	B	C	D
<i>Cerceris rybyensis</i>		NE		Various habitats, nests in compacted soil. Nest stocked with various solitary bees. Local throughout much of Britain.		✓		
<i>Crossocerus annulipes</i>		NE		Nests in decaying wood, burrow stocked with leafhoppers. Widespread in southern Britain.				✓
<i>Mimumesa dahlbomi</i>		NE		Various habitats, nests in dead wood. Prey leafhopper and planthopper nymphs. Widespread in England.		✓		
<i>Nysson spinosus</i>		NE		A cleptoparasite of the crabronid wasp <i>Argogorytes mystaceus</i> . Widespread throughout Britain.		✓		✓
<i>Passaloecus singularis</i>		NE		Various habitats, nest in dead wood and stems. Prey, aphids. Widespread in England and Wales.	✓			
<i>Pemphredon lugubris</i>		NE		Various habitats, nest in dead wood. Prey aphids. Widespread throughout Britain.	✓			✓
<i>Psenulus concolor</i>		NE		Various habitats, nests in plant stems and preys on psyllids. Local in southern Britain.				✓
<i>Psenulus pallipes</i>		NE		Various habitats, nests in plant stems and dead wood. Prey aphids. Widespread in England.				✓
<i>Trypoxylon attenuatum</i>		NE		Various habitats, nests in dead wood and stems. Prey small spiders. Widespread in much of Britain.	✓			
<b>Eumenidae</b>								
<i>Odynerus spinipes</i>		NE		Nests in vertical sand faces, entrance has a curved chimney. Prey are larvae of <i>Hypera</i> weevils. Common in England and Wales.		✓		
<b>Tiphiidae</b>								
<i>Tiphia minuta</i>		NE	NS(Nb)	Open habitats on sandy and chalky soils. Local throughout England and Wales.		✓		
<b>Vespidae</b>	<b>Social wasps</b>							
<i>Vespa crabro</i>	Hornet	NE		Woodlands, nests in hollow trees and other cavities. Locally common in much of southern Britain.	✓			
<b>LEPIDOPTERA</b>	<b>BUTTERFLIES &amp; MOTHS</b>							
<b>Crambidae</b>								
<i>Agriphila straminella</i>		NE		Dry grassland, larvae feed on Sheep's Fescue and other grasses. Widespread throughout Britain.	✓			
<i>Chrysoteuchia culmella</i>		NE		Dry grassland, larvae feed on various grasses. Widespread throughout Britain.	✓	✓	✓	✓
<i>Crambus lathoniellus</i>		NE		Various grasslands, larvae feed on grasses. Widespread throughout Britain.		✓		
<b>Erebidae</b>								
<i>Euclidia mi</i>	Mother Shipton	LC		Frequents flowery meadows, waste places, woodland rides, larvae feeding on <i>Trifolium</i> . Local throughout Britain.				✓
<i>Tyria jacobaeae</i>	Cinnabar	LC	S41 RO	Various open habitats; larvae on ragworts. Widespread throughout much of Britain.	✓			
<b>Gelechiidae</b>								
<i>Apraerema larseniella</i>		NE		Larvae in spun shoots of trefoils and <i>Genista</i> spp.		✓		
<i>Apraerema taeniolella</i>		NE		Larvae on <i>Lotus corniculatus</i> , <i>Trifolium</i> or <i>Medicago</i> where they feed in spun together shoots and leaves. Adults in July. Not uncommon in the south.		✓		
<b>Geometridae</b>								

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					A	B	C	D
<i>Cyclophora punctaria</i>	Maiden's Blush	LC		Oak woodland. Larva on Quercus and occasionally Betula. Widespread but less frequent in northern England and southern Scotland.		✓		
<i>Timandra comae</i>	Blood-vein	LC	S41 RO	Larvae on docks and related plants. Widespread and common as far north as Scotland.	✓			
<b>Gracillariidae</b>								
<i>Cameraria ohridella</i>	Horse Chestnut Leaf Miner	NE		Larvae mine the leaves of Horse Chestnut. First found in Britain in 2002 and now widespread in England and Wales.		✓		
<b>Hepialidae</b>								
<i>Korscheltellus lupulina</i>	Common Swift	LC		Rough grassland, fields and gardens. Larvae feed on the roots of grasses. Common in much of England and Wales, rather local in Scotland.		✓		
<b>Hesperiidae</b>								
<i>Ochlodes sylvanus</i>	Large Skipper	LC		Various open habitats, larvae feed on grasses. Widespread in England and Wales.	✓		✓	✓
<i>Thymelicus sylvestris</i>	Small Skipper	LC		Various open habitats, larvae feed on grasses. Widespread in England and Wales.	✓	✓		✓
<b>Incurvariidae</b>								
<i>Cauchas rufimitrella</i>		NE		Damp grassland, larvae feed on Cardamine pratensis. Widespread throughout Britain.		✓		
<i>Incurvaria masculella</i>		NE		Open woodland and scrub, larvae feeding on hawthorn. Widespread throughout Britain.		✓		
<i>Nemophora degeerella</i>		NE		Damp woodland, larvae feed on dead leaves. Widespread in England and Wales.		✓		
<b>Lasiocampidae</b>								
<i>Malacosoma neustria</i>	Lackey	VU	S41 RO	Various habitats; larvae are polyphagous. Throughout the southern half of England becoming more local further north.		✓		
<b>Lycaenidae</b>								
<i>Aricia agestis</i>	Brown Argus	LC		Various open habitats on dry soils, larvae feed on Helianthemum, Erodium and Geranium species. Widespread in eastern England, much more local in the west and in Wales.				✓
<i>Celastrina argiolus</i>	Holly Blue	LC		Sunny rides and clearings of woodlands, gardens and hedgerows, larvae feed on Ilex aquifolium and Hedera helix. Widespread in England and Wales.			✓	
<i>Favonius quercus</i>	Purple Hairstreak	LC		Inhabits woodlands, the larva feeding on Quercus. Widely distributed in southern England and Wales but very local in parts of Scotland.	✓	✓		✓
<i>Lycaena phlaeas</i>	Small Copper	LC		Various open habitats on light soils, larvae feed on Rumex acetosella and R. acetosa. Widespread throughout Britain.				✓
<i>Thecla betulae</i>	Brown Hairstreak	VU	WCA, S41	Various open habitats; larvae feed on Blackthorn. Local and declined in parts of southern England and Wales.				✓
<b>Micropterigidae</b>								
<i>Micropterix calthella</i>		NE		Various open habitats, adults feed on pollen. Widespread throughout Britain.				✓

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					A	B	C	D
<b>Noctuidae</b>								
<i>Amphipyra pyramidea</i>	Copper Underwing	LC		Inhabits woodland, parkland and hedgerows. Larvae on oak and other deciduous trees. Widespread and common in southern Britain.		✓		✓
<i>Apamea monoglypha</i>	Dark Arches	LC		Various open habitats; larvae feed on grasses. Widespread and common.		✓		
<i>Autographa gamma</i>	Silver Y	LC		Mainly a migrant moth, most abundant in southern and eastern England but reaching all the British Isles.	✓		✓	
<i>Hadena perplexa</i>	Tawny Shears	LC		Various open habitats; larvae feed on various species of Silene and Spargularia rupicola. Locally in England, Wales and southern Scotland.		✓		
<b>Nymphalidae</b>								
<i>Aglais io</i>	Peacock	LC		Various habitats, larvae feed on Urtica dioica. Widespread throughout Britain.			✓	✓
<i>Aglais urticae</i>	Small Tortoiseshell	LC		Various habitats, larvae feed on Urtica dioica. Widespread throughout Britain.			✓	✓
<i>Aphantopus hyperantus</i>	Ringlet	LC		Damp woodland rides and scrub on heavy soils, larvae feed on various grasses. Widespread throughout England, Wales and parts of Scotland.	✓			✓
<i>Coenonympha pamphilus</i>	Small Heath	VU	S41	Various open habitats; larvae on fine-leaved grasses. Widespread throughout Britain.	✓		✓	✓
<i>Maniola jurtina</i>	Meadow Brown	LC		Various grasslands, very common throughout Britain.	✓	✓	✓	✓
<i>Melanargia galathea</i>	Marbled White	LC		Various open habitats, including calcareous grassland, road verges and field margins. Larvae feed on grasses. Local in southern and central England and south Wales.		✓		
<i>Pararge aegeria</i>	Speckled Wood	LC		Various open habitats, larvae feed on grasses in shade. Widespread in southern Britain and parts of Scotland.	✓		✓	✓
<i>Polygonia c-album</i>	Comma	LC		Various habitats, larvae feed on Urtica dioica and Humulus lupulus. Widespread throughout England and Wales.			✓	
<i>Pyronia tithonus</i>	Gatekeeper	LC		Various open habitats, including woodland rides, larvae feed on grasses. Widespread throughout England and Wales.	✓	✓	✓	
<i>Vanessa atalanta</i>	Red Admiral	LC		Various habitats, larvae feed on Urtica dioica. A migrant but also overwinters. Widespread throughout Britain.			✓	✓
<i>Vanessa cardui</i>	Painted Lady	LC		Various habitats, larvae feed on thistles. A migrant, unable to overwinter.				✓
<b>Oecophoridae</b>								
<i>Alabonia geoffrella</i>		NE		Woodlands, scrub and hedgerows, larvae feed in dead stems and twigs. Widespread in southern Britain.		✓		✓
<i>Crassa unitella</i>		NE		Various open habitats, larvae feed in fungi and under dead tree bark. Widespread in southern Britain.				✓
<i>Depressaria daucella</i>		NE			✓			
<b>Peleopodidae</b>								
<i>Carcina quercana</i>	Flat Cooper	NE		Woodlands, larvae feeding on the leaves of various trees, particularly oaks. Widespread throughout Britain.		✓	✓	
<b>Pieridae</b>								
<i>Anthocharis cardamines</i>	Orange Tip	LC		Damp meadows and woodland margins, larvae feed on various Brassicaceae, particularly Cardamine pratensis and Alliaria petiolata. Widespread throughout Britain.		✓		✓
<i>Gonepteryx rhamni</i>	Brimstone	LC		Various habitats, larvae feed on Frangula and Rhamnus. Widespread in England and Wales.	✓	✓	✓	✓

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					A	B	C	D
<i>Pieris brassicae</i>	Large White	LC		Various habitats, larvae feed on Brassicaceae. Widespread throughout Britain.	✓		✓	✓
<i>Pieris napi</i>	Small White	LC		Various open habitats, larvae feed on various Brassicaceae. Widespread throughout Britain.				✓
<i>Pieris rapae</i>	Green-veined White	LC		Various habitats, larvae feed on Brassicaceae. Widespread throughout Britain.	✓	✓	✓	✓
<b>Plutellidae</b>								
<i>Prays fraxinella</i>	Ash Bud Moth	NE		Woodland and scrub, larvae feed on ash. Widespread throughout Britain.				✓
<b>Pyralidae</b>								
<i>Aphomia sociella</i>		NE		The caterpillars of this moth feed on the comb of bumble-bees and wasps.		✓		
<b>Tortricidae</b>								
<i>Celypha lacunana</i>		NE		Various open habitats, larvae polyphagous on herbs and shrubs. Widespread throughout Britain.		✓		
<i>Commophila aeneana</i>	Yellow Conch	NE	NS(Nb)	Various open habitats, larvae feeding on ragwort. Local in southern England.	✓			
<i>Ditula angustiorana</i>	Red-barred Tortrix	NE		Various habitats, larvae feeding on various trees and shrubs. Widespread throughout much of Britain.			✓	
<i>Enarmonia formosana</i>		NE				✓		
<i>Endothenia gentianaeanana</i>		NE		Various open habitats, larvae in teasel flowerheads. Widespread in southern Britain.	✓			
<i>Gypsonoma dealbana</i>		NE		Open woodland, larvae feed on the leaves and buds of various deciduous trees. Widespread in England and Wales.		✓		
<i>Hedya pruniana</i>		NE		Woodland margins and hedges, larvae feed on flowers and shoots of blackthorn, apple and plums. Widespread throughout Britain.				✓
<i>Pandemis heparana</i>	Dark Fruit-tree Tortrix	NE		Various habitats, larvae feed on various deciduous trees and shrubs in a silken web. Widespread in lowland Britain.		✓		
<i>Pseudargyrotoza conwagana</i>		NE		Woodland and scrub, larvae feed on ash and privet. Widespread throughout Britain.				✓
<i>Ptycholoma lecheana</i>		NE		Woodland and scrub, larvae feed on various deciduous trees. Widespread throughout Britain.				✓
<b>MECOPTERA</b>								
<b>Panorpidae</b>								
<i>Panorpa communis</i>		NE		Various habitats, adults predatory, larvae soil-dwelling, Widespread throughout Britain.		✓		
<b>NEUROPTERA</b>								
<b>LACEWINGS</b>								
<b>Chrysopidae</b>								
<i>Chrysoperla carnea</i>		NE		Various habitats including gardens. Larvae are active predators on the foliage of shrubs and trees. Widespread throughout Britain.	✓	✓	✓	✓
<i>Cunctochrysa albolineata</i>		NE		Associated with broadleaved trees and shrubs in woodland; larvae are active predators. Widely distributed throughout Britain, fairly common in the south but rather local in the north and west.		✓	✓	

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Micromus variegatus</i>		NE		Amongst low vegetation in a wide range of habitats. The larvae are active predators on foliage. Widespread in southern Britain.		✓		
<i>Symphorobius pellucidus</i>		NE		Associated with conifers, particularly Scots pine, larvae are active predators on the foliage. Widely distributed but local in the southern counties of England, becoming much more local in the north.		✓		
<b>ODONATA</b>	<b>DRAGONFLIES &amp; DAMSELFLIES</b>							
<b>Aeshnidae</b>								
<i>Aeshna cyanea</i>	Southern Hawker	LC		Mesotrophic lakes, ponds, canals and ditches, including gardens. Widespread in southern Britain.	✓	✓		
<i>Anax imperator</i>	Emperor Dragonfly	LC		In larger ponds, lakes, flooded sand and gravel pits, dykes, canals and slow flowing rivers. Widespread in southern England and south Wales.		✓		
<b>Agriidae</b>								
<i>Calopteryx splendens</i>	Banded Demoiselle	LC		Slow flowing streams and rivers, usually with muddy bottoms. Locally common in the lowlands of southern Britain, but rare in the west.			✓	✓
<i>Calopteryx virgo</i>	Beautiful Demoiselle	LC		Clear, fast-flowing streams with stony bottoms with overhanging trees and shrubs. Local throughout southern Britain.			✓	✓
<b>Coenagriidae</b>								
<i>Coenagrion puella</i>	Azure Damselfly	LC		Generalist; all types of still and slow flowing water with abundant emergent vegetation. Widespread in much of Britain.	✓	✓		
<i>Ischnura elegans</i>	Blue-tailed Damselfly	LC		Generalist; all types of still and slow moving water. Widespread and very common in England and Wales, rather more restricted in Scotland.	✓			
<i>Pyrhosoma nymphula</i>	Large Red Damselfly	LC		Generalist; all types of still and flowing water. Widespread and common in Britain.	✓	✓		
<b>Corduliidae</b>								
<i>Somatochlora metallica</i>	Brilliant Emerald	VU	NR	Breeds in various water bodies where overhanging trees are present. Very local; occurs in two areas in Britain: the central Highlands of Scotland and a much larger population in central-southern England.	✓			
<b>Lestidae</b>								
<i>Lestes sponsa</i>	Emerald Damselfly	LC		All types of still, lowland water with abundant emergent vegetation. Widespread and common in the lowlands of Britain.		✓		
<b>Libellulidae</b>								
<i>Libellula depressa</i>	Broad-bodied Chaser	LC		Well-vegetated water bodies including garden ponds. It can tolerate mildly polluted conditions. Widespread throughout England and Wales.		✓		✓
<i>Libellula fulva</i>	Scarce Chaser	NT		Breeds in unpolluted rivers and lakes, preferring stretches of water with tall emergent vegetation. Very local in southern England.				✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>Libellula quadrimaculata</i>	Four-spotted Chaser	LC		Various still-water habitats from grazing level ditches to bog pools and lochans in upland areas. Widespread throughout Britain.		✓		
<i>Sympetrum sanguineum</i>	Ruddy Darter	LC		Ponds and ditches with tall emergent plants, including coastal grazing marshes. Widespread in England and Wales.		✓		
<b>ORTHOPTERA</b>	<b>GRASSHOPPERS &amp; BUSH CRICKETS</b>							
<b>Acrididae</b>								
<i>Chorthippus parallelus</i>	Meadow Grasshopper	LC		All types of moderately long grassland, particularly in moister areas. Very widely distributed and common.	✓	✓	✓	✓
<b>Conocephalidae</b>								
<i>Conocephalus discolor</i>	Long-winged Conehead	LC		Usually found in long grassland. Historically scarce but now widespread in southern and central England.	✓	✓		✓
<b>Meconematidae</b>								
<i>Meconema thalassinum</i>	Oak Bush Cricket	LC		Deciduous woodland, in the north mainly on limestone. Widespread and common in southern Britain.	✓	✓	✓	✓
<b>Phaneropteridae</b>								
<i>Leptophyes punctatissima</i>	Speckled Bush Cricket	LC		On low vegetation in woodland edges, scrub, hedges and gardens. Widespread throughout England and Wales.	✓	✓	✓	✓
<b>Tetrigidae</b>								
<i>Tetrix subulata</i>	Slender Groundhopper	LC		Damp places such as water meadows, fens, stream margins and wet woodland rides. Locally common throughout England and Wales.		✓		
<i>Metrioptera roeselii</i>	Roesel's Bush Cricket	LC		Usually found in long grassland. Historically scarce but now widespread in southern and central England.	✓			✓
<b>PSOCOPTERA</b>	<b>BARKFLIES</b>							
<b>Stenopsocidae</b>								
<i>Graphopsocus cruciatus</i>		NE		Frequent on deciduous trees.		✓		
<b>RHAPHIDOPTERA</b>	<b>SNAKEFLIES</b>							
<b>Raphidiidae</b>								
<i>Atlantoraphidia maculicollis</i>		NE		Associated with conifers, particularly Scots Pine and larch. Adults and larvae are predacious. Larvae develop beneath bark and in dead wood. Southern England and also parts of Scotland.	✓			
<i>Phaeostigma notata</i>		NE		Larvae develop beneath bark and in dead wood of deciduous tree, seeming to prefer oak. Larvae and adults are predacious. Common in parts of southern England, becoming more local in the north.		✓		✓
<i>Subilla confinis</i>		NE				✓		
<b>TRICHOPTERA</b>	<b>CADDIS FLIES</b>							
<b>Hydropsychidae</b>								
<i>Hydropsyche</i>		LC		Widespread and common species of outflows of ponds and lakes north to the central lowlands of Scotland.				✓

Group / species	English name	IUCN Status	GB rarity Status	Associations / Ecology	Area			
					A	B	C	D
<i>angustipennis</i>								
<b>Leptoceridae</b>								
<i>Athripsodes aterrimus</i>		LC		Widespread and common still or slow flowing water species.				✓
<i>Athripsodes cinereus</i>		LC		Widespread and common in larger permanent waters.				✓
<i>Mystacides azurea</i>		LC		A widespread and common species of streams rivers and stony lakes.				✓
<b>Limnephilidae</b>								
<i>Glyphotaelius pellucidus</i>		LC		Widespread and common mainly still water species.	✓	✓	✓	
<i>Grammotaulius nigropunctatus</i>		LC		Widespread and common species of grassy marshes that dry up over summer.	✓			
<i>Limnephilus affinis</i>		LC		A widespread and common species of still waters that dry up over summer. Especially common in saltmarshes.		✓		
<i>Limnephilus auricula</i>		LC		A widespread and common species of marshes that dry up over summer.	✓	✓	✓	
<i>Limnephilus decipiens</i>		LC		Mainly restricted to the southern half of England where it is a widespread and often common still water species.	✓			
<i>Limnephilus rhombicus</i>		LC		A widespread and common species of all types of water body that retain some water over summer.		✓		
<b>Polycentropidae</b>								
<i>Polycentropus flavomaculatus</i>		LC		A widespread and common species of stony streams rivers and lakes.			✓	

## APPENDIX 2: INVERTEBRATE STATUS CODES

### The new IUCN status codes

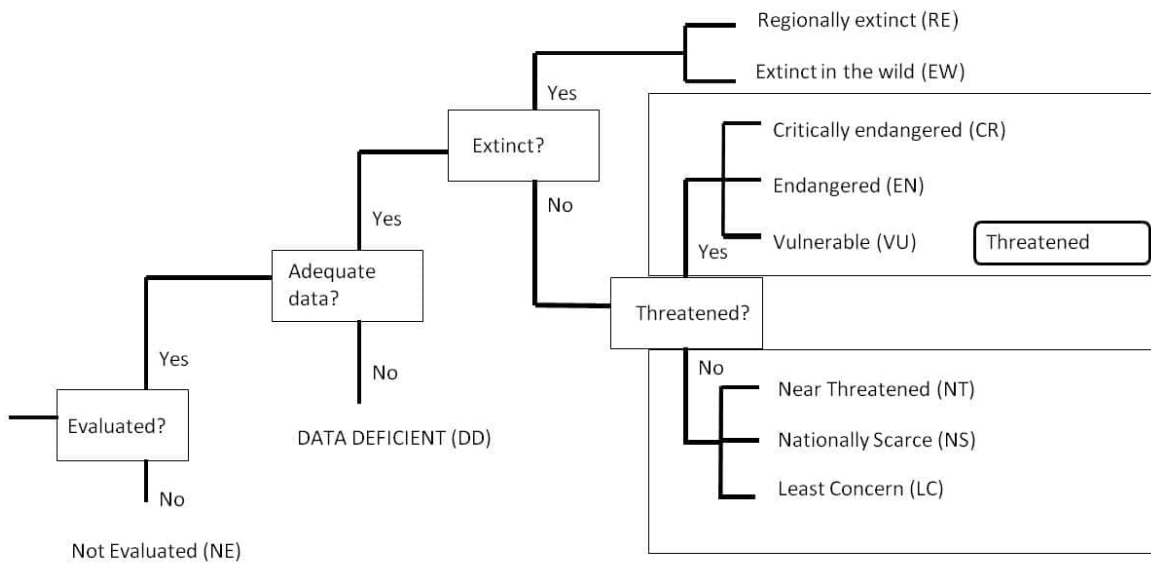
Many British invertebrate species have been assigned a formal status code. These codes are paramount in the definition of noteworthy species and accordingly, it is necessary to explain them here.

Natural England has recently instigated a new programme of invertebrate status reviews, in which species are assessed according to universally accepted criteria set by the International Union for the Conservation of Nature (IUCN) (IUCN 2012a, 2012b, 2014). In contrast to previous status assessments, which focussed largely on absolute rarity, the IUCN approach places each species into a threat category that also takes historic population trends into account. Species qualifying for a threat status (Critically Endangered, Endangered or Vulnerable) are those that are not only rare, but also have a history of decline or extreme population fluctuations. Species not assigned to a threat category are categorised as Near Threatened, Least Concern, Data Deficient or Not Applicable.

As of 2016, a total of almost 4000 species have been reviewed in accordance with IUCN guidelines. All of these belong to groups that have readily available identification keys, active recorders and a history of recording. Progress with the IUCN invertebrate status review programme has recently been afforded a very useful summary (Webb & Brown, 2016).

A key to the IUCN status codes is given below and summarised in Fig. 1.

<p><b>REGIONALLY EXTINCT (RE)</b> A taxon is Extinct when there is no reasonable doubt that the last individual has died.</p> <p><b>CRITICALLY ENDANGERED (CR)</b> A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Table 1). Critically Endangered species that are likely to be Extinct, but for which confirmation is still required are reported as Critically Endangered (Possibly Extinct), abbreviated as CR(PE).</p> <p><b>ENDANGERED (EN)</b> A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Table 1).</p> <p><b>VULNERABLE (VU)</b> A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Table 1).</p> <p><b>NEAR THREATENED (NT)</b> A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.</p> <p><b>LEAST CONCERN (LC)</b> A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.</p> <p><b>DATA DEFICIENT (DD)</b> A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.</p> <p><b>NOT EVALUATED (NE)</b> A taxon is Not Evaluated when it has not yet been evaluated against the criteria.</p> <p><b>NOT APPLICABLE (NA)</b> This category is typically used for introduced non-native species whether this results from accidental or deliberate importation. It may also be used for recent colonists (or attempted colonists) responding to the changing conditions available in Britain as a result of human activity and/or climate change. The IUCN regard 1500 as the cut-off date after which a species is classed as 'non-native'.</p>
---



**Fig. 1.** Hierarchical relationships of the categories

Taxa listed as Critically Endangered, Endangered or Vulnerable are defined as Threatened (Red List) species. For each of these threat categories there is a set of five main criteria A-E, with a number of sub-criteria within A, B and C (and an additional sub-criterion in D for the Vulnerable category), and one of which qualifies a taxon for listing at that level of threat. The qualifying thresholds within the criteria A-E differ between threat categories and are summarised in Table 1.

**Table 1.** Summary of the thresholds for the IUCN Criteria

Criterion	Main thresholds <i>Critically Endangered</i>	<i>Endangered</i>	<i>Vulnerable</i>
A. Rapid decline	>80% over 10 years or 3 generations in past or future	>50% over 10 years or 3 generations in past or future	>30% over 10 years or 3 generations in past or future
B. Small range + fragmented, declining or fluctuating	Extent of occurrence <100 km <sup>2</sup> or area of occupancy <10 km <sup>2</sup> + two of the following: - severely fragmented or only a single location - continuing decline - extreme fluctuations	Extent of occurrence <5,000 km <sup>2</sup> or area of occupancy <500 km <sup>2</sup> + two of the following: - severely fragmented or no more than 5 locations - continuing decline - extreme fluctuations	Extent of occurrence 20,000 km <sup>2</sup> or area of occupancy <2,000 km <sup>2</sup> + two of the following: - severely fragmented or no more than 10 locations - continuing decline - extreme fluctuations
C. Small population and declining	<250 mature individuals, population declining	<2,500 mature individuals, population declining	<10,000 mature individuals, population declining
D. Very small population	<50 mature individuals	<250 mature individuals	D1. <1,000 mature individuals
D2. Very small area of occupancy			D2. <20 km <sup>2</sup> or 5 or fewer locations
E. Quantifiable probability of extinction	>50% within 10 years or three generations	>20% within 20 years or five generations	>10% within 100 years

## **Curent GB rarity codes (IUCN assessed species)**

The IUCN reviews also provide an assessment of rarity, based purely on the number of hectads (10km x 10km squares) in which any given species occurs. Two categories are defined:

### **Nationally Rare (NR)**

Species recorded from between 1 and 15 hectads within a given date class when there is reasonable confidence that exhaustive recording would not find them in more hectads.

### **Nationally Scarce (NS)**

Species recorded from between 16 and 100 hectads within a given date class when there is reasonable confidence that exhaustive recording would not find them in more hectads.

Broadly speaking, the Nationally Rare category is equivalent to the Red Data Book categories used by Shirt (1987) and Bratton (1991), namely: Endangered (RDB1), Vulnerable (RDB2), Rare (RDB3) and Insufficiently Known (RDBK). The Nationally Scarce category is directly equivalent to the combined Nationally Notable A (Na) and Nationally Notable B (Nb) categories introduced by the Nature Conservancy Council (Ball, 1986).

## **Curent GB rarity codes (Non-IUCN assessed species)**

For species not yet evaluated against the IUCN criteria, the most recent conservation status assessment is given, as specified by the Red Data Book categories (Shirt, 1987; Bratton, 1991) and Nationally Notable categories (Ball, 1986):

### **RDB1 (Endangered)**

Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. These include:

- Species known from only a single locality since 1970.
- Species restricted to habitats that are especially vulnerable.
- Species which have shown a rapid and continuous decline in the last 20 years and are now estimated to exist in 5 or fewer localities.
- Species believed extinct but which would need protection if re-discovered.

### **RDB2 (Vulnerable)**

Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. These include:

- Species declining throughout their range.
- Species in vulnerable habitats.
- Species whose populations are low.

### **RDB3 (Rare)**

Taxa with small populations which are not at present endangered or vulnerable but which are at risk. These include:

- Species which are estimated to occur in 15 or fewer localities.

### **RDBK (Insufficiently known)**

Taxa suspected to fall within the RDB categories but which are insufficiently known to enable placement.

**RDBi (Indeterminate)**

Taxa believed to qualify as either RDB1, RDB2 or RDB3 but which cannot be reliably placed into any category.

**pRDB (Provisional)**

The prefix 'p' before any Red Data Book category implies that the grading is provisional., pending the publication of a future edition of the Red Data Book.

Nationally Scarce species are those falling within the Nationally Notable categories introduced by Ball (1986). They are species that are estimated to occur within the range of 16 to 100 ten-kilometre squares of the British National Grid system since 1970. Notable species are subdivided as follows:

**NS (Na)**

Species estimated to occur within the range of 16 to 30 10-kilometre squares of the National Grid System, or for less well-recorded groups, within seven or fewer vice counties.

**NS (Nb)**

Species estimated to occur within the range 31 to 100 10-kilometre squares of the National Grid System, or for less well-recorded groups, between eight and 20 vice counties.

**NS (N)**

Species which are estimated to occur in 16 to 100 10 km squares in Great Britain. The subdividing of this category into Nationally Scarce A and Nationally Scarce B has not been attempted for some species because of either the degree of recording that has been carried out in the group to which the species belongs, or because there is some other reason why it is not possible to be so exact.

**Recent provisional status assessments**

Certain poorly recorded Dipteran groups have been subject to recent status assessment which is not based on comparisons of hectad data over two time periods (Falk et. al, 2016). This review uses IUCN status terminology with the added prefix 'p' (e.g. pVulnerable and pNationally Scarce) to indicate that these are provisional assessments based on data which would be insufficient for a formal IUCN status review. The category 'Data Deficient'efficient' (DD) is included.

# APPENDIX 8.8: LAND WEST OF IFIELD – INVERTEBRATE SURVEY REPORT

# LAND WEST OF IFIELD

## Invertebrate Survey Report

OCTOBER 2019



**Land West of Ifield**

**Invertebrate Survey Report**

Author Jon Mellings

Checker Brandon Murray

Approver Martina Girvan

Date OCTOBER 2019

**VERSION CONTROL**

Version	Date	Author	Changes
01	September 2019	Jon Mellings	First Draft

This report has been prepared for Homes England (the "Client") in accordance with the terms and conditions of appointment (the "Appointment") between the Client and **Arcadis UK** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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## **APPENDIX B : INVERTEBRATE SCOPING STUDY**

## Executive Summary

This report presents the findings of invertebrate surveys undertaken by Arcadis Consulting (UK) Ltd on behalf of Homes England. The surveys were undertaken to inform a proposed development located to the west of Ifield, West Sussex, called 'Land West of Ifield', referred to in this report as 'the site'.

Following an invertebrate-specific scoping study carried out during 2018, a detailed invertebrate survey of both terrestrial and aquatic habitats was recommended to be undertaken during late summer 2018 and spring 2019.

The survey area comprised an extensive network of fields, native semi-natural broadleaved woodland and a Golf Course supporting semi-improved grassland, mature woodland and scrub habitats as well as several ponds. Two small rivers including the Ifield Brook and the River Mole also crossed the site, as well as additional wetland habitat towards the north of the site. For the purposes of the survey, the site was subdivided into areas. The areas are described below:

- Area A: An active Golf Course in the south of the site, which contained a range of habitats (including grassland, trees and aquatic features);
- Area B: Ifield Meadows Local Wildlife Site;
- Area C: A number of grassed arable fields and associated hedges and trees, largely grazed by cattle in the north of the site;
- Area D: A number of largely arable fields and associated field margins, hedgerows and trees;
- Area E: A number of small fields supporting grazing animals and crops in the west of the site.

Whilst all five areas were sampled, the current report details findings from Areas A, C, D and E only, as Area B is not due to be impacted by the proposed development.

The compartments within these areas were defined using the extant field boundaries, where applicable.

The surveys were scoped following a desk study. Both terrestrial and aquatic invertebrate surveys were conducted, as described below:

For the terrestrial surveys, three separate visits were conducted. The surveys broadly followed methods outlined in NERR005, a manual produced by Natural England, which sets out standard approaches to invertebrate survey and analytical techniques for the purposes of conservation evaluation.

Each aquatic invertebrate sample was collected through a three minute sweep method, a standard method for sampling freshwater habitats. Each sample was collected from a sufficient range of habitats to adequately cover the main invertebrate niches of the waterbody in question.

In response to historic records of a Species of Principal Importance, the brown hairstreak (*Thecla betulae*) on site provided by Sussex Biodiversity Record Centre, a dedicated transect was undertaken covering suitable habitat for this butterfly during 2018.

From survey work conducted during 2018 and 2019, 719 species were recorded from the site. Of these, 34 species of recognised conservation status in the UK were recorded, including one species currently classed as Red Data Book (RDB1) nationally 'endangered' under pre-1994 IUCN criteria (a tephritid fly *Acinia corniculata*); two species classed as nationally 'vulnerable' under post-2001 IUCN criteria; two species classed as RDB3 nationally 'rare' and four species classed in the 'near threatened' post-2001 IUCN category. Two species classed within the RDB 'unknown' or Data Deficient (DD) categories were recorded, together with 22 species classed as nationally scarce in the UK.

The assemblages of invertebrates found on the site were analysed using a 'pantheon' analysis. Pantheon enables invertebrate assemblage to be grouped according both to habitat affinity (Species Assemblage Types SATs) and in terms of conservation value, this output can be used to pinpoint which elements of the surveyed habitat support invertebrates of highest conservation value and which areas of the site support notable invertebrates. This can be invaluable in appropriately informing post-development habitat creation.

From Pantheon analysis, at habitat-level the largest number of species were attributed to the 'Tall Sward and Scrub' assemblage.

Other significantly represented assemblages, in order of number of attributed species were:

- 'Arboreal',
- 'Marshland',
- 'Shaded Woodland Floor',
- 'Short Sward and Bare Ground',
- 'Peatland',
- 'Decaying Wood' and
- 'Running water'.

The habitat-level assemblages of highest conservation value based on Pantheon criteria were 'Short Sward and Bare Ground' and 'Decaying Wood', which both achieved particularly high Species Quality Index scores in relation to Area A (Ifield Golf Course).

From Pantheon analysis of Area A (Ifield Golf Course) data alone, two SATs, namely 'Scrub Edge' and 'Ephiphyte fauna' achieved 'Favourable Condition' status, were recorded. 'Bark and sapwood decay' did not quite achieve favourable condition status at sub-site level, this assemblage was also well represented within the Pantheon output for Area A.

brown hairstreak was recorded during the survey from four locations within the survey area, scattered around the periphery of the centre of the site (Area D).

On balance, in consideration of the overall species deployment on site, the deployment of rarities and the Pantheon output, the habitats of highest value overall appear to include a combination of mature woodland/Scrub Edge (including wood decay habitat); and the associated tall and short grassland habitats; these were particularly well represented within the Ifield Golf Course (Area A) and within the hedgerows, woodland, scrub and grassland habitats of Area D, in the centre of the site (i.e. not within the arable fields).

Although the wetland habitats were not as strongly expressed either in terms of Pantheon output or rarity value, the juxtaposition of wet and dry habitats on site is likely to be a significant underlying factor in relation to the site's overall value for invertebrates.

The site as a whole can be considered to support an invertebrate assemblage of at least regional conservation value, whilst sub-site Areas C and E, both supported significant habitat and species of conservation value, Areas A and D were found to support assemblages and species of higher conservation value.

# 1 Introduction

## 1.1 Overview

Arcadis Consulting (UK) Ltd, working on behalf of Homes England, was instructed to undertake ecological surveys to inform an Environmental Impact Assessment (EIA) of a proposed masterplan for residential use on land to the west of Ifield, West Sussex.

## 1.2 Site Location and Setting

The proposed development site is located to the west of Ifield, Crawley (central grid reference - TQ 24133 37360).

The site which covers approximately 200ha in total supports a range of habitats including semi-improved grassland, arable fields, amenity grassland, woodland, grazing pasture, a network of hedgerows and several ponds. The River Mole flows west to east through the north of the site, and Ifield Brook, flows south to north through the west of the site. Rusper Road passes through the south of the site.

The site is situated to the north-west of the A23 (Crawley Avenue) and is bordered by residential properties to the east, farmland to the west and woodland to the north and south.

An aerial image illustrating the site surveyed is presented in Image 1.



Image 1: Aerial imagery of the site

## 1.3 Proposed Development

The proposed development comprises the construction of approximately 3000 residential dwellings, three schools (two primary and one secondary) and associated infrastructure.

Due to the proximity of the site to Gatwick Airport (approximately 1.3km to the north), the development is to be concentrated towards the southern end of the site, with the northern part of the site forming open space.

## 1.4 Purpose of the Invertebrate surveys

### 1.4.1 Aim

The main aim of the survey was to establish the conservation value of invertebrate assemblages occurring within the site.

### 1.4.2 Objectives

The objectives of the surveys were as below:

- To collect samples from target habitats as recommended within the 2018 scoping study (Mellings, 2018, presented in full in Appendix B) using protocols outlined in Drake et al (2007);
- To survey the site for the presence of species listed under Section 41 of the NERC Act (Anon 2006)<sup>1</sup> 'Species of Principal Importance' (herein referred to as S41 species), including brown hairstreak (*Thecla betulae*) butterflies;
- To analyse invertebrate data using Pantheon (Webb *et al* 2017), including an updated version of Species-habitat Information System (ISIS) and produce a report including findings/species lists and an evaluation of key assemblages and species in terms of their conservation value.

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<sup>1</sup> Species of Principal Importance are species identified for the purpose of conserving biodiversity, species which are most threatened, in greatest decline, or where the UK holds a significant proportion of the world's total population. These are listed on Section 41 (S41) of the NERC Act 2006 (Anon 2006). For each of these species priority actions are identified. For some of these species 'research' is the main priority action identified.

## 2 Approach and methodology

### 2.1 Introduction and Overview

This report outlines the results of the invertebrate surveys conducted across the site. This report includes the results of the following assessments:

- Desk study;
- Site walkover scoping study; and
- Invertebrate field surveys, including
  - Terrestrial invertebrate sampling;
  - Aquatic invertebrate sampling;
  - Dedicated brown hairstreak survey.

### 2.2 Desk study

The purpose of the desk study was to review existing information available in the public domain and from biological data recorders and holders.

The desk study included a review of historic invertebrate records as well as statutory and non-statutory sites of nature conservation importance from within a 2km radius of the survey area. Historic and statutory/non-statutory site data was supplied by Sussex Biodiversity Records Centre (SxBRC) for the purpose of the project.

The desk study is not replicated here, but due to the findings of the desk study, a targeted brown hairstreak transect was included within the 2018 detailed survey remit.

Other data sources utilised were:

- Aerial photography (e.g. Google Earth mapping);
- The Multi-Agency Geographic Information for the Countryside (MAGIC) (available at: <https://magic.defra.gov.uk/MagicMap.aspx>);
- National Biodiversity Network (NBN) Atlas (available at: <https://nbn.org.uk/>).
- The results of the above desktop study are presented and discussed in Section 3.

### 2.3 Site walkover and scoping study

This section of the report outlines a summary of the site walkover and scoping survey. This site visit and the subsequent findings are discussed in full in the associated report, which is presented in this report in Appendix B.

#### 2.3.1 Timing

The site was surveyed over a two-day period including 7th and 8th June 2018.

The entire site was walked and detailed, geo-referenced target notes recorded in which habitat features were recorded. Target notes referenced both features of particular value as invertebrate habitat and general habitat as an aide-memoire.

#### 2.3.2 Incidental species recording

No sampling was undertaken during the survey; however, a basic list of species identifiable without requirement of microscopic identification was collected.

The scoping study consisted of a walkover of the site. This walkover was utilised to scope the subsequent surveys. From the findings of the scoping survey, habitats of highest conservation potential for invertebrates were selected for detailed sampling. These broadly included scrub-edge, grassland, woodland (including wood decay habitat) and wetland habitats.

## 2.4 Field surveys

### 2.4.1 Overview

For the purpose of the survey, the site was divided into sampling Areas A, B, C, D and E as used in the scoping study. Whilst all five areas were sampled, the current report details findings from Areas A, C, D and E only, as Area B is not due to be impacted by the proposed development. Each of the areas was also subdivided into 'compartments', the areas and compartments are presented in Figure 1. Identification of Area B samples has been deferred due to the probable removal of this area from the development. The areas are as described below:

- Area A: an active Golf course in the south of the site, which contained a range of habitats (including grassland, trees and aquatic features);
- Area B: Ifield Meadows Local Wildlife Site;
- Area C: A number of grassed arable fields and associated hedges and trees, largely grazed by cattle in the north of the site;
- Area D: A number of largely arable fields and associated field margins, hedgerows and trees;
- Area E: A number of small fields supporting grazing animals and crops in the west of the site.

Sufficient terrestrial and aquatic samples were collected from each survey area to enable robust analysis, using Pantheon (Webb *et al* 2017)), of each area as a stand-alone unit.

### 2.4.2 Terrestrial invertebrate sampling

The methodology broadly followed methods outlined in NERR005 (Drake *et al.*, 2007), a manual produced by Natural England, which sets out standard approaches to invertebrate survey and analytical techniques for the purposes of conservation evaluation. The methods and analytical techniques using Invertebrate Species-habitat Information System - ISIS (now part of an online resource called 'Pantheon') have become Natural England's recommended method for both Common Standards Monitoring and Ecological Impact Assessment (EclA) applications. The method aims to ensure a robust analysis of key invertebrate assemblages within the specified areas of the site. Sampling locations are shown on Figure 2, Figure 3 and Figure 4.

#### Timing

Terrestrial invertebrate sampling was undertaken over three separate periods. The first of these was over four consecutive days between 3 and 6 July 2018; the second between 28 August and 5 September 2018 and the third between 7 and 9 May 2019.

On each occasion surveys were undertaken in suitable weather conditions for invertebrate survey, i.e. warm, sunny and relatively windless conditions between the hours of 10:00 and 17:00. The exception being during the third visit where survey was undertaken when the ground was wet from rainfall the previous evening. In this instance, no sweep netting was undertaken.

Full details of the timings, dates and conditions during the survey sampling are presented in Appendix A, Table 1.

#### Sampling and identification

Where practical, species were identified on site and without undue disturbance. However, many invertebrates cannot be adequately identified in the field necessitating specimens to be taken for *ex situ* identification using a microscope.

For robust analysis of assemblages from target habitats, at least four samples were collected per substrate (habitat layer), per site. Natural England generally recommend sampling over four discrete survey events between spring and late summer; however, a compromise of three site visits is generally considered acceptable to adequately assess the conservation value of a site.

The precise approach to sampling varied according to habitat, the following methods were used during the survey (see results section for site-specific information):

#### **Sweep-net**

A standard sweep net was used to collect specimens from grassland and scrub habitat. Timed sweeps were undertaken in representative habitat in accordance with Drake et al (2007).

#### **Vacuum Sampling**

A vacuum sampler was used to collect ground-dwelling specimens not easily retrieved by other sampling methods. Vacuum sampling was timed, enabling repeatable surveys to be undertaken as specified in Drake et al (2007).

#### **Beating tray**

A beating tray was used to collect specimens from trees and scrub habitat. Timed samples were collected in accordance with Drake et al (2007).

#### **Direct searching**

Direct searching beneath refugia such as rocks, under bark and in the crevices of standing and fallen trees;

#### **Spot sampling**

Direct catching of species not easily caught using other methods (i.e. direct catching of bees, solitary wasps, large hoverflies etc.).

### **2.4.3 Aquatic invertebrate sampling**

Aquatic invertebrate sampling was undertaken over two, two-day periods including the 25 and 26 July 2018 and 28 and 29 May 2019. The methodology broadly followed methods outlined in NERR005 (Drake et al., 2007).

#### **Sample site selection and collection of macroinvertebrate samples**

The selection of sampling sites aimed to reasonably represent the heterogeneity of habitat and therefore, the macroinvertebrate fauna of the site as a whole.

Samples were collected both from running water habitats including the River Mole and Ifield Brook, where they crossed the site as well as from representative ponds occurring in the Ifield Golf Course (Area A) and Area C. Areas sampled are presented in Figure 5 and Figure 6.

Each aquatic invertebrate sample was collected in accordance with Bligh (1999) three minute sweep method, a standard method for sampling freshwater habitats. Each sample was collected from a sufficient range of representative meso-habitats to adequately cover the main invertebrate niches of the waterbody in question<sup>2</sup>. Each sampling event was timed for three minutes, the sampling time divided between the different meso-habitats and the watch stopped after each sweeping to enable the contents of the net to be deposited in the sample tray.

An additional one-minute direct search was undertaken alongside the sweep to catch invertebrates not easily caught by sweeping, such as surface dwelling, highly mobile, Gyrinid beetles.

Samples were sorted on site and preserved in alcohol.

#### **Washing, sorting and identification of aquatic samples:**

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<sup>2</sup> Refers to invertebrates reasonably collected with a pond net, i.e., those occurring within the water column, within and around aquatic vegetation and on or within the first centimetre or so of the bottom substrate. Specific grab sampling (or similar techniques) for species living at greater depth within the substratum, were not attempted.

Following collection samples were thoroughly washed and preserved using industrial denatured alcohol (IDA) in readiness for identification.

Where necessary, specimens were identified to species-level using appropriate, up to date taxonomic keys, such as volumes produced by the Freshwater Biological Association and Field Studies Council (FSC). The majority of specimens were identified by Jon Mellings; however, some diptera families including most *Dolichopodidae*, *Chloropidae*, *Tephritidae* and some other families were identified by Dr Tony Irwin, with some verification of difficult specimens by Dr John Ismay.

#### **2.4.4 Brown hairstreak survey**

Brown hairstreak transects were undertaken on the 28, 29 and 30 August, 2018. Transect methodology loosely followed that set by Pollard and Yates (Pollard and Yates 1993) and consisted of walking a set transect route (illustrated in Figure 7), between 10:45 and 15:45 and only when weather conditions are suitable for butterfly activity.

The transect route followed hedgerows and field boundaries containing unmanaged Blackthorn (*Prunus spinosa*) with stands of mature Ash (*Fraxinus excelsior*) trees. During the transect, the route was walked slowly looking for Brown hairstreak butterflies on the wing or ovipositing on Blackthorn. Where mature Ash trees were present, binoculars were used to scan the canopy to look for adults in flight. No egg count survey was undertaken during the winter as presence was confirmed on 30 August 2018.

### **2.5 Survey limitations**

Although major insect and other invertebrate orders required for the adequate assessment of a site such as Ifield were conducted, no detailed survey of night-flying moths was undertaken. Moths (Lepidoptera) can be an important order in assessing arboreal and other habitats for conservation evaluation.

Certain *Hymenoptera* (including *Ichneumonids* and other parasitica) are not included within Pantheon analysis and not covered by the survey. The omission of such groups is generally accepted by Natural England. In addition, the survey did not include molluscs (*Gastropoda*) other than aquatic species.

Whilst the majority of sampling was undertaken during warm, sunny conditions ideal for invertebrate sampling, some data was collected during the third visit when ground conditions were wet from rainfall the previous evening. In this instance, no sweep netting was undertaken. However, considering the large data set collected, this is not considered to have adversely impacted upon the findings of the surveys.

Although sampling effort was generally of sufficient resolution to enable robust assessment of individual survey areas (Areas A, C, D and E) using Pantheon, the resolution of sample data varied between survey areas. This was due to complexity of habitat or access restrictions. Fewer survey samples were collected in Area E than the other areas (due to access restrictions). However, considering the similarity between the habitats in this Area and Area D, this is not considered to have impacted upon the results of the assessment. The purpose of dividing each Area into sub-compartments, was to enable a more manageable assessment of the different Areas within this large site.

Every effort was made to sample habitat features of potential conservation value for invertebrates at a suitable resolution to inform a robust study. However, certain assemblages are not easily sampled using standard methods, for example wood decay assemblages, some of which occur in inaccessible cavities in standing and fallen decaying wood. Many of these species develop as larvae within decaying wood and can be sampled as adults from spring and early summer beating and sweeping methods, when they emerge to feed on foliage and flowers, for example.

Overall, it is considered that the surveys conducted are in line with standard protocols and will provide sufficient resolution to enable the Ifield site to be valued for its importance for invertebrates.

### 3 Data analysis

Species data from both terrestrial and aquatic sampling for each of the survey areas was input into an Excel spreadsheet and then pasted into Pantheon, an online invertebrate recording and analytical resource. Pantheon includes an updated version of Natural England's Invertebrate Species-habitat Information System (ISIS). The version of Pantheon used for the purpose of the current project was version 3.7.4 (Webb et al, 2017). Output and results are presented and discussed within the following sections of this report.

Pantheon results are displayed in tabular form and may be tailored to provide a range of different outputs. The key elements used for the purpose of the current report are included in three output tables which evaluate species assemblages on different habitat scales. These include a habitats and resources 'broad biotopes' table, a habitats and resources 'habitats' table and an ISIS – Specific Assemblage Types (SATs) output table.

At each scale, invertebrates are grouped according to a known affinity to a particular habitat or habitat resource. On the biotope scale the resolution is very broad e.g. 'wetland', 'open habitats', 'tree associated'. The next layer down, the habitat scale<sup>3</sup> groups invertebrates into somewhat more defined subdivisions such as 'marshland' and 'peatland' which are subdivisions of the 'wetland' biotope scale, for example. Examples of assemblages within the most precise scale, the Specific Assemblage include 'reed-fen and pools' grouped within the 'wetland' – 'peatland' hierarchy' and 'undisturbed fluctuating marsh' which is nested as a third tier within the 'wetland' – 'marshland' hierarchy.

The three hierarchical levels recognised within the Pantheon output are defined as follows (from Webb et al, 2017):

- Broad Biotope Level - Broad Biotopes are a useful way to split sample data into something manageable whilst retaining a strong ecological grounding. They include tree-associated, open, wetland and coastal habitats. Species can occur in more than one broad biotope. This occurs when the same habitat has been typed into two divisions. A good example is wet woodland, which is found in both the tree-associated and wetlands.
- Habitat Level – Habitats are a mid-level category within the hierarchy and often readily identifiable and recognisable by conservation workers (e.g. saltmarsh). Some are identified as broad habitats in the UK, but most are new terms used to refer to a series of resources or a series of broad habitat types.
- Specific Assemblage Types (SATs) - are characterised by ecologically restricted species and were generally only expressed in lists from sites with conservation value. This classification is particularly useful for identifying assemblages of higher conservation value.

The SATs output is particularly useful for identifying assemblages of higher conservation value within the survey area.

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<sup>3</sup> Habitat scale is analogous to the Broad Habitat Type (BAT) classification used in older versions of ISIS

## 4 Results

### 4.1 Introduction

The area covered by the survey is outlined in Figure 1. As for the scoping study, the survey area was subdivided into areas (Areas A, B, C, D, E). Each Area was further sub-divided into compartments and the habitat within each compartment was described in detail in relation to the scoping study (Appendix B). Where information is presented in full in the scoping study, only a summary for context is presented in this section of the report.

### 4.2 Desk Study

This section outlines the broad results of the desk study. This was conducted as a component of the initial scoping study, and is presented in full in Appendix B.

#### 4.2.1 Sites subject to statutory nature conservation designations

Sites subject to statutory designations due to their nature conservation interest within or within close proximity to the site are as follows:

##### Sites of Special Scientific Interest (SSSI)

- **House Copse SSSI** - 650m south of the site
- **Buchan Hill Ponds SSSI** – 1.8km south of the site.
- **Glover's Wood SSSI** - 2.5km northwest of the site.

##### Non-statutory nature conservation sites

Sites subject to non-statutory designations due to their nature conservation interest within the site boundary or within close proximity to the site are as follows:

##### Local Nature Reserves (LNR)

Target Hill Park LNR is 1.8km southeast of the Ifield Golf Course (Area A).

##### Sites of Nature Conservation Interest (SNCI)

- **Ifield Brook Wood and Meadows, Crawley SNCI** – comprises part of the site immediately east of Ifield Brook (Area B).
- **Hyde Hill, Ifield SNCI** – contiguous with the Ifield Golf Course part of the site (Area A).
- **Ifield Pond and surroundings, Crawley SNCI** – c200m south of the site.
- **Woldhurstlea Wood, Glossops Green SNCI** – 1km southeast of the site.
- **Willoughby Fields, Crawley SNCI** – 400m northeast of the site.
- **Wood near Lower Prestwood Farm SNCI** – 730m west of the site.
- **Orltons Copse, Crawley SNCI** – 1.4km west of the site.
- **Kilnwood Copse SNCI** – 1.3km southwest of the site.

#### 4.2.2 Invertebrate species of higher conservation value recorded

Historic invertebrate records provided as part of a data-search by Sussex Biodiversity Record Centre (SxBRC) to inform the project include a number of rare, uncommon and threatened UK species. These include species listed as 'Species of Principal Importance' within Section 41 (England) of the Natural Environment and Rural Communities Act (NERC Act), 2006, as well as species classed within the various pre and post 2001 IUCN categories based on their known conservation status within the UK as a whole.

The SxBRC search includes a note relating to 'sensitive records' which states in relation to wood white (*Leptidea sinapis*) and duke of burgundy (*Hamearis lucina*) butterflies that 'these two rare butterfly species

have a very restricted range in Sussex and so records are reported at a 1km resolution on advice from Butterfly Conservation Sussex Branch.' Neither species is recorded within the data search, therefore, it can be assumed that neither species is known to occur within the search area.

The SxBRC invertebrate data search recorded within the boundary of the site the following species of conservation importance:

#### **Grasshoppers and crickets (Orthoptera)**

- Long-winged Conehead (*Conocephalus fuscus*) (Sussex Rare). Recorded on site.
- Roesel's Bush-cricket (*Metrioptera roeselii*) (Sussex Rare). Recorded in several locations on site.

#### **Butterflies and moths (Lepidoptera)**

- brown hairstreak (Post-2001 IUCN 'Vulnerable'; S41 Species). Recorded in several locations on-site.
- White Admiral (*Limenitis camilla*) (Post-2001 IUCN 'Vulnerable'; S41 priority species). Recorded on site
- Small Heath (*Coenonympha pamphilus*) (Post-2001 IUCN 'Near Threatened'; S41 priority species). Recorded both within and outside the site.
- Bulrush Veneer (*Calamotropha paludella*) (Nationally Scarce; Sussex Rare). Recorded on site.
- White-barred Knot-horn (*Elegia similella*) (Nationally Scarce); Sussex Rare). Recorded on site.
- Green-brindled Crescent (*Allophytes oxyacanthae*) (S41 Species). Larvae recorded on site.
- Chequered Pearl (*Evergestis pallidata*) (Sussex Rare) Recorded in one location on site.

#### **Beetles (Coleoptera)**

- A weevil (*Dorytomus ictor*) (Nationally Scarce (Nb). Recorded on one location on site

Additional species of recognised conservation status recorded within a 2km radius of the site are listed, together with the above in Appendix B. These include Post-2001 IUCN species classed as 'Near Threatened' or rarer, species classed as nationally scarce in UK based on grid square occupancy, and species classed as S41 species. Species listed as being of local importance in Sussex are listed as 'Sussex Rare'.

### **4.3 Habitat assessment of the site**

#### **4.3.1 General habitat**

Other than the Ifield Golf Course in the south of the site (Area A), the site largely comprises mixed agricultural land, with grassland pasture/meadowland occupying the majority of the site, but with a significant block of arable land (planted with cereal crop at the time of survey), towards the centre of the site, south of the River Mole and west of Ifield Brook (Area D). Overall, there is a substantial resource of native broadleaved trees, woodland and scrub habitat, with mature and veteran trees occurring both within the small blocks of semi-natural woodland and within species-rich hedgerows and riparian margins of the site. Wetland habitat included the heavily shaded and predominately unvegetated stretches of the River Mole and the Ifield Brook and there were several vegetated ponds within the Ifield Golf Course in particular (Area A).

Areas of particularly high potential value for invertebrates included the area to the east of the Ifield Brook comprising the Ifield Brook Wood and Meadows SNCI, which supported a network of small herb-rich, meadowland in mosaic with mature scrub and woodland, some of this woodland was ancient woodland (Area B). The fairway edge habitats within the Ifield Golf Course (Area A) supported a significant resource of herb-rich grassland and scrub/woodland edge habitat and whilst most of the grassland areas within the site were species-poor, both grassland and arable field were frequently bounded by tall grassland margins and headlands with uncut hedge margins and mature trees providing habitat with potential to support significant Scrub Edge, arboreal and wood-decay invertebrate assemblages. In addition to the grasslands within the Ifield Brook Wood and Meadows SNCI (Area B) and the uncut margins of the Golf Course, herb-rich small fields of higher invertebrate potential were found at several locations within the site.

Full details of the Habitat Assessment are presented in Appendix B.

## 4.4 Field survey results

### 4.4.1 Terrestrial and Aquatic Survey Results Overview

In total, 719 invertebrate species were recorded during 2018 and 2019. Of these, 639 species were recorded from terrestrial and 80 from the aquatic samples collected. It should be noted that a number of the species recorded from terrestrial sampling methods have larval aquatic stages and occur on land as adults. Appendix A, Table 2 presents a breakdown of species per invertebrate order/higher taxon recorded from aquatic and terrestrial samples.

In terms of individual Areas, the greatest number of species were recorded from Area A (Ifield Golf Course), consisting of 445 species; 407 species were recorded from Area D, 251 from Area C and 202 from Area E.

A full list of all species recorded during 2018 and 2019, from each Area is included in Appendix A, Table 3. The list includes the current conservation status of recorded species.

From the site as a whole, 34 species of recognised conservation status in the UK were recorded. These included one species currently classed as Red Data Book (RDB1) nationally 'endangered' under pre-1994 IUCN criteria; two species classed as nationally 'vulnerable' under post-2001 IUCN criteria; two species classed as RDB3 nationally 'rare' and three species classed in the 'near threatened' post-2001 IUCN category. Two species classed within the RDB 'unknown' or Data Deficient (DD) categories were recorded, together with 22 species classed as nationally scarce in the UK. Each of these species is listed below.

In addition, four species are S41 species; these include two species of butterfly: brown hairstreak and Small Heath; and two species of moth Sallow Moth (*Cirrhia icteritia*) and Blood-vein (*Timandra comae*). All species of recognised conservation status recorded during the survey are listed below:

In addition, all species of recognised conservation status recorded during the survey are listed and described in Appendix A, Table 3. This table includes all recorded species currently listed as S41 species, together with UK Red Data Book (RDB) species listed under either post-2001 IUCN guidelines, or using pre-1994 criteria. Species currently listed as nationally scarce (including now superseded Notable A (Na) and B (Nb) categories), are also included).

### 4.4.2 Notable Species Recorded During the Surveys

This section of the report outlines each of the species of note outlined in the section above.

#### **RDB1 'Endangered' (pre-1994 IUCN criteria)**

- A tephritid fly (*Acinia corniculata*).

#### **Vulnerable' Post-2001 IUCN criteria**

- A malachite beetle (*Axinotarsus pulicarius*).

#### **'Vulnerable' Post-2001 IUCN criteria; S41 'priority species'**

- Brown Hairstreak (*Thecla betulae*).

#### **RDB3 'rare' pre-1994 criteria**

- A picture-winged fly (*Myopites inulaedyssentericae*);
- A mirid bug (*Lygus pratensis*).

#### **Near Threatened - Post-2001 IUCN criteria; S41 'priority species'**

- Small Heath (*Coenonympha pamphilus*).

#### **Near Threatened - Post-2001 IUCN criteria**

- Scarce chaser (*Libellula fulva*);
- A big-headed fly (*Tomosvaryella minima*).

### **RDBK 'Data Deficient'/'insufficiently known' Insufficiently known (UK pre-1994)**

- A grass fly (*Lasiambia coxalis*);
- A grass fly (*Meromyza femorata*).

### **Nationally scarce (Na)**

- Brown Ant (*Lasius brunneus*);
- Painted Nomad Bee (*Nomada fucata*).

### **Nationally Scarce**

- A long-legged fly (*Achalcus bimaculatus*);
- A linyphiid spider (*Ceratinopsis stative*);
- An orb-web spider (*Cercidia prominens*);
- A grass fly (*Dicraeus scibilis*);
- A long-legged fly (*Dolichopus virgultorum*);
- Dusky Cockroach (*Ectobius lapponicus*);
- A theridiid spider (*Episinus maculipes*);
- An opomyzid fly (*Geomyza subnigra*);
- A short-palped crane fly (*Limonia trivittata*);
- A tumbling flower beetle (*Mordellistena variegata*);
- A jumping spider (*Sibianor aurocinctus*);
- A philodromid spider (*Thanatus striatus*);
- A linyphiid spider (*Trematocephalus cristatus*).

### **Nationally Scarce (Nb)**

- A woodworm beetle (*Anobium inexpectatum*);
- Sharp-collared Furrow Bee (*Lasioglossum malachurum*);
- Lobe-spurred Furrow Bee (*Lasioglossum pauxillum*);
- A leaf weevil (*Polydrusus flavipes*);
- An apionid weevil (*Protapion difforme*);
- A lacehopper (*Reptalus panzeri*);
- A ground beetle (*Tachys bistriatus*).

### **S41 Moth – Priority Actions 'Research Only'**

- Sallow Moth (*Cirrhia icteritia*);
- Blood-vein (*Timandra comae*).

## **4.5 Pantheon results**

Results of Pantheon analysis for each site in turn are included in Appendix A. The results include analysis of data collected from combined terrestrial and aquatic sampling and results are considered, in relation to each Area, within the discussion, section 5.

## **4.6 brown hairstreak transect**

Findings of the 2018 brown hairstreak survey are included in Appendix A, Table 20. The transect route taken for the purpose of the brown hairstreak survey is illustrated in Figure 7 and locations of positive sightings are represented in Figure 8.

## 5 Discussion

### 5.1 Overview

The total number of species (719) recorded from the survey reflected the robust sampling effort. Furthermore, sufficient samples were collected from grassland, scrub, hedgerow, woodland and a range of wetland habitats to reasonably characterise the assemblages of conservation importance within the site.

The number of invertebrate species recorded from each of the sample sites was somewhat variable. The largest number of species recorded from a single Area was 445 recorded from Area A; 407 species were recorded from Area D, 251 from Area C and 202 species were recorded from Area E. However, a component of this variation is likely to be attributable to sampling effort, which varied according to habitat complexity and overall size.

Areas A, C and D all comprised specimens derived from sampling of aquatic as well as terrestrial sampling, whilst no aquatic sampling was undertaken in Area E, largely due to access limitations. However, sampling effort in Area E was undertaken more to add resolution to the overall site data. Although fewer overall samples were collected from terrestrial habitats in Area C compared to Areas A and D, the sampling effort was sufficiently robust in terms of ground, field and scrub layers for the purposes of Pantheon analysis for this site.

In terms of survey timing, terrestrial samples were collected from three, separate sampling events in early May, early July and late August to early September; this surveying effort giving reasonable temporal coverage of target assemblages. The late May and late July aquatic sampling again, can be considered reasonably robust in covering key assemblages and species, although some of the early emerging mayflies (*ephemeroptera*) and some other species, may have emerged prior to the May survey window. The brown hairstreak transect yielded positive results and was undertaken at the end of August, the peak recorded flight period of this species.

For the site as a whole, (Table 2) beetles (coleoptera) were the most numerous higher taxon with 198 species, followed by two-winged flies (Diptera) with 159 recorded species, 141 true bugs (Hemiptera) and 100 species of spider (Araneae). Of the remaining large orders, bees, ants and wasps (*aculeate Hymenoptera*) were represented by 32 species and *Lepidoptera* (butterflies and moths) by 23 species. The best represented of the smaller orders included grasshoppers, crickets and groundhoppers (*Orthoptera*), harvestmen (*Opiliones*) and dragonflies and damselflies (*Odonata*).

This result indicated that most of the larger taxa were reasonably represented within the sample data and in particular, that the main target taxa for the Pantheon/ISIS analysis were represented. Interestingly, whilst two-winged flies were the second most strongly represented in terms of species at a whole site level, on a sample site level, true bugs were more strongly represented. This suggested, that there were fewer repeats within the two-winged flies between the different sample sites, whereas the true bugs were more consistently recorded.

The site level species deployment in terms of number of species per taxon, was consistent between all four Areas (Areas A,C,D and E); with beetles being the largest group in all instances followed by true bugs, two-winged flies, spiders, bees ants and wasps and butterflies and moths.

Whilst butterflies were well represented within the sample data with 17 recorded species, moths were poorly represented with only six species. Moths can only realistically be surveyed using overnight mercury vapour trapping, a method which has practical limitations on a site such as Ifield. Moths comprise an important component of 'tree-associated' and in particular, 'arboreal' assemblages in Pantheon and the lack of resolution of this group should be borne in mind in evaluating these assemblages.

### 5.2 Pantheon output

#### 5.2.1 Broad biotope level affinities of species recorded on a site level

From Pantheon analysis of the combined Ifield dataset, the largest number of species recorded were attributed on a 'Broad biotope' level to the 'Open Habitat' category, with 359 species. Significantly fewer species were attributed at this level to the 'Tree Associated' and 'Wetland' assemblages, which were attributed with 165 and 138 species respectively.

This deployment reflected sampling effort and habitat coverage to some extent, there being arguably more variation, in the field and ground layer habitats, than in the arboreal and wetland habitats. In addition, the overall

pool of species attributed to the 'Open Habitat' assemblage in the Pantheon programme was greater than the number attributed to either the 'Tree Associated' or 'Wetland' assemblages.

However, from the Pantheon output, 'Open Habitat' species recorded from Ifield were better represented in terms of the overall percentage of the entire species pool supported by Pantheon, with eight percent representation, compared to the five percent of the respective species pools represented within both the 'Tree-Associated' and 'Wetland' biotope level assemblages.

Importantly, whilst only 11 percent of the 719 species collected from the site as a whole were collected through dedicated aquatic sampling methods, 21 percent of all species were attributed to the 'Wetland' biotope level assemblage in the Pantheon output. This means that roughly half of these wetland species were collected/recorded through sampling of predominately terrestrial habitats.

On balance, the deployment of species between the three biotopes: 'Open Habitat', 'Tree Associated' and 'Wetland' would seem to reasonably represent the target assemblages expected from a site such as Ifield.

### 5.3 Habitat-level assemblages recorded on a site level

From habitat-level Pantheon output data for the whole site, eight assemblages sufficiently robust to produce a Species Quality Index (SQI) score were recorded<sup>4</sup>. In terms of the number of attributed species, by far the most strongly represented assemblage at habitat-level was the 'Tall Sward and Scrub' assemblage, to which 305 species were attributed (equivalent to 44 percent of all recorded species recognised in the Pantheon output).

Other significantly-represented assemblages at the habitat-level included 'Arboreal', nested within the biotope level 'Tree Associated' assemblage, with 79 species; 'Marshland' nested within 'Wetland' at biotope level was attributed with 75 species; 60 species were ascribed to the 'Shaded Woodland Floor' assemblage, 44 species each were ascribed to another wetland assemblage 'Peatland' and 'Short Sward and Bare Ground', 32 species were attributed to the 'Decaying Wood' assemblage and 24 species with an association with 'Running Water' were recognised.

Habitat-level assemblages represented by too few species to be considered robust in the Pantheon output included 'Wet Woodland' with nine attributed species, 'Lake' with seven attributed species and 'Upland', 'Saltmarsh' and 'Brackish ditches and pools', each represented by a single species.

In Pantheon, habitat supporting 'Tall Sward and Scrub' invertebrate assemblages are described as:

*'Areas of dense herbage or partial shade where a humid microclimate is maintained at ground level. Dominance by woody plants is limited by exposure, grazing or cutting of vegetation, but they often form an important component of the habitat.'*

Semi-natural systems supporting important examples of this assemblage type include heath grassland, Moorland, hay meadows, scattered scrub and woodland edge. Sward height and density is often an important factor in species representation, as are the extent of flowering and seed-set.'

This description reasonably reflects much of the grassland, scrub matrix and woodland edge habitat elements within the site as a whole. The high proportion of Tall Sward and Scrub affiliated species can be seen as a reasonable reflection of the habitat surveyed and sampling effort.

On a whole site level, none of the SQIs of the robust habitat-level assemblages exceeded the corresponding favourable condition thresholds<sup>5</sup> set in the original versions of ISIS. Also, there was relatively little discrepancy between the relative scores of the assemblages at this level.

Whilst 'Tall Sward and Scrub' was by far the largest habitat-level assemblage, the highest SQI score achieved, both in actual terms and in relation to the corresponding favourable condition threshold, of any assemblage was for 'Short Sward and Bare Ground'. The SQI score for this assemblage was 130, this indicating that the site was

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<sup>4</sup> In Pantheon an SQI score is considered robust when more than 15 species are attributed to a given assemblage.

<sup>5</sup> Where an SQI score for a given assemblage exceeds its corresponding favourable condition target score it is generally considered that the assemblage is of or approaching national importance.

of fairly high conservation value, but still well short of the favourable condition target of 160 set in the original version of ISIS for this assemblage.

The remaining habitat-level assemblages achieved SQL scores in descending order as follows: 'Decaying Wood' (129); 'Running water'(126); 'Peatland' (121); 'Tall Sward and Scrub'(116); 'Arboreal' (111); 'Marshland' (108) and 'Shaded Woodland Floor' (105). These scores are below the favourable condition target.

## 5.4 Specific Assemblages Types (SATs) recorded on a site level

On a site level, the recorded SATs need to be considered with caution due to the non-standard number of samples contributing to them; however, the results do provide a useful insight into assemblages recorded on a site level. In Pantheon, SAT level assemblages are considered to be the most important in terms of site assessment for conservation evaluation. This is due to the fact that these assemblages comprised habitat specialists, often including less-common species. SATs tend to only be represented on sites supporting habitat of conservation value for invertebrates.

On a site level, the following 15 SATs were recognised from the 2018/19 Ifield data (Appendix A):

- A212 - Bark and sapwood decay (20 species);
- F002 - Rich flower resource (19 species);
- F001 - Scrub Edge (18 species);
- F112 - Open Short Sward (7 species);
- F003 - Scrub Heath and Moorland (6 species);
- F111 - Bare Sand and Chalk (4 species);
- W211 - Open water on disturbed mineral sediments (3 species);
- A215 - Epiphyte Fauna (4 species);
- A211 - Heartwood decay (2 species);
- W221 - Undisturbed fluctuating marsh (2 species);
- W125 - Slow flowing rivers (1 species);
- W126 – Seepage (1 species);
- W314 - Reed-fen and pools (1 species);
- W311 - Open water in acid mire (1 species); and
- M311 - Saltmarsh and transitional brackish marsh (1 species).

From the whole site Ifield data, three assemblages A212 'Bark and sapwood decay' (20 species); F002 'Rich flower resource' (19 species) and F001 'Scrub Edge' (18 species) were particularly well represented. These assemblages were all attributed with enough specialist species to achieve 'Favourable condition status'; however, these scores are likely to have been exaggerated by the non-standard number of samples collected on a whole site level.

The 'Bark and sapwood decay' assemblage type is found in and around trees and shrubs generally, but especially in older specimens. The assemblage is primarily associated with death and decay of the outer woody tissues of the trees or shrubs; the sapwood and bark. Wood decay habitat was present in the more mature hedgerows and broadleaved woodland blocks within the site.

'Rich flower resource' relates specifically to bees, which being foraging species tend to occur in greater diversity in habitats supporting a wide range of flowering plants as a nectar resource. This assemblage is, however, a resource-based SAT which may be dispersed between several more tangible habitat types. Whilst herb-rich grassland was limited in extent on site, certain areas such as within the taller rough areas of the Ifield Golf Course supported more flower-rich habitat.

The 'Scrub Edge' SAT is typically found where scrub or woodland grades into or is interspersed with open areas of grassland, heathland or early successional vegetation types. The juxtaposition of open vegetation with woody development is important to insects with complex life cycles that require different microhabitats at different stages of development. This is a resource-based assemblage type that replaced the old F212 Scrub Edge SAT<sup>6</sup>.

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<sup>6</sup> The 'old F212 Scrub Edge SAT' refers to pre-Pantheon versions of ISIS

This change allows the assemblage type to be expressed in early successional habitat matrices in addition to close sward grassland matrices. It links clearly to scrub management and the maintenance of graded edge habitats. Scrub Edge habitat was well represented on site in areas such as the Ifield Golf Course and in parts of the site where hedgerow and woodland edge habitat has been left unmanaged.

Other well represented assemblages included F112 - Open Short Sward (7 species), and F003 - Scrub Heath and Moorland (6 species) and F111 - Bare Sand and Chalk (4 species)

The 'Open Short Sward' SAT occurs in poached short sward grassland, especially calcareous grassland, but not in uniform, dense sward grassland where moist conditions prevail at ground level.

Species classed within the 'Scrub Heath and Moorland' tend to include species associated with lower nutrient dwarf shrub and grassland habitats occurring in both upland and lowland areas. The species attributed to this group from the survey data include species such as orb-web spiders (*Agalenatea redii*) and (*Neoscona adianta*), which occur fairly commonly in less improved grassland and woodland ground layers, as well as in more classic heathland and Moorland habitats.

The 'Bare Sand and Chalk' assemblage contains species that are associated with hot, dry soil conditions normally found in bare ground in early successional habitats. This assemblage was best represented during the survey in areas such as the Ifield Golf Course (Area A).

Overall the better represented SATs recorded on a whole site level give a good indication of the presence of species assemblages of conservation value occurring on the site. The SATs and their associated species are discussed in relation to each of the Areas A, C, D and E below.

## 5.5 Affinities of Pantheon assemblages to species recorded on a whole site level

On a whole site level and at a broad biotope level, the number of species of recognised conservation status attributed to 'Open Habitats' was 21; nine uncommon species were attributed to the 'Tree Associated' biotope level assemblage and five to 'Wetlands'.

On a Habitat-level, the largest number of uncommon species were attributed to 'Tall Sward and Scrub' with 10 species of recognised status; followed by in descending order: 'Short Sward and Bare Ground' (seven species); 'Arboreal' (five species); 'Decaying Wood' (three species); 'Peatland' and 'Running Water' (two species each) and, 'Shaded Woodland Floor', 'Wet Woodland' and 'Marshland' each with one species of recognised conservation status. Note: Species associations at a SAT level are not discussed here and are considered at a sub-site level following this section.

## 5.6 Uncommon Species Within Each Habitat Level Assemblage

This section of this report outlines the 'uncommon species' recorded within each habitat level assemblage. This permits the 'value' of these species to be assessed, and if required, suitable mitigation to be outlined.

### 5.6.1 Uncommon species attributed to 'Tall Sward and Scrub' habitat-level assemblage

The relatively low SQI score recorded for 'Tall Sward and Scrub' is indicative of the proportion of common and local species in relation to the uncommon species within the dataset; the large number of species attributed to this group diluting the rarity value. However, on a site level, a large number of species of recognised conservation status were attributed to this group including some rare species.

Species of recognised conservation status attributed to the 'Tall Sward and Scrub' assemblage included six species of two-winged flies (*Diptera*); three species of spider (*Araneae*); two species of beetle (*Coleoptera*) and one species each of the orders *Dictyoptera* (cockroaches) and *Lepidoptera* (butterflies and moths). These species are described as follows:

*Acinia corniculata*, a species of picture-winged fly currently classed as RDB1 (nationally endangered) in the UK, was attributed to 'Tall sward and shrub'. This species was arguably the rarest species recorded during the 2018/19 survey, despite a recent increase in records nationally. The species is associated with the flowerheads of Common Knapweed (*Centaurea nigra*), within which the larvae develop.

Another rare species of picture-winged fly *Myopites inulaedyssentericae*, also of the family *tephritidae* was also attributed to 'Tall Sward and Scrub'. *M. inulaedyssentericae* (previously known as *M. apicatus*) is currently classed as RDB3 'rare' under pre-1994 criteria. The larvae of this fly develops in the flowerheads of Fleabane (*Pulicaria dysenterica*) (White, 1988) and possibly other plants. Fleabane was common in the damper areas and field margins within the survey area. Both *Acinia corniculata* and *Myopites inulaedyssentericae* were swept from grassland in Area D during the 2018/19 survey.

Other uncommon two-winged flies attributed to 'Tall Sward and Scrub' during the survey included three species of the family *chloropidae* known as frit flies or grass flies. These included two species classed in the RDBK 'unknown' or Data Deficient (DD) categories *Lasiambia coxalis*, *Meromyza femorata* agg. and one nationally scarce species *Dicraeus scibilis*.

Unlike most other *chloropids*, *L. coxalis* is a larval parasite within the eggs of grasshoppers (*Acrididae*). However, little information could be found on this species in the UK, either in terms of distribution or biology. During the survey the fly was recorded from Area A, the Ifield Golf Course, where it was likely to be associated with grasshoppers occurring within the taller sward edge habitat.

*Meromyza femorata* agg. is an aggregate of *chloropid* flies. The fly has been widely recorded across the southern half of the UK with many records being coastal. Like other grass flies, *M. femorata* probably feeds on grasses. During the survey the insect was recorded from Area C. An area which included drier grassland and damper paleochannel habitat.

Whilst *Dicraeus scibilis* is most strongly associated with coastal grassland, including saltmarsh and dune habitats, inland records are mainly from water meadows and unimproved pastures. The biology of the species is unknown; however, Falk et al. (2016) speculates that the 'Larvae probably develop in grass seeds like related species'. During the survey, *D. scibilis* was recorded from grassland habitat in Area D, this area is bordered by the Ifield Brook and River Mole.

The remaining two-winged fly of recognised conservation status recorded during the survey was the nationally scarce *Geomyza subnigra*, this being the rarest of several species of the family *Opomyzidae* recorded during the survey. The insect has been recorded from widely scattered locations in southern England and Wales as well as from Scotland. According to Falk et al. (2016) *G. subnigra* occurs mainly in dry habitats including 'dry grassland on chalk downs, heathland, dunes and shingle ridges behind beaches'. Adults of the insect have been recorded from around the roots of grasses including False Oat-grass (*Arrhenatherum elatius*) and Tufted Hair-grass (*Deschampsia cespitosa*). Falk et al. (2016) conjecture that the species may be more widespread than records indicate, due to its illusive nature and that vacuum sampling (used during the current survey) may be a better capture method than sweep netting. During the survey, *G. subnigra* was recorded from unmown field edge habitat in Area E.

The three species of spider of recognised conservation status attributed to 'Tall Sward and Scrub' are all currently classed as nationally scarce in the UK. These include *Thanatus striatus*, a running crab spider (*Philodromidae*); *Cercidia prominens*, a species of the orb-web spider family (*Araneidae*) and *Ceratinopsis stativa* a money spider (*Linyphiidae*). In the UK *Thanatus striatus* mainly occurs in coastal sites around the Thames Gateway in south Essex and north Kent, there are also a number of inland records. The spider has been well recorded in Surrey and there are several records from inland sites in Sussex. Harvey et al. (2002) states that '*T. striatus* occurs on the ground at the base of vegetation in sandy grassland, heathland and dunes but also in tussocky grassland on sea walls, in brackish grassland, saltmarsh, dyke edges, waste ground and old sand pits' During the survey several specimens of the spider was recorded only from grassland or field margin habitat in Area D.

There are scattered records of *Cercidia prominens* in both England, Scotland and Wales; however, the majority of records are from southeast England, in particular from Surrey and East Sussex. Roberts (1995) describes the favoured habitat of this spider as being 'At the base of vegetation, often at the edge of banks, footpaths and other clearings.' Bee et al. (2017) are more specific, stating that *Cercidia* 'Occurs on heathland and chalk grassland, often in sparsely vegetated areas', where it spins its orb-web close to the ground. During the survey, a number of specimens of this distinctive spider were recorded from both Area A and D.

*Ceratinopsis stativa* is listed as nationally scarce in a review by Harvey et al. (2017). Although there are scattered records in the UK as far north as Northumberland, the spider has mainly been recorded from the southeast and East Anglia. There are several widely scattered records from Sussex. The species is primarily associated with grassland habitat, including calcareous grassland, but it has also been recorded from wetland habitats supporting sphagnum (Roberts, 1995). During the survey the insect was recorded from the Ifield Golf Course (Area A), a site which supported significant areas of grassland habitat.

The two species of beetle of recognised conservation status attributed to 'Tall Sward and Scrub', included a very rare malachite beetle *Axinotarsus pulicarius* (*Malachiidae*) classed as nationally rare (RDB3) and with a threat status of 'vulnerable' in a review by Alexander (2015), and a nationally scarce *apionid* weevil *Protapion difforme* (*Apionidae*).

In addition to a specimen conforming to the more widespread recent UK colonist, *Axinotarsus marginalis* recorded from Area A, a male specimen collected from Area C keyed out as *Axinotarsus pulicarius*. *A. pulicarius* is a rare and seldom recorded malachite beetle, with records in the UK being restricted to a few sites in the Thames Corridor area and Surrey, and according it has apparently been lost from former coastal localities in Kent.

The nearest record to the Ifield site is from near Fairmile in Surrey, approximately 25km northwest. According to Alexander (2015), the larvae of this beetle is thought to develop in stems, or at the roots of plants in areas of damp grassland and coastal shingle, whilst the adult is associated with flowers and flowering grasses in rank herbage and ruderal vegetation. Alexander (2015) conjectures that habitats with permanently moist soils may be important for *A. pulicarius*. During the survey the insect was recorded from Area C, this site supported wet grassland within paleochannels and other riparian habitat. The wet grassland comprised grasses such as Marsh Foxtail (*Alopecurus geniculatus*) and Floating Sweet-grass (*Glyceria fluitans*).

*Protapion difforme* is one of a number of species of the genus recorded during the survey. In the UK the species is largely confined to the southern half of the UK and it is arguably most frequently recorded from the southeast. The beetle has been recorded from several locations in West Sussex. Although *P. difforme* has been associated with knotgrass *Polygonum* spp., Hyman and Parsons (1992) suggest that it may be more closely associated with clovers *Trifolium* spp. *P. difforme* occurs in habitats including, according to Hyman and Parsons (1992) 'Damp grassland, wetland, disturbed ground, hedgebanks and along ditches'. During the survey, the weevil was beaten from woodland edge habitat in Area C. This woodland edge supported wet grassland, which is likely to provide the typical habitat for this species.

Dusky Cockroach *Ectobius lapponicus* (*Dictyoptera: Blattellidae*) is one of three species of cockroach native to the UK. Like the other two species, Dusky Cockroach is mainly restricted to southern England where the majority of records are from central counties south of London. There are several records from Sussex including a record from Ifield Golf Course (Area A) within the site. Whilst the insect tends to be fairly common where it occurs, it was classed Nationally Scarce in a review by Sutton (2015). Dusky Cockroach occurs in a fairly diverse range of predominately, dry habitats including woodland margins, scrub and grassland on both calcareous and acidic soils. During the survey the insect was recorded in Areas A, D and E and appears to be well represented within the general area.

The blood-vein *Timandra comae* (*Lepidoptera: Geometridae*) is one of a number of moth species which are still generally widespread and common in England, but are listed on S41 due to a recorded decline in the UK in recent decades. The bloodvein is associated primarily with 'damp places with rank, herb-rich vegetation including hedgerow ditches, woodland rides, wet meadows and gardens.' (Waring and Townsend, 2003). Larval foodplants include dock (*Rumex* spp.) and knotgrass (*Polygonum* spp.). During the survey blood-vein was recorded only from within the Ifield Golf Course (Area A); however, the species is likely to occur within suitable habitat across the site.

### **5.6.2 Uncommon species attributed to 'Short Sward and Bare Ground' habitat-level assemblage**

After 'Tall Sward and Scrub', 'Short Sward and Bare Ground' was attributed with the largest number of species of recognised conservation status of the Ifield habitat-level assemblages. In relative terms, this assemblage also achieved the highest SQI score.

In total, seven species of recognised conservation status were attributed to the 'Short Sward and Bare Ground' assemblage including three species of bee (*Hymenoptera: Apidae and Halictidae*); a lacehopper (*Hemiptera: Cixiidae*); a two-winged fly (*Diptera*); a butterfly (*Lepidoptera: Nymphalidae*) and a spider (*Araneae*). These species are described as follows:

Although classed as nationally scarce, both Sharp-collared Furrow Bee (*Lasioglossum malachurum*) and Lobe-spurred Furrow Bee *L. pauxillum* are two species which have increased significantly in the UK in recent years and it is probable that the conservation status of both species will be revised. Sharp-collared Furrow Bee now occurs across much of southern England but still rare in the west with only scattered records from Wales and Cornwall.

The bee has been recorded at a number of sites both in Sussex and nearby in Surrey. The insect is eusocial and nests in 'dense and occasionally extensive aggregations' (Else and Edwards, 2018), usually on level, or gently sloping exposed or sparse ground. Widely polylectic, it collects both pollen and nectar from a wide range of flowering herbs and shrubs. The species also occurs in a wide range of different habitats, including agricultural land. During the survey, Sharp-collared Furrow Bee was recorded only from field margin habitat in Area E.

Lobe-spurred Furrow Bee has also been recorded from several locations in West Sussex and this bee is associated with a range of habitats including chalk grassland and open woodland. It nests in bare ground forming small to large nesting aggregations. The bee is polylectic, nectaring on various flowering herbs. The species was recorded from field margin, open grassland and open edges of woodland during the 2018 survey. (sources: Else and Edwards (2018) and Edwards and Broad (2005).

The Painted Nomad Bee (*Nomada fucata*) is a nationally scarce 'cuckoo' species which lays its eggs in the nest of its host the Yellow-legged Mining Bee (*Andrena flavipes*). The insect, like its host is associated with a range of habitats including, according to Falk (2015), 'soft rock cliffs, chalk downland and brownfield sites such as quarries and sandpits.' The bee nectars as an adult on various shrubs, yellow composites, buttercups and cinquefoils. Painted Nomad Bee is largely found in southern UK where it occurs most commonly in coastal habitats. However, its range has expanded in recent decades. There are a number of confirmed and unconfirmed records from sites north of the survey area in Surrey and also in West Sussex to the south. During the 2019 survey the bee was recorded from the Ifield Golf Course (Area A), its host *Andrena flavipes* was not recorded, but is likely to also occur on site.

Classed as nationally scarce, *Reptalus panzeri* (previously known as *Oliarus panzeri*), is an uncommon species of lacehopper, which is largely restricted to southeast England in the UK, being relatively common in the London area. There are a few records from Sussex, including a record from Newhaven in 2003, though it is uncertain whether or not it has been previously recorded in the Crawley area. According to Kirby (1992), the ecology of the insect is 'somewhat obscure', though it has been 'found on a number of occasions in areas which are periodically waterlogged, but dry out and crack in the summer'. There is a theory that the cracking may be important by enabling the insect to oviposit below normal ground level. The adults are recorded both from grassland and from shrubs and bushes; however, it is considered to be a predominately grassland insect. During the survey, *R. panzeri* was beaten from the woodland edge habitat in Ifield Golf Course (Area A). There are a variety of wet and dry grassland habitats including ephemeral ponds and ditches in this area.

*Tomosvaryella minima* is an uncommon species of big-headed fly which is currently classed under post-2001 IUCN guidelines as Near Threatened. According to Falk and Chandler (2005), the fly has been mainly recorded from East Anglia with one record from South Wales and the insect does not appear to have been previously recorded from Sussex. Falk and Chandler describe the favoured habitat of the species as 'Dry, sandy areas, both on coastal dunes and inland on heaths in the Brecklands'. The biology of *T. minima* is not known, but other members of the genus *Tomosvaryella* are internal parasites as larvae of leafhoppers (*Cicadellidae*). During this survey the fly was recorded only from the Ifield Golf Course (Area A), an area which has areas of dry sandy and short grassland and exposed sand areas in the form of sand traps.

*Sibianor aurocinctus* is a rare jumping spider which is more or less restricted to the south-east of England, where it is commonest in the Thames Corridor area (Bee et al., 2017). There are relatively few Sussex records of this spider; however, there is a pre-1980 record within 5km east of the survey area. The spider has no clear habitat affinity other than being associated with dry, sparsely vegetated habitats including heathland, chalk

grasslands and brownfield sites. During the survey *S. aurocinctus* was recorded from the Ifield Golf Course (Area A), a site which supported areas of short, free-draining dry grassland habitat in mosaic with scrub at the edge of broadleaved woodland habitat.

Small heath (*Coenonympha pamphilus*) is a small butterfly which is still widespread and common over the whole of the UK; however, a dramatic recorded decline within recent decades has led to the species being included as an S41 and S42 'Species of principal importance' in England and Wales respectively. The species has also been classed under post-2001 IUCN criteria as 'Near Threatened'. The butterfly is found in open, sunny habitats including grassland, heaths, meadows, sand dunes etc. Adults favour areas with short sward. Larvae feed on various grasses including bent grasses (*Agrostis* spp.), fescues (*Festuca* spp.) and meadow grasses (*Poa* spp.) During the survey Small Heath was recorded in semi-improved grassland habitat in Area B and C.

### 5.6.3 Uncommon species attributed to 'Arboreal' habitat-level assemblage

In total, five species of recognised conservation status were attributed to the 'Arboreal' habitat-level assemblage and it should be noted, that unlike the majority of assemblages at this level, 'Arboreal' has no nested SATs. In relative terms the 'Arboreal' assemblage achieved a relatively low SQI score; however, this assemblage was attributed with the third highest number of species of recognised conservation status. Of these, two species of *Lepidoptera* including a butterfly and a moth, two species of spider and one beetle were attributed to the 'Arboreal' assemblage. These species are described as follows:

brown hairstreak is a local species of butterfly occurring in southern Britain. Due to a significant recorded decline in recent decades due to hedgerow removal and changes in management including mechanised flailing of hedgerows, the species has been included as a S41 species. The species is also listed as 'Vulnerable' under post 2001 IUCN criteria. brown hairstreak is associated with hedgerows, shrub and woodland edge where the larval foodplant Blackthorn (*Prunus spinosa*) is a prominent component. Management is important and in particular the butterfly requires hedgerows and Scrub Edge habitats that are not managed by annual flailing. The butterfly also favours habitat with mature standard trees such as Ash (*Fraxinus excelsior*) and hedgerows with a good structural succession, where Bramble (*Rubus fruticosus* agg.), and tall herbs such as Hemp Agrimony (*Eupatoria cannabinum*) and Fleabane are present. Due to several historic records of brown hairstreak on and in close proximity to the site, a transect was undertaken during the current survey. Adult butterflies were recorded along unmanaged hedgerows and Scrub Edge habitat in Areas A and B.

The Sallow Moth *Cirrhia icteritia* is one of a number of moth species which are still generally widespread and common in England, but is an S41 species due to a recorded decline in the UK in recent decades. The insect is associated with damp woodland, heathland and marshland habitats; the larvae feed initially on Grey Willow (*Salix cinerea*) catkins and then on herbaceous plants. During the survey the moth was recorded from Area D.

The two species of spider attributed to the 'Arboreal' assemblage include *Episinus maculipes*, comb-footed spider (*Theridiidae*) and *Trematocephalus cristatus*, a species of money spider (*Linyphiidae*).

*E. maculipes* has until recently been considered an extreme rarity in the UK; however, there has been an increase in recording in recent years and the species is now listed as nationally scarce. Whilst the majority of *E. maculipes* records are from sites near the coast between Cornwall and Kent, the species has also been recorded inland and there are Sussex records within less than 18 kilometres east and 25 kilometres west of the survey area. According to Bee et al. (2017), the spider occurs in woodland edge and on the coast in vegetated cliff habitats, often in association with Ivy (*Hedera helix*). During the survey the spider was recorded from the Ifield Golf Course (Area A), which supported significant areas of scrub at the edge of broadleaved woodland habitat, alongside wet and dry grassland habitat.

The majority of UK records for *Trematocephalus cristatus* are from the southeast English counties of Surrey and Sussex and the spider has been historically recorded from several sites within close proximity to the site, including a record from within 5km. According to Harvey et al. (eds.) (2002) *T. cristatus* can be quite numerous at sites where it is found and 'occurs on the foliage of various trees and bushes, especially oak, birch and gorse, in a variety of situations such as woodland, heathland, gardens, parkland, etc'. During the survey both male and female spiders were beaten from deciduous foliage in Area D.

A broad-nosed weevil *Polydrusus flavipes* was the only species of high conservation status of the 17 beetle species attributed to the 'Arboreal' habitat-level assemblage. *P. flavipes* is a scarce weevil in the UK with

records widely scattered as far north as the extreme north of England. However, most records are from southeast England. According to Hyman and Parsons (1992), the weevil is primarily associated with 'young oak and aspen', also possibly occurring on 'hazel, beech, birch and hawthorn', although Hyman and Parsons (1992) also state that the beetle 'has also been noted from mature oaks in parkland'. During the survey, *P. flavipes* was beaten from broadleaved woodland/woodland edge in Area C. The habitat supported Pedunculate Oak (*Quercus robur*), Ash woodland, with understorey trees including Hawthorn (*Crataegus monogyna*) and Field Maple (*Acer campestre*).

#### 5.6.4 Uncommon species attributed to 'Decaying Wood' habitat-level assemblage

The 'Decaying Wood' habitat-level assemblage which includes representatives from the nested SAT-level assemblages 'Bark and sapwood decay', 'Heartwood decay' and 'Epiphyte Fauna', was reasonably well subscribed in terms of the total number of species recorded, indicating that the recorded invertebrate resource to some extent reflected the wood decay resource observed within the hedgerows, woodland and scrub habitat on the site as a whole.

Whilst a number of the species attributed to this group from the 2018-19 survey data were relatively local in the UK, with beetle species such as a jewel beetle (*Agrilus laticornis*), the Shothole Woodborer (*Scolytus rugulosus*), a malachite beetle *Axinotarsus marginalis* and several species of *scraptiid* beetle including *Anaspis garneysi* and *A. humeralis*, relatively few species with recognised conservation status were attributed to this group. These included an ant (*Hymenoptera: Formicidae*) and a beetle (*Coleoptera: Anobiidae*), described as follows:

In the UK, the Brown Tree Ant (*Lasius brunneus*) is mainly confined to the central and southern counties of England. It has been recorded from West Sussex, but not within close proximity to the survey area. The species is associated with mature, but still living deciduous trees and whilst the ant has often been associated with oak (*Quercus* spp.), it also occurs on other trees. The ant uses tunnels beneath the bark, but nests deeper within the trunk or within the root system. During the survey, several specimens were beaten from ancient woodland or hedgerow habitat in Area D.

*Anobium inexpectatum* is a wood-boring beetle closely related to the commoner woodworm beetle (*A. punctatum*), which was also recorded during the survey. The male specimen was determined by morphological characters and comparison of genital capsules. In the UK, *A. inexpectatum* has been recorded widely across the southern half of the UK, with a concentration of records in north Kent and there are several records from West Sussex.

The beetle is, according to Hyman and Parsons (1992) found in 'Woodland, pasture woodland, neglected orchards, quarries and old, ivy covered buildings'. Unlike closely related species, the beetle breeds almost exclusively in the stems of old ivy. During the 2018 survey the insect was beaten from woodland edge or woodland habitat in Area A.

Note: Another nationally scarce saproxylic species, a tumbling flower beetle (*Mordellistena variegata*), was also recorded during the survey. This, like species recorded from Area D, is like other members of the genus, not recognised in Pantheon analysis. The insect is recorded as having patchy distribution confined to the southeast of the UK, with a number of records from Surrey, Sussex and Kent, south of London. There is a historic record of the insect from approximately 3km west of the site, at Rusper.

Like other tumbling flower beetles, *M. variegata* is a saproxylic species. The larvae develop in delignified rotting wood and the beetle has been recorded from a range of broadleaved trees including Pedunculate Oak, Field Maple and Rowan (*Sorbus aucuparia*). The insect is also sometimes associated with traditionally managed fruit orchards. During the survey the beetle was beaten from habitat comprising Pedunculate Oak, Hawthorn, Hazel, Ash and other broadleaved trees.

#### 5.6.5 Uncommon species attributed to 'Peatland' habitat-level assemblage

The 44 species of invertebrate attributed to the 'Peatland' habitat-level assemblage included both aquatic species such as the diving beetles *Acilius sulcatus* and *Ilybius montanus*, *Hemiptera* such as a lesser water boatman (*Sigara scotti*) and land-living hygrophilous species (found in association with water). These included rather local species of spider such as the crab spiders (*Thomisidae*) *Xysitcus ulmi* and *Ozyptila brevipes* and

tetragnathid spiders including *Tetragnatha nigrita*. However, the least common species attributed to this group included two nationally scarce species of long-legged fly *Achalcus bimaculatus* and *Dolichopus virgultorum*.

*Achalcus bimaculatus*, was classed as nationally scarce in a review by Drake (2018) and was described as new to science as recently as 1997. The fly appears to have a very thinly scattered recorded distribution, mainly across the southern half of the UK, and has been recorded since 1990 from locations from Cornwall to Norfolk. According to Drake (2018), *A. bimaculatus* is a wetland species found in fen, poor fen, reedbed and carr (probably strays from adjacent open mire), usually of high quality; and is found mainly on peat soils. During the survey the fly was recorded only from Area D, probably within the riparian woodland habitat.

*Dolichopus virgultorum* is an uncommon species of long-legged fly which has been historically recorded in scattered locations in southern England and South Wales, with several records from West Sussex including records immediately south of Dorking and also around Uckfield and Tunbridge Wells to the east of the site. In a recent review by Drake (2018) the fly is said to be '*showing an apparent increase in frequency but not expansion of range*', and that it is '*likely to be associated mainly with damp (but not saturated) ground or water margins in broadleaf woodland and scrub rather than more open habitats*'. *D. virgultorum* was well recorded during the 2018-19 survey being recorded from Areas A, C, D and E.

### 5.6.6 Uncommon species attributed to 'Running Water' habitat-level assemblage

Like the other wetland associated assemblages, the 'Running Water' habitat-level assemblage was derived from samples taken from both aquatic and terrestrial habitats. SATs including 'Slow flowing rivers' and 'Seepage' are nested within this assemblage, but all but two of the 24 species attributed to this group in the 2018-19 Pantheon output for the Ifield site were non-specialist 'Running Water' species.

The majority of species attributed to 'Running Water' from combined Ifield data were two-winged flies (*Diptera*) and the long-legged flies *Dolichopodidae* were the best represented, with five species. Whilst the majority of these were relatively well recorded species, one species, *Chrysotus palustris* is still uncommon in the UK, despite being moderated from its former nationally scarce status in a review by Drake (2018) and *Chrysotus blepharosceles* is a somewhat local species in the UK. Other flies attributed to this group included a relatively infrequently recorded chloropid (grass fly), *Oscinisoma cognatum* and an ephydrid fly *Philygria interstincta*.

Two species of recognised conservation status attributed to the 'Running Water' assemblage included a short-palped crane fly *Limonia trivittata* classed as nationally scarce and a dragonfly (Odonata: Libellulidae) the Scarce chaser *Libellula fulva* which is currently classed as 'Near Threatened' under post-2001 IUCN criteria.

*Limonia trivittata* is associated with wetland and wet woodland habitats. The insect has been recorded from scattered localities across the UK and from several localities in Sussex, including a record from near Horsham, approximately 7km from the site. Falk (1991) describes the favoured habitat of *L. trivittata* as 'Wet woodlands on calcareous soils, especially besides rivers'. Although the biology is said to be 'unknown', Falk refers to a probable association with Butterbur (*Petasites hybridus*), suggesting that the larvae may develop 'in petioles or rootstocks'. During the survey *L. trivittata* was recorded from Area D, this area supporting riparian woodland habitat.

The Scarce chaser (*Libellula fulva*) was once a rare species restricted to a few lowland river systems in southern and eastern England in the UK; however, according to Brooks and Cham (2004), the dragonfly has since the mid 2000s 'expanded its range at rate faster than all other species in Britain except the Small Red-eyed Damselfly.' There are a number of records from West Sussex, particularly towards the west of the survey area near Horsham. Whilst the dragonfly has expanded its UK range, it has been afforded 'Near Threatened' status under post-2001 IUCN criteria due to the threat posed by development of its favoured habitat which includes the floodplains of slow-flowing rivers and marshes with dense, abundant vegetation.

An adult male scarce darter (*Libellula fulva*) was recorded adjacent to one of the ponds within the Ifield Golf Course (Area A) during the survey. No larvae of this species was recorded during the aquatic component of the survey; whilst this does not constitute proof that the dragonfly does not breed on site, it is typically associated with backwaters and ditches rather than ponds as breeding habitat and the riparian habitat on site was heavily shaded and arguably unsuitable as breeding habitat for scarce chaser.

### 5.6.7 Uncommon species attributed to 'Marshland' habitat-level assemblage

The 'Marshland' habitat-level assemblage was represented by 75 species in the Pantheon output, making it the best represented of the wetland habitats for the Ifield site. Most of the species were relatively common and collected using aquatic and terrestrial sampling methods. Only three species were attributed to the nested SAT 'Open water on disturbed mineral sediments' and two from 'Undisturbed fluctuating marsh'. Despite the large number of species attributed to 'Marshland', only one species of recognised conservation status, a nationally scarce ground beetle *Tachys bistriatus*, was attributed to this habitat-level assemblage in Pantheon.

*T. bistriatus* is described in Luff (2007) as being 'very scarce' and 'Extremely local in southern and eastern England'. The species was listed as Nationally Scarce (Least Concern) in a status review by Telfer (2016). The majority of records are from the extreme south of England, close to the south coast, although there are scattered records as far north as Yorkshire. In Sussex, there are post-1990 records in the Haywards Heath and Horsham areas. This minute ground beetle is associated with 'damp sand and clay near fresh water'. During the survey the insect was recorded from damp meadowland close to a hedgerow in Area E.

Beetles comprised the largest proportion of species attributed to the 'Marshland' assemblage. This group comprised predominately aquatic species including eight common and widespread diving beetles of the family Dytiscidae and eight water scavenger beetles Hydrophilidae. Of the two-winged flies (Diptera), the long-legged flies were particularly well represented, with nine species attributed to this family, including local species *Chrysotus palustris* also described under 'Running Water' (above). The 13 species of true bug (Hemiptera) attributed to the 'Marshland' habitat-level assemblage included the rather local lesser waterboatman species *Hesperocorixa moesta* and the Saucer Bug *Ilyocoris cimicoides*.

Uncommon species attributed to 'Shaded Woodland Floor' habitat-level assemblage

The 60 species attributed to the 'Shaded Woodland Floor' habitat-level assemblage from the Ifield Pantheon output included only one species of higher conservation status; a nationally scarce short-palped crane fly *Limonia trivittata*. This species is also attributed at habitat-level to both 'Running Water' and 'Wet Woodland' assemblages and was discussed under running water (above).

More than half of the species attributed to 'Shaded Woodland Floor' from analysis of the Ifield data were two-winged flies (Diptera). Of these, crane flies of the families Limoniidae and Tipulidae were particularly well represented, but, with the exception of *L. trivittata*, only common, widespread crane flies were recorded. Besides crane flies, Lauxaniidae, a family of acalypterate flies frequently associated with shaded habitats and soldierflies (Stratiomyidae) were also reasonably well represented within the 'Shaded Woodland Floor' assemblage; however, only widespread and common representatives were recorded.

Of the other taxa recorded, *Stenammina debile*, a secretive species of myrmicine ant associated with leaf litter in shaded woodland habitats was attributed to this group. *S. debile* is rather a local species in the UK, with by far the most records being from southeast England.

### **5.6.8 Uncommon species attributed to 'Wet Woodland' habitat-level assemblage**

With only nine attributed species, 'Wet Woodland' was poorly represented within the Ifield Pantheon output. A nationally scarce short-palped crane fly (*Limonia trivittata*) already discussed in relation to both 'Running water' and 'Shaded Woodland Floor' assemblages, was the only species of recognised conservation status attributed to 'Wet Woodland'. Other species attributed to this assemblage included rove beetles including the widespread *Stenus flavipes* and *S. bimaculatus* as well as the rather local *Platystethus nitens*, which is also associated with other marshland and wetland habitats.

## **5.7 Sub-site Level Pantheon output**

This section of the report outlines the results of the invertebrate analysis for each of the compartments on the site surveyed and analysed. The Pantheon output for Areas A, C, D and E is discussed as follows:

### **5.7.1 Area A – Ifield Golf Course**

#### **Broad biotope level assemblages recorded for Area A**

From Pantheon analysis of the combined Ifield Area A dataset, the largest number of species recorded were attributed on a 'Broad biotope' level to the 'Open Habitat' category, with 228 species. Significantly fewer species

were attributed at this level to the 'Tree Associated' and 'Wetland' assemblages, which were attributed with 108 and 83 species respectively.

This characterisation was almost exactly proportional to the percentage representation for the whole site data with 54 percent of the data being from 'Open Habitats'; 26 percent of the data being attributed to 'Tree Associated' and 20 percent being attributed to 'Wetland' on a biotope level.

Area A was subject to a mixture of terrestrial and aquatic sampling and the proportion of species attributed to each assemblage reflects the expected characterisation in relation to the habitats recorded.

#### **Habitat-level assemblages recorded for Area A**

From habitat-level Pantheon output data for Area A, seven assemblages sufficiently robust to produce a Species Quality Index (SQI) score were recorded<sup>7</sup>. In terms of the number of attributed species, by far the most strongly represented assemblage at habitat-level was the 'Tall Sward and Scrub' assemblage, to which 196 species, or 47 percent of all recorded species recognised in Pantheon, was attributed.

Other significantly-represented assemblages at the habitat-level included 'Arboreal', nested within the biotope level 'Tree Associated' assemblage with 55 species; 'Marshland' nested within 'Wetland' at biotope level was attributed with 48 species; 34 species were ascribed to the 'Shaded Woodland Floor' assemblage; 28 species were ascribed to 'Short Sward and Bare Ground', 26 to 'Peatland' and 23 species were attributed to the 'Decaying Wood' assemblage.

Habitat-level assemblages represented by too few species to be considered robust in the Pantheon output included 'Running Water' with 10 attributed species, 'Wet Woodland' with five attributed species, four species were attributed to the 'Lake' assemblage and two species were attributed to 'Upland' at a habitat-level.

The large proportion of species attributed to the 'Tall Sward and Scrub' resulting from Pantheon analysis of the Area A (Ifield Golf Course) site reasonably reflected the target habitats and sampling effort. There was a significant surface area of Scrub Edge habitat on the periphery of the Golf Course and as part of the landscaping. These wooded margins frequently formed, a strong structural gradation from the shorter mown sward of the Golf Course fairways, through rough grassland, tall herb and low Bramble scrub, to the taller wooded edge. Additional species characterisation between 'Arboreal', 'Marshland', 'Shaded Woodland Floor', 'Short Sward and Bare Ground', 'Peatland' and 'Decaying Wood' habitat-level assemblages, in order of magnitude, reflected the range of habitats present on the site.

A number of mature and veteran trees were present in and around the Golf Course, providing habitat for both arboreal and wood decay species and there was significant woodland ground layer habitat with potential to support shade tolerant species. Whilst a number of the ponds within the Golf Course were evidently created, there was a range of marginal and open water habitats both on site and in the wider landscape of potential value to a range of aquatic and hygrophilus invertebrates. Drier, short sward grassland was present within Area A, due to management of fairways and rough areas.

Whilst the Golf Course greens were evidently too manicured to be of high value to invertebrates, grassland margins kept relatively short by mowing provided structural variation within this area and there was also some usage of the margins of sandy bunkers by bare earth favouring species such as mining bees of the genera *Lasioglossum* and *Andrena* in particular.

In terms of species representation, 'Tall Sward and Scrub' was by far the largest habitat-level assemblage; however, the SQI score registered for this assemblage was fairly low, being well below the favourable condition threshold set in the original version of ISIS. Similarly, other the habitat-level assemblages 'Arboreal', 'Marshland' and 'Shaded Woodland Floor' produced relatively low SQI scores for Area A.

In contrast, the SQI score of 148 recorded for the 'Short Sward and Bare Ground' was relatively high and close to the favourable condition threshold set in the original version of ISIS of 160 for this assemblage. With only 28 attributed species the 'Short Sward and Bare Ground' assemblage was small in proportion to 'Tall Sward and

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<sup>7</sup> In Pantheon an SQI score is considered robust when more than 15 species are attributed to a given assemblage.

Scrub' and several other of the habitat-level assemblages recorded for Area A; however, the assemblage was sufficiently well attributed to achieve a robust SQI score.

The strength of the score was directly related to the number of species of high conservation status associated with this assemblage. Four species of high conservation status were attributed to 'Short Sward and Bare Ground', a proportionally high number compared to the total number of species assigned to this assemblage. This number of uncommon species was matched by 'Tall Sward and Scrub'; however, the proportion of rarities for this assemblage was much low due to the larger number of species attributed to this assemblage.

Of the remaining assemblages, 'Decaying Wood' achieved the highest SQI score of 139, indicating an assemblage of some conservation value due to the presence of one Near Threatened and one nationally scarce species. The remaining robust habitat-level assemblage, 'Peatland' achieved an SQI score of 124, from a dataset of 26 species and included one nationally scarce species, indicating an assemblage of moderate conservation value.

### **Specific Assemblage Types recorded for Area A**

In total, 12 SATs were recognised from Pantheon analysis of Area A (Ifield Golf Course) invertebrate data. Of these two, 'Scrub Edge' and 'Epiphyte' achieved scores exceeding the favourable condition thresholds set in the Pantheon database. In Pantheon, a score exceeding the threshold target scores is considered to indicate an assemblage of high conservation value, these assemblages typically comprise species with a restricted range and habitat affinity. F001 'Scrub Edge' is an example of a resource-based SAT; i.e. one which occurs as a diffuse resource over a range of habitat types; the habitat however, unlike some of the other resource-based SATs, has a good discrimination of conservation quality. The assemblage relates to scattered scrub habitats and also can be found in the interface between hedgerow and meadowlands. Habitat management is important in relation to Scrub Edge habitats, due to the importance of graded scrub-edge habitats.

Species attributed to the 'Scrub Edge' assemblage for Area A included the nationally scarce Dusky Cockroach and the Silver-washed Fritillary Butterfly (*Argynnis paphia*). The latter is a woodland species which is relatively widespread in southern England and Wales.

The other SAT achieving a score exceeding its favourable condition threshold in ISIS for Area A was the 'Epiphyte Fauna' SAT. Due to the small pool of species recognised as belonging to this SAT in Pantheon, the favourable condition threshold is very low. The three or four species attributed to this assemblage from Pantheon analysis of the Area A data were sufficient for a favourable condition score to be registered. None of the species attributed to the assemblage were recognised as being of high conservation status, the species included Rosy Footman (*Mitochrista miniate*), a moth whose larvae feed on lichens growing on the branches of trees and a flower bug (Anthocoridae) *Cardiastethus fasciventris*.

In addition, two other SATs were well represented within the output for Area A. These included A212 'Bark and sapwood decay' and F002 'Rich flower resource'. With 15 attributed species, the 'Bark and sapwood decay' assemblage was better represented, in numerical terms, than any of the other recognised SATs, but the score was below the favourable condition threshold score of 19. Like the 'Epiphyte Fauna' and 'Heartwood decay' SATs, 'Bark and sapwood decay' is nested in the previously discussed 'Decaying Wood' habitat-level assemblage. Collectively, these assemblages are well represented within the output data and indicate that the collective wood decay assemblages within Area A, if not the site as a whole, are of significant conservation value.

Without the use of trapping methods such as water traps, flight interception traps and similar indirect methods, Wood decay assemblages are frequently poorly expressed in samples, therefore, a relatively strong representation where only direct methods were used may indicate a resource of even higher conservation value. The overall resource of wood decay habitat within the woodland edges and mature/veteran standards recorded during the survey, was significant.

F002 'Rich flower resource' is, like 'Scrub Edge', a resource-based SAT. However, the overall discrimination of conservation quality is considered to be 'very poor' in a synopsis by Lott (2008). The flowering resource on which the assemblage is based can be distributed between a range of habitat types, including both grassland, scrub and early successional habitats such as 'Open mosaic habitats on previously developed land'. The

assemblage is made up entirely of bee species, so in effect, is a direct reflection of the number of bee species recorded from a site.

Species attributed to the 'Rich flower resource' assemblage for Area A included the nationally scarce Painted Nomad Bee (*Nomada fucata*) as well as the Clover Melitta (*Melitta leporine*), an uncommon species which forages on Fabaceae species including clovers and vetches.

Although the SQI registered for 'Short Sward and Bare Ground' on a habitat-level indicated it to support and assemblage of relatively high conservation value at that level, this was not reflected at SAT level. The two assemblages, F112 'Open sward and bare ground' and F111 'Bare Sand and Chalk' nested within 'Short Sward and Bare Ground', were both poorly expressed within the Pantheon output for Area A. These assemblages were represented by three species each, the favourable condition thresholds for 'Open sward and bare ground' and 'Bare Sand and Chalk', is 12 and 19 respectively. It should be noted that two of the three species attributed to the F111 'Bare Sand and Chalk' assemblages were species of high conservation value, these included a RDB3 nationally rare and Near Threatened species of big-headed fly (*Tomosvaryella minima*) and a nationally scarce jumping spider (*Sibianor aurocinctus*). The third species attributed to the 'Bare Sand and Chalk' SAT was a rhopalid bug (*Stictopleurus punctatonervosus*). This bug has recolonised much of southern England having been considered to be extinct in the UK as recently as the 1990s.

Whilst wetland species were reasonably well represented at both biotope and habitat levels within the datasets, the representation at SAT level was poor. Only two species were attributed to W211 'Open water on disturbed mineral sediments' and neither species was of recognised conservation status; however, the single species attributed to the W125 'Slow-flowing rivers' assemblage, was the Scarce chaser, a species listed as Near Threatened based on post-2001 IUCN criteria.

## 5.7.2 Area C – Northern area

### Broad biotope level assemblages recorded for Area C

From Pantheon analysis of the Area C dataset, the largest number of species recorded were attributed on a 'Broad biotope' level to the 'Open Habitat' category, with 118 species. Significantly fewer species were attributed at this level to the 'Wetland' and 'Tree Associated' assemblages, which were attributed with 60 and 43 species respectively. Two species tagged as 'Coastal' species at a biotope level were also attributed within the Pantheon output for Area C.

These included an ant-like flower beetle (*Anthicus antherinus*) and a gastropod New Zealand Mud Snail (*Potamopyrgus antipodarum*). Both species are often found in coastal habitats in the UK, but are also recorded inland in the UK. *A. antherinus* is a local species with population concentrations in Southeast England and the West Midlands; New Zealand Mud Snail is an invasive snail which has been recorded in a variety of wetland habitats throughout the UK.

The proportion of 'Open Habitat' species for Area C was very close to that recorded for both Area A and for the site as a whole. Fifty three percent of species were attributed to Open Habitats compared to 54 percent for Area A and the site as a whole. However, being represented by 27 percent of the data, the 'Wetland' biotope level assemblage was better represented than the 19 percent attributed to the 'Tree Associated' fauna of Area C.

This characterisation reasonably reflects the predominately grassland habitat of Area C and the wet grassland, pond and riparian habitats sampled were comparatively well represented in this area.

### Habitat-level assemblages recorded for Area C

From habitat-level Pantheon data for Area C, four sufficiently robust assemblages were recorded. In common with the results for all other areas, the most strongly represented habitat-level assemblage was 'Tall Sward and Scrub', with 108 species, or 49 percent of all recorded species recognised in Pantheon.

Other significantly represented assemblages at habitat-level included 'Marshland', nested within 'Wetland' at biotope level, with 36 species; 'Arboreal' nested within the 'Tree Associated' biotope with 22 species and another wetland assemblage, 'Peatland' comprised 15 species.

Habitat-level assemblages represented by too few species to be considered robust in the Pantheon output included 'Running Water' with 12 species, 'Shaded Woodland Floor' and 'Decaying Wood' both with 11 species,

10 species were attributed to 'Short Sward and Bare Ground' and three species were attributed to the 'Lake' assemblage.

As with other sites, the large proportion of species attributed to the 'Tall Sward and Scrub' resulting from Pantheon analysis of Area C reasonably reflected the target habitats and sampling effort. There was a significant amount of tall sward grassland and Scrub Edge habitat within the hedgerows and wooded margins of Area C.

Samples from the River Mole, as well as those derived from sampling of the pond and associated marshland and paleochannel habitat of Area C, also contributed to the dataset. This was reflected in the relatively large proportion of the dataset deployed jointly between the 'Marshland', 'Peatland' and 'Running Water' habitat-level assemblages.

Wooded habitat was somewhat less well represented in Area C compared to Areas A and D, and this was reflected in the relatively small proportion of species attributed to the 'Arboreal' assemblage; however, the overall complement of tree-associated species was increased by the species attributed to 'Shaded Woodland Floor' and 'Decaying Wood' assemblages.

In terms of species representation, whilst 'Tall Sward and Scrub' was by far the largest habitat-level assemblage, the SQI score registered for this was fairly modest, being well below the favourable conditions threshold set in the original version of ISIS. However, this assemblage was attributed with rarities including notably, a nationally rare (RDB3) malachite beetle (*Axinotarsus pulicarius*), which was also afforded 'Vulnerable' threat status based on post-2001 IUCN criteria, a chloropid fly (*Meromyza femorata* agg.), classed as RDBK 'insufficiently known' and a nationally scarce apionid weevil (*Protapion difforme*). The remainder of the better subscribed habitat-level assemblages 'Marshland' and 'Arboreal', also produced relatively low SQI scores for Area C although a nationally scarce broad-nosed weevil (*Polydrusus flavipes*), was attributed to 'Arboreal'.

The highest recognised robust SQI score at habitat-level for Area C was 140 achieved by 'Peatland'. Although this assemblage was attributed with only 15 species, the minimum number of species required for a robust assessment. This score was increased due to the presence of a nationally scarce species of long-legged fly (*Dolichopus virgultorum*), a well recorded species throughout the site as a whole.

Although the 'Short Sward and Bare Ground' habitat-level assemblage was attributed with too few species to be considered robust, this assemblage was attributed with two species of recognised conservation status including the nationally scarce, though increasing, Lobe-spurred Furrow Bee and the Small Heath, a relatively common butterfly listed as an S41 species and with a 'Near Threatened' threat category based on post-2001 IUCN criteria.

### **Specific Assemblage Types recorded for Area C**

In total, eight SATs were recognised from Pantheon analysis of Area C invertebrate data. None of these assemblages comprised sufficient species counts to exceed their respective favourable condition thresholds within Pantheon. The largest number of species attributed to a single SAT for Area C was 10 attributed to the A212 'Bark and sapwood decay'; whilst this score fell well short of the favourable condition target score of 19 set in Pantheon, the representation further reinforced the significance of 'Wood decay' assemblages on the site level.

Another SAT represented within the Area C output included F002 'Rich flower-resource' to which eight species were ascribed including the Lobe-spurred Furrow Bee. Because of its diffuse nature, the 'Rich flower-resource' SAT is not considered a good indicator of habitat quality; however, the presence of less common bee species increases the overall conservation value of this assemblage.

The only other SAT represented within the Pantheon output for Area C to which more than two species were attributed was F001 'Scrub Edge'. Four species in total were attributed to this, including an arboreal species of leafhopper (*Allygus mixtus*), two mining bees; Hawthorn Mining Bee (*Andrena chrysoceles*) and the Coppice Mining Bee (*A. helvola*) and *Lophopilio palpalis*, a common species of harvestman. The presence of 'Scrub Edge' species indicates the presence of habitat with good structural diversity of value to invertebrates.

### 5.7.3 Area D – Central Area west of Ifield Brook

#### Broad biotope level assemblages recorded for Area D

From Pantheon analysis of the Area D dataset, the largest number of species recorded were attributed on a 'Broad biotope' level to the 'Open Habitat' category, with 212 species. Significantly fewer species were attributed at this level to the 'Tree Associated' and 'Wetland' assemblages, which were attributed with 91 and 72 species respectively. One species the New Zealand Mud Snail, recorded from aquatic sampling and tagged as 'Coastal' at a biotope level was also attributed within the Pantheon output for Area D. This non-native species was also recorded from Area C.

As with the preceding areas, the proportion of 'Open Habitat' species for Area C was comparable to that recorded for the site as a whole. 56 percent of species were attributed to Open Habitats compared to 54 percent for Area A and the site as a whole. In addition, 27 percent of data was attributed to 'Tree Associated' and 19 percent was attributed to 'Wetland' on a biotope level; this closely reflecting the proportional sampling at both site level and for Area B.

Area D was subject to a mixture of terrestrial and aquatic sampling and the proportion of species attributed to each assemblage reflects the expected characterisation in relation to the habitats recorded. Whilst much of the open habitat in Area D was intensively managed arable land, the field edges frequently supported structurally diverse marginal habitat. Importantly, the hedges were frequently unmanaged, allowing strong successional development at the field margins. The eastern boundary of Area D included the wooded edge of the Ifield Brook. Both this and the samples from the River Mole at the shared boundary with Area C, contributed to the sample data and mature broadleaved riparian woodland towards the north of Area D, contributed to the 'Tree Associated' dataset.

#### Habitat-level assemblages recorded for Area D

From habitat-level Pantheon output data for Area D, seven assemblages sufficiently robust to produce a SQI score were recorded. In common with the results for all other areas, by far the most strongly represented habitat-level assemblage was 'Tall Sward and Scrub', with 182 species, or 48 percent of all recorded species recognised in Pantheon from the data for Area D.

Other significantly represented assemblages at habitat-level included 'Arboreal', nested within the 'Tree Associated' assemblage at biotope level with 46 species; 'Marshland', nested within 'Wetland' with 38 species; 'Shaded Woodland Floor' was attributed with 34 species; followed by 'Short Sward and Bare Ground' with 22 species; 'Peatland' with 21 species and 'Running Water' with 19 species.

Habitat-level assemblages represented by too few species to be considered robust in the Pantheon output included 'Decaying Wood' with 13 species, 'Lake' and 'Wet Woodland' both with four species, and 'Brackish pools and ditches' with one species.

As with other sites, the large proportion of species attributed to the 'Tall Sward and Scrub' resulting from Pantheon analysis of the Area D site reasonably reflected the target habitats and sampling effort. There was a significant surface area of structurally diverse tall sward grassland and Scrub Edge habitat within the hedgerows, riparian edge habitat and wooded margins of Area D.

The riparian woodland at the north of Area D (Appendix 2, Figure 1 compartment 20) was well sampled and contributed to the representation of 'Tree Associated' 'Arboreal', 'Shaded Woodland Floor' and 'Decaying Wood' assemblages at habitat-level. Aquatic samples from both the River Mole and Ifield Brook contributed to the strongly represented 'Marshland', 'Peatland' and 'Running Water' assemblages.

In terms of species representation, 'Tall Sward and Scrub' was by far the largest habitat-level assemblage, the SQI score registered for this was, at 119, higher than the scores recorded for all other area recorded, but still fell well short of the favourable conditions threshold set at 160 in the original version of ISIS. However, this assemblage was attributed with rarities including a very rare (RDB1) picture-winged fly (*Acinia corniculata*) and four nationally scarce species including Dusky Coackroach, a grass fly (*Dicraeus scibilis*), a running crab spider (*Thanatus striatus*), and an orb-web spider (*Cercidia prominens*).

Of the remaining robustly attributed habitat-level assemblages, the SQIs recorded for 'Arboreal', 'Marshland', 'Shaded Woodland Floor' and 'Short Sward and Bare Ground', were all relatively low, both in actual terms and in

relation to their respective SQI scores. However, all these assemblages, other than 'Marshland', supported at least one species of recognised conservation status.

The 'Arboreal' assemblage was attributed with the brown hairstreak, an S41 'Species of principal importance' which also has a threat status of 'Vulnerable' under post-2001 IUCN criteria. This species was recorded from three locations along a transect traversing the boundary of Area D. Other species of recognised conservation value attributed to the Area D 'Arboreal' assemblage included a nationally scarce money spider (*Trematocephalus cristatus*) and the Sallow, one of a number of generally widespread and common moth species included under S41.

It is probable that the SQI for the 'Arboreal' assemblages was based on pre-1994 Red Data Book criteria only, which reflects rarity based on the number of national records, rather than the post-2001 criteria which is based more on recorded decline. As such, brown hairstreak and the Sallow may have not been weighted for rarity value for the purposes of SQI analysis.

'Shaded Woodland Floor' was attributed with one nationally scarce species of short-palped crane fly (*Limonia trivittata*), Other species of recognised conservation value attributed at habitat-level included two nationally scarce species including the Lobe-spurred Furrow Bee and a jumping spider (*Sibianor aurocinctus*) attributed to 'Short Sward and Bare Ground',

Whilst the number of attributed species was relatively low, the SQI scores of 130 for 'Peatland' and 133, for the 'Running Water' were somewhat higher, indicating assemblages supporting a higher proportion of species of recognised conservation status. Of these, whilst the SQI for 'Peatland' was, at 130, far short of its favourable condition target of 180; the 'Running Water' SQI score of 133 was approaching the favourable condition threshold score of 150 set for this assemblage.

Two nationally scarce species of long-legged fly (*Dolichopodidae*) including *Achalcus bimaculatus* and *Dolichopus virgultorum* were attributed to 'Peatland' and a short-palped crane fly (*Limonia trivittata*) (also attributed to 'Shaded Woodland Floor') was attributed to 'Running water'.

Whilst the 'Wood decay' assemblage was not attributed with sufficient species to produce a robust SQI score, one nationally scarce species, the Brown Tree Ant (*Lasius brunneus*) was attributed to this group, though the other species attributed to this assemblage were generally widespread. Furthermore, a nationally scarce tumbling flower beetle (*Mordellistena variegata*), despite being known wood decay species, does not appear to be recognised in the current version of Pantheon. This species should be considered in terms of assessing the conservation value of the wood decay element of the site.

### **Specific Assemblage Types recorded for Area D**

In total, 12 SATs were recognised from Pantheon analysis of Area D invertebrate data. None of these comprised sufficient species counts to exceed their respective favourable condition thresholds within Pantheon. The largest number of species attributed to a single SAT for Area D was 12 attributed to the F002 'Rich flower-resource', this score approaching the favourable condition threshold of 14 set for this resource-based assemblage. The assemblage included the nationally scarce Lobe-spurred Furrow Bee, a species which may be subject to status revision due to an increase in records.

Whilst the species score of nine registered for A212 'Bark and sapwood decay' fell well short of the favourable condition target score of 19 set in Pantheon, the representation further reinforced the significance of 'Wood decay' assemblages on an overall site level. Whilst none of the species attributed to this SAT were of higher conservation status, the single species attributed to the closely related A211 'Heartwood decay' assemblage, was the nationally scarce Brown Tree Ant, previously mentioned in relation to the 'Wood decay' habitat-level assemblage.

The F001 'Scrub Edge' assemblage was also reasonably well represented within the output for Area D. Nine species in total were attributed to this assemblage, these included mainly common and widespread species, with the Dusky Cockroach, being the only nationally scarce species.

Although the remaining SATs were relatively poorly expressed within the Pantheon output for Area D, four species attributed to F003 'Scrub Heath and Moorland' included three relatively local species of spider including two orb-web spiders *Neoscona adianta* and *Agalenatea redii* and a crab spider (*Xysticus audax*). Whilst these

species are frequently associated with Moorland and heathland habitats, all three also occur in dry grasslands, especially in southeast England. The other species attributed to 'Scrub Heath and Moorland', was a mirid bug *Lygus pratensis*. Despite still awaiting status revision from RDB 3, *L. pratensis* has significantly increased both its UK range and broadened its habitat affinity in recent years. The species was formerly more confined to lowland heathland habitats.

The three species attributed to the F111 'Bare Sand and Chalk' SATs included the previously mentioned nationally scarce jumping spider (*Sibianor aurocinctus*) as well as two rhopalid bugs. The latter of these was, like its very similar sibling species, *S. abutilon*, considered to be 'extinct' in the UK as recently as 2000, but have since rapidly colonised much of south and central England.

The closely allied F112 'Open Short Sward' SAT was also attributed with three fairly local species including the two bugs, the Turtle Shieldbug (*Podops inuncta*) and a mirid bug (*Charagochilus gyllenhalii*) and a weevil (*Tychius meliloti*).

#### **5.7.4 Area E – South of Rusper Road and north of Ifield Golf Course**

Survey effort for Area E was lower than for the other survey areas due to access restrictions, resulting in an overall lower species count. Results of Pantheon analysis should therefore be considered with caution.

##### **Broad biotope level assemblages recorded for Area E**

From Pantheon analysis of the combined Ifield Area E dataset, the largest number of species recorded were attributed on a 'Broad biotope' level to the 'Open Habitat' category, with 126 species. Significantly fewer species were attributed at this level to the 'Tree Associated' and 'Wetland' assemblages, which were attributed with 38 and 22 species respectively.

The proportion of 'Open Habitat' species for Area E was somewhat greater in terms of percentage deployment between the three biotope level assemblages. Sixty eight percent of species were attributed to Open Habitats compared to 54 percent for Area A and the site as a whole. Unlike the other areas, none of the data collected for Area E was derived from sampling of aquatic habitats. As such, the percentage attributed to 'Wetland' habitats at biotope level would be expected to be relatively low. This assemblage was represented by 22 species or 12 percent of the overall data for Area E. However, the 'Tree Associated' assemblage, with 38 attributed species comprising 20 percent of the overall data was proportionately comparable to that recorded for Area C, another site from which 'Tree Associated' species were mainly obtained from hedgerow margins and standards rather than woodland *per se*.

Habitat within compartment 38 of Area E, comprised generally tall sward meadowland with structurally varied hedgerows with standards. The recorded species characterisation for Area E generally reflects the habitats present within the area.

##### **Habitat-level assemblages recorded for Area E**

From habitat-level Pantheon output data for Area E, two assemblages sufficiently robust to produce a SQI score were recorded. In common with the results for all other areas, by far the most strongly represented habitat-level assemblage was 'Tall Sward and Scrub', with 108 species, or 49 percent of all recorded species recognised in Pantheon from the Ifield data for Area D. This number of species was also attributed to the 'Tall Sward and Scrub' assemblage for Area C.

The only other robustly represented habitat-level assemblage resulting from Pantheon analysis of Area E data was the 'Arboreal' assemblage to which 25 species were attributed. The third most strongly represented habitat-level assemblage, 'Short Sward and Bare Ground' was represented by 14 species, marginally below the threshold of 15 species required for a robust SQI score.

Other habitat-level assemblages represented by too few species to be considered robust in the Pantheon output including 'Shaded Woodland Floor', 'Marshland', 'Peatland', 'Decaying Wood', 'Running Water' and 'Wet Woodland' assemblages.

As with other sites, the large proportion of species attributed to 'Tall Sward and Scrub' resulting from Pantheon analysis of Area E data reasonably reflected the target habitats and sampling effort. The sample sites collected

from compartment 38 were all from edge habitat, where there was a significant resource of tall sward grassland and unmanaged Scrub Edge habitat.

The field margins sampled also comprised mature woody habitat, with both hedgerow scrub species and mature trees. The hedgerow to the south of the site bordering Area A, the Ifield Golf Course, was relatively broad and supported trees and ground flora approximating to woodland.

Whilst no wetland habitat was sampled, the proximity of Area E to a range of wetland habitats, increased the likelihood of wetland species, including two-winged flies (Diptera) and other species with an affinity to wetland being represented within the samples.

In terms of SQI scores, both 'Tall Sward and Scrub' (SQI: 103) and 'Arboreal' (SQI: 100) assemblages returned low scores compared to the other areas. However, one nationally scarce species, the Dusky Cockroach, was attributed to 'Tall Sward and Scrub' and several other species including a species of pea weevil (*Coelositona cambricus*), an apionid weevil (*Eutrichapion ervi*), a rove beetle (*Stenus picipes*), two-winged flies including (*Geomyza subnigra*) (a species which was listed as nationally scarce in Falk (2016), *G. nartshukae* (which has been very sparsely recorded in the UK) and *G. balachowskyi*.

The 'Arboreal' assemblage for Area E, supported mainly common and widespread species. More local species included an orb-web spider (*Gibbaranea gibbosa*), the Acorn Weevil (*Curculio glandium*) and an arboreal leafhopper (*Lamprotettix nitidulus*).

Species attributed to the 'Short Sward and Bare Ground' habitat-level assemblage included solitary bees including Lobe-spurred Furrow Bee, Sharp-collared Furrow Bee, both species are classed as nationally scarce, but currently subject to a status review due to a recorded increase in the UK.

Whilst both 'Marshland' and 'Peatland' assemblages were insufficiently populated for robust SQI scores to be attributed, these assemblages 'Marshland' was attributed with a nationally scarce ground beetle (*Tachys bistriatus*) and 'Peatland' with a nationally scarce long-legged fly (*Dolichopus virgultorum*). The latter of these species was also recorded from several other survey sub-areas.

### **Specific Assemblage Types recorded for Area E**

In total, nine SATs were recognised from Pantheon analysis of Area E invertebrate data. These comprised sufficient species counts to exceed their respective favourable condition thresholds within Pantheon.

The largest number of species attributed to a single SAT for Area E was nine attributed to the F002 'Rich flower resource' SAT; however, this score fell well short of the favourable condition target score of 14 set in Pantheon for this assemblage. Bee species attributed to this assemblage for Area E included both Lobe-spurred Furrow Bee and Sharp-collared Furrow Bee mentioned above as well as local species such as Panzer's Nomad Bee (*Nomada panzeri*) and Least Furrow Bee (*Lasioglossum minutissimum*), both of which are largely restricted to southern England and South Wales.

The second most species were attributed to F001 'Scrub Edge' SAT with six species. The nationally scarce Dusky Cockroach, also attributed at a habitat-level to 'Tall Sward and Scrub' was the only species of note attributed to this assemblage.

For Area E, the F003 'Scrub Heath and Moorland' SAT was attributed with three species including the now widespread mirid bug *Lygus pratensis*, which is still classed as RDB3 despite a significant recorded increase, as well as fairly local spiders *Agalenatea redii* and *Dictynia latens*, both of which were recorded elsewhere on site.

Other SATs represented by one or two species recorded from Area E data included A212 'Bark and sapwood decay'; A215 'Epiphyte Fauna'; F112 'Open Short Sward' and W221 'Undisturbed fluctuating marsh'. None of the species attributed to these SATs were of recognised conservation status.

## 6 Evaluation

Invertebrate sampling conducted during the 2018 and 2019 field seasons targeted key invertebrate habitats identified during a scoping study conducted earlier in the summer, 2018. The target habitats included more flower-rich semi-improved grassland habitat as well as unmanaged hedgerows and scrub, broadleaved semi-natural woodland and aquatic habitats, including both ponds and riparian habitat of the River Mole and the Ifield Brook.

The survey areas are defined as Areas A, C, D and E. Area B defined prior to the initial scoping study was omitted following the survey stages (this area is not going to be impacted by the development). Samples were collected from each area at sufficient resolution to enable robust analysis of each area as a stand-alone unit. Within these, sampling effort was deployed between targeted habitats representative of the site as a whole and from defined ground, field and shrub/arboreal layers within each target habitat. Representative wetland habitats were also sampled using standard aquatic sampling techniques.

The robustness of sampling effort was reflected in the results and 719 species were recorded in total from the site. A breakdown of species into taxonomic orders showed a robust coverage of target species with the main groups including beetles (Coleoptera), true bugs (Hemiptera), two-winged flies (Diptera), spiders (Araneae) and bees, ants and wasps (Aculeate Hymenoptera) all being well represented. Within the major order Lepidoptera (butterflies and moths), whilst butterflies were well recorded during the survey, moths were recorded only incidentally, this group can only be surveyed accurately by means of overnight light-trapping.

From the survey as a whole, a total of 34 species of recognised conservation status were recorded, as well as around 97 species considered to be of local occurrence in the UK.

Species of higher conservation status recorded during the survey included one species currently classed as Red Data Book (RDB1) nationally 'endangered' under pre-1994 IUCN criteria; two species classed as nationally 'vulnerable' under post-2001 IUCN criteria; two species classed as RDB3 nationally 'rare' and three species classed in the 'near threatened' post-2001 IUCN category. Two species classed within the RDBK 'unknown' or Data Deficient (DD) categories were recorded, together with 22 species classed as nationally scarce in the UK.

In addition, four species are listed as S41 species; these include two priority species of butterfly: brown hairstreak and Small Heath and two species of moth (although these only have 'research' listed as a priority action).

The overall total of 34 of species of higher conservation status recorded from the site is large, indicating that the invertebrate fauna of the site as a whole is of higher conservation value<sup>8</sup>.

In terms of Pantheon output, on both an individual area and whole site basis, a significantly greater proportion of species were attributed to open habitats as opposed to tree-associated and wetland biotopes.

At habitat-level, 'Tall sward and shrub' habitat-level assemblage, was by far, the best represented assemblage across all areas as well as on a whole-site basis. Furthermore, whilst the SQI score recorded in Pantheon analysis for this assemblage was relatively low, both the greatest number of species of higher conservation value (10 species) and three of the rarest species recorded from the site were attributed to this assemblage. The 'Tall sward and shrub' assemblage comprises species associated with tall sward grasslands and with Scrub Edge mosaics of tall grassland, tall herbs and scrub.

Within the areas, this habitat was well represented within tall grassland margins and scrub/woodland interfaces of the Ifield Golf Course (Area A) and the tall sward margins, open meadowland and unmanaged hedgerow and woodland edge of Areas C, D and E. Rare species attributed to 'Tall sward and shrub' at habitat-level, but not expressed at SAT level included the RDB1 nationally 'endangered' picture-winged fly (*Acinia corniculata*), an RDB3 'rare' picture-winged fly (*Myopites inulaedyssentericae*) and RDB3 'rare' malachite beetle (*Axinotarsus pulicarius*).

The overall resource of shorter sward grassland was relatively limited compared to the taller sward resource on site. However, the number of uncommon species attributed to the 'Short Sward and Bare Ground' habitat-level

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<sup>8</sup> In 'Criteria used to define significance of invertebrate habitat' (Colin Plant Associates), sites supporting RDB1 'endangered' species were classed as being of 'International' importance.

assemblage on a site-level was the highest, relative to the overall number of attributed species, for any habitat-level assemblage recorded during the survey. Of the seven species of recognised conservation status attributed to this group in Pantheon, the RDB3 'rare' big-headed fly (*Tomosvaryella minima*) was the rarest. This species indicated the importance of dry, sandy habitat such as that within the Ifield Golf Course (Area A) in which it was found.

Although five species of recognised conservation value were recorded on a site level for 'Arboreal' habitat-level, this assemblage comprised the second highest number of species recorded from all but one of the surveyed sub-sites, the SQI in Pantheon was generally low. The presence of brown hairstreak within the 'Arboreal' assemblage, may elevate the perceived value of this assemblage due to the s41 and 'vulnerable' threat status.

SATs of importance recognised within the Pantheon analysis on a whole site level included A212 'Bark and sapwood decay' (20 species); F002 'Rich flower resource' (19 species); F001 'Scrub Edge' (18 species) and A215 'Epiphyte Fauna' (four species). These assemblages were all attributed with enough specialist species to achieve 'Favourable condition status'; however, these scores are likely to have been exaggerated by the non-standard number of samples collected on a whole site level.

From Pantheon analysis of Area A (Ifield Golf Course) data, two SATs F001 'Scrub Edge' and A215 'Epiphyte fauna' achieving 'Favourable Condition' status, were recorded. 'Bark and sapwood decay' did not quite achieve favourable condition status, this assemblage was also well represented within the Pantheon output for Area A.

These SATs are collectively elements of the scrub and woodland edge habitat within the Ifield Golf Course and elsewhere on the site, and according to Pantheon protocol, indicate that the 'Scrub Edge' and 'Epiphyte Fauna' assemblages occurring in Area A, are of or close to national importance and that the 'Bark and sapwood decay' assemblage is also significant being well represented in the Area A dataset.

Overall the wetland habitat assemblages supported generally fewer species of higher conservation value, the 'Marshland' assemblage for the whole site with one nationally scarce ground beetle (*Tachys bistriatus*), out of 76 species being attributed. The 'Peatland' assemblage was less strongly represented, with 44 recognised species, but with two attributed nationally scarce species of long-legged fly (*Achalcus bimaculatus*) and *Dolichopus virgultorum* was of slightly higher conservation value and the 24 species attributed to 'Running Water' included two species of higher conservation value including the 'Near Threatened' Scarce chaser (*Libellula fulva*) and a short-palped crane fly (*Limonia trivittata*).

Wetland assemblages were all poorly expressed at SAT level, with the species being distributed diffusely between a range of closely allied SATs. The presence of SAT species, however, indicates the presence of niches for habitat specialists within the overall wetland habitat, even if these are poorly expressed within the data.

Comparative assessment of the relative value of the different sample areas is not clear cut. Sixteen species of recognised conservation status were recorded from Area D, 15 from Area A (Ifield Golf Course); with somewhat fewer being recorded from Area C (seven species) and Area E (five species). The size of the sampling areas did vary between sample sites and so the lower number of species including rarities recorded from Areas C and E may, in part reflect sampling effort, although this is not considered to have impacted the veracity of the survey.

Area D arguably supported species of highest collective rarity value with two red data book picture-winged flies (*Tephritidae*), the RDB1 'endangered' *Acinia corniculata* and RDB3 'rare' *Myopites inulaedyssentericae*, together with the S41 'Species of principal importance' and nationally 'vulnerable' brown hairstreak and 11 nationally scarce species.

However, Area A supported a 'Near Threatened'/RDB3 big-headed fly (*Tomosvaryella minima*) and a very rare grass fly (*Lasiambia coxalis*) as well as 10 nationally scarce species.

National recorder Dr John Ismay (pers. com.) confirmed the identity of *Lasiambia coxalis*, recorded in Area A as being 'correct and a very good record' and stated that 'there are very few records' of this fly, 'mostly from extremely xeric (dry) sites from southern England with high grasshopper populations, which is the larval host.' *L. coxalis* is currently classed as DD 'Data deficient', but evidence suggests it may be very rare in the UK.

Area A was also the stand-out area in terms of Pantheon scores; supporting at habitat-level 'Short sward and scrub' assemblage of high conservation value as well as two SATs of or close to national significance including F001 'Scrub Edge' and A215 'Ephiphyte fauna', and a significant 'Bark and sapwood decay' assemblage.

Area C was particularly noteworthy for supporting a post-2001 'vulnerable' malachite beetle (*Anixotarsus pulicaria*), a considerable rarity as well as a RDBK 'unknown' grass fly, *Meromyza femorata* agg. and four nationally scarce species.

Area E, was the most poorly recorded site, but still supported five nationally scarce species, this being a respectable total would qualify this area as being of 'County' significance for invertebrates.

The baseline data collected allows the following information to be obtained:

- Which habitats on the site are of the highest conservation value of invertebrates;
- Which areas of the site are of highest value for invertebrates
- The value of the invertebrate assemblages within the site and within each area of the site;
- Key species on the site to be identified;
- Baseline data on the invertebrate assemblages supported by the site, which will allow the impact of any future intervention to be assessed.

These conclusions are presented in the next section of this report.

## 7 Conclusions

Although many of the open fields within the site supported arable crops and improved grassland habitat of relatively low conservation value, the site also supported a considerable resource of tall sward grassland, mature unmanaged Scrub Edge, hedgerow and broadleaved woodland. Wetland habitats including both the riparian corridors of Ifield Brook and the River Mole and several well vegetated ponds, were also a prominent feature of the site.

Collectively these habitats supported a large number of rare and nationally scarce invertebrate species, including species listed as S41 species. Wood decay habitat was well represented within the hedgerows and wooded areas of the site and whilst shorter sward grasslands constituted a relatively small resource over the site as a whole, this habitat supported an invertebrate assemblage of some conservation value.

From evaluation of the Pantheon output and in consideration of the number of species of high conservation value recorded the site as a whole should be regarded as being of at least regional conservation value for invertebrates, with Areas A and D approaching national importance.

### 7.1 Confirmation of habitats/species of higher conservation potential

Key findings of the 2018/19 Ifield detailed invertebrate survey are summarised as follows:

- 719 species were recorded from the site. Of these, 34 species of recognised conservation status in the UK were recorded including one species currently classed as Red Data Book (RDB1) nationally 'endangered' under pre-1994 IUCN criteria; two species classed as nationally 'vulnerable' under post-2001 IUCN criteria; two species classed as RDB3 nationally 'rare' and four species classed in the 'near threatened' post-2001 IUCN category. Two species classed within the RDBK 'unknown' or Data Deficient (DD) categories were recorded, together with 22 species classed as nationally scarce in the UK;
- From Pantheon analysis, at habitat-level the largest number of species were attributed to 'Tall Sward and Scrub' assemblage, with other significantly represented assemblages including, in order of number of attributed species: 'Arboreal', 'Marshland', 'Shaded Woodland Floor', 'Short Sward and Bare Ground', 'Peatland', 'Decaying Wood' and 'running water';
- The habitat-level assemblages of highest conservation value based on Pantheon criteria were 'Short Sward and Bare Ground' and 'Decaying Wood', which both achieved particularly high Species Quality Index (SQI) scores in relation to Area A (Ifield Golf Course);
- At a site level, three SATs including 'Bark and sapwood decay'; 'Rich flower resource'; 'Scrub Edge' and 'Epiphyte Fauna' achieved scores exceeding their favourable condition thresholds in Pantheon; however, these scores were derived from a non-standard (combined) dataset;
- From Pantheon analysis of Area A (Ifield Golf Course) data alone, two SATs F001 'Scrub Edge' and A215 'Ephiphyte fauna' achieved 'Favourable Condition' status, were recorded. 'Bark and sapwood decay' did not quite achieve favourable condition status at this level, but this assemblage was also well represented within the Pantheon output for Area A;
- On balance, in consideration of the overall species on site, the deployment of rarities and the Pantheon output, the habitats of highest value overall appear to include a combination of mature woodland/Scrub Edge (including wood decay habitat); and the associated tall and short grassland habitats; these were particularly well represented within the Ifield Golf Course (Area A) and within the hedgerows, woodland, scrub and grassland habitats of Area D;
- Although the wetland habitats were not as strongly expressed either in terms of Pantheon output or rarity value, the juxtaposition of wet and dry habitats on site is likely to be a significant underlying factor in relation to the site's overall value for invertebrates;
- The site as a whole can be considered to support an invertebrate assemblage of at least regional conservation value, whilst sub-site Areas C and E, both supported significant habitat and species of conservation value, Areas A and D were found to support assemblages and species of particularly high conservation value.

## 8 Mitigation recommendations and further work

### 8.1 Introduction

Significant habitat supporting invertebrates of high conservation value recorded during the survey included broad, field boundary grassland habitats, grading into uneven Scrub Edge and in places, small blocks of broadleaved woodland. These were particularly well represented in the grassy headlands and wooded margins and islands of the Ifield Golf Course (Area A) and the field margins of Area D (including habitat supporting brown hairstreak).

In contrast, much of the open areas of the site, particularly the interior, large arable fields of Area D and some of the large areas of improved grassland were of low conservation value for invertebrates.

In view of this, the possibility of maintaining as much of the mature hedgerow and scrub/woodland and associated grassy margins as possible within the context of the development should be given serious consideration. In addition, maintenance of the integrity of the site's existing wetland habitats, including the Ifield Brook and River Mole and where possible the ponds occurring within Ifield Golf Course and elsewhere on site should be a priority.

Corridor habitat should be subject to ongoing management sympathetic to the target assemblages including scrub-edge, grassland, arboreal and wood decay and wetland invertebrate assemblages including species such as the S41 'Species of principal importance' the brown hairstreak and other specialist invertebrates such as the RDB1 picture-winged flies *Acinia corniculata* and RDB3 *Myopites inulaedyssentericae* and other rarities recorded from the site.

*Acinia corniculata* is associated with Common Knapweed and Falk (1991) recommends that herb-rich grassland sites supporting *A. corniculata* should be managed by grazing and or cutting on rotation, with Common Knapweed left uncut until after seeds are set.

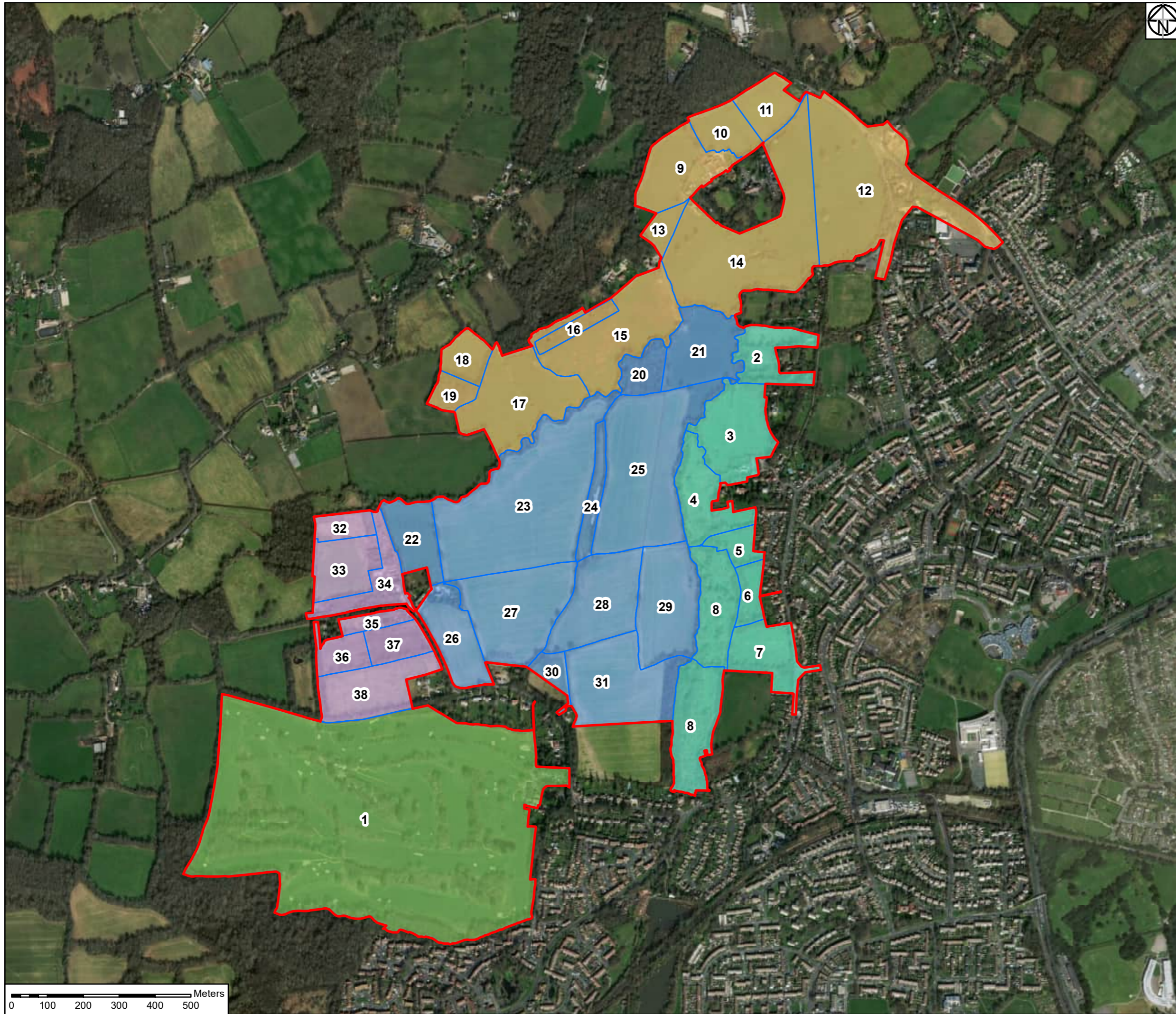
At the time of writing, it is understood that Area B, not assessed during the current survey is likely to be maintained and managed as mitigation for the proposed development. Management planning and actual management of this site should include appropriate measures to benefit invertebrate assemblages and uncommon species recorded during the current survey. brown hairstreak is also known to occur in this habitat, and appropriate Scrub Edge management should benefit this butterfly as well as other Scrub Edge species

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## Figure 1: Survey areas and compartment numbers

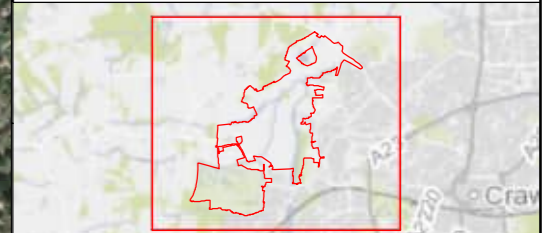


**Legend:**

- Site Boundary
- Site A
- Site B
- Site C
- Site D
- Site E
- Survey Zonations
- 1** Compartment Numbers

**Notes:**

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
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Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL

<p><b>Client</b></p> <p><b>Homes England</b></p> <p>Site Land West of Ifield</p>	<p>HOMES ENGLAND PROJECT: <b>LAND WEST OF IFIELD</b></p> <p>Client Homes England Eastbrook Shafesbury Road Cambridge CB2 8BF</p>
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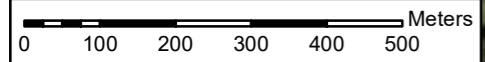
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**FIGURE 1:  
SURVEY AREAS AND  
COMPARTMENT NUMBERS**

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Checked	J. Norman	Date: 18OCT19	Signed
Approved	D. Lucey	Date: 18OCT19	Signed
Scale:	1:10,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10020728

Suitability Description:  
Issued for information

Drawing Number: \_\_\_\_\_ Revision: **P01**

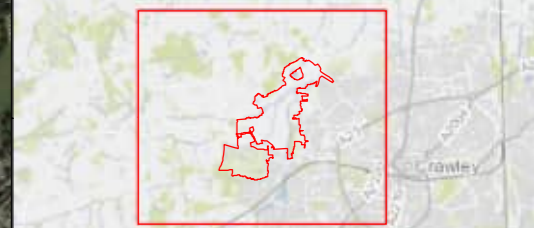


## Figure 2: Terrestrial invertebrate sample areas visit 1



**Legend:**

- Site Boundary
- Terrestrial Invertebrate Sample Location



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL

**Client**



**ENGLAND**  
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**Site**  
Land West of Ifield

**Client**  
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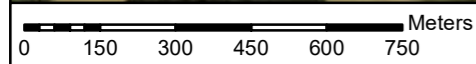
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**TITLE:**

**FIGURE 2:  
TERRESTRIAL INVERTEBRATE  
SAMPLE AREAS VISIT 1**

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Approved	D. Lucey	Date	18OCT19	Signed
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Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	10020728	

Suitability Description:  
Issued for information

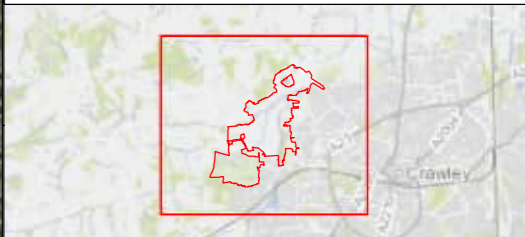


### **Figure 3: Terrestrial invertebrate sample sites visit 2**



**Legend:**

- Site Boundary
- Terrestrial Invertebrate Sample Location



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL


**Client**



**ENGLAND**  
PROJECT:  
**LAND WEST OF IFIELD**

**Site**  
Land West of Ifield

**Client**  
Homes England  
Eastbrook  
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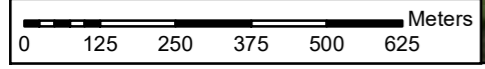
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**FIGURE 3:  
TERRESTRIAL INVERTEBRATE  
SAMPLE SITES VISIT 2**

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Approved	D. Lucey	Date	18OCT19	Signed
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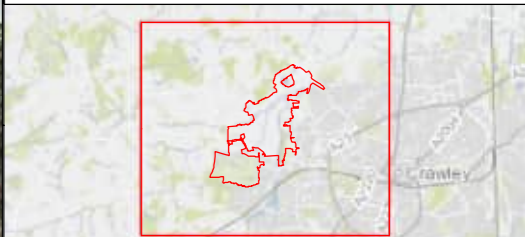


## Figure 4: Terrestrial invertebrate sample sites visit 3



**Legend:**

- Site Boundary
- Terrestrial Invertebrate Sample Location



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL


**Client**



**HOMES ENGLAND**  
PROJECT:  
**LAND WEST OF IFIELD**

**Site**  
Land West of Ifield

**Client**  
Homes England  
Eastbrook  
Shaftebury Road  
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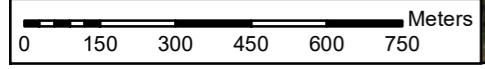
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**FIGURE 4:  
TERRESTRIAL INVERTEBRATE  
SAMPLE SITES VISIT 3**

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Checked	J. Norman	Date	18OCT19	Signed
Approved	D. Lucey	Date	18OCT19	Signed
Scale:	1:15,000	Datum:	AOD	
Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	10020728	

Suitability Description:  
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Drawing Number: \_\_\_\_\_ Revision: **P01**

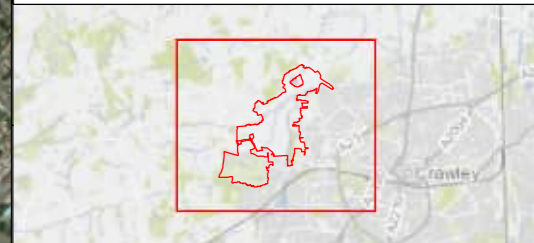


## Figure 5: 2018 aquatic invertebrate sample sites visit 1



**Legend:**

- Site Boundary
- Aquatic Invertebrate Sample Location



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL

<p><b>Client</b></p> <p><b>Homes England</b></p> <p><b>Site</b> Land West of Ifield</p>	<p><b>HOMES ENGLAND</b> <b>PROJECT:</b> <b>LAND WEST OF IFIELD</b></p> <p><b>Client</b> Homes England Eastbrook Shaftebury Road Cambridge CB2 8BF</p>
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**TITLE:**

**FIGURE 5:  
2018 AQUATIC INVERTEBRATE  
SAMPLE SITES VISIT 1**

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Checked	J. Norman	Date: 18OCT19	Signed
Approved	D. Lucey	Date: 18OCT19	Signed
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Suitability Description: Issued for information

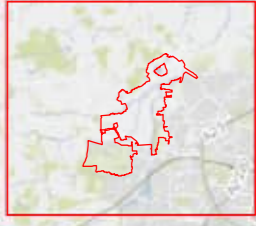


## Figure 6: 2018 aquatic invertebrate sample sites visit 2



**Legend:**

- Site Boundary
- Aquatic Invertebrate Sample Location



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL

**Client**



Site  
Land West of field

HOMES ENGLAND  
PROJECT:  
**LAND WEST OF IFIELD**

Client  
Homes England  
Eastbrook  
Shalford Road  
Cambridge  
CB2 8BF



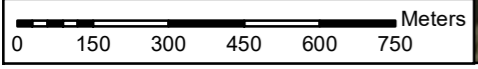
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TITLE:  
**FIGURE 6:  
2018 AQUATIC INVERTEBRATE  
SAMPLE SITES VISIT 2**

Drawn	S. Pradeepa	Date	18OCT19	Signed
Checked	J. Norman	Date	18OCT19	Signed
Approved	D. Lucey	Date	18OCT19	Signed
Scale:	1:15,000	Datum:	AOD	
Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	10020728	

Suitability Description:  
**Issued for information**

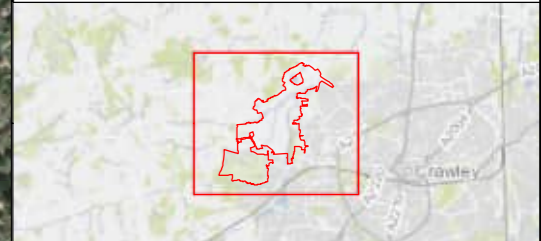


## Figure 7: Brown hairstreak survey transect route



**Legend:**

- Site Boundary
- Brown Hairstreak Survey Transect Route



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL

<p><b>Client</b></p> <p><b>Site</b> Land West of Ifield</p>	<p>HOMES ENGLAND PROJECT: <b>LAND WEST OF IFIELD</b></p> <p><b>Client</b> Homes England Eastbrook Shafesbury Road Cambridge CB2 8BF</p>
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**FIGURE 7:  
BROWN HAIRSTREAK SURVEY  
TRANSECT ROUTE**

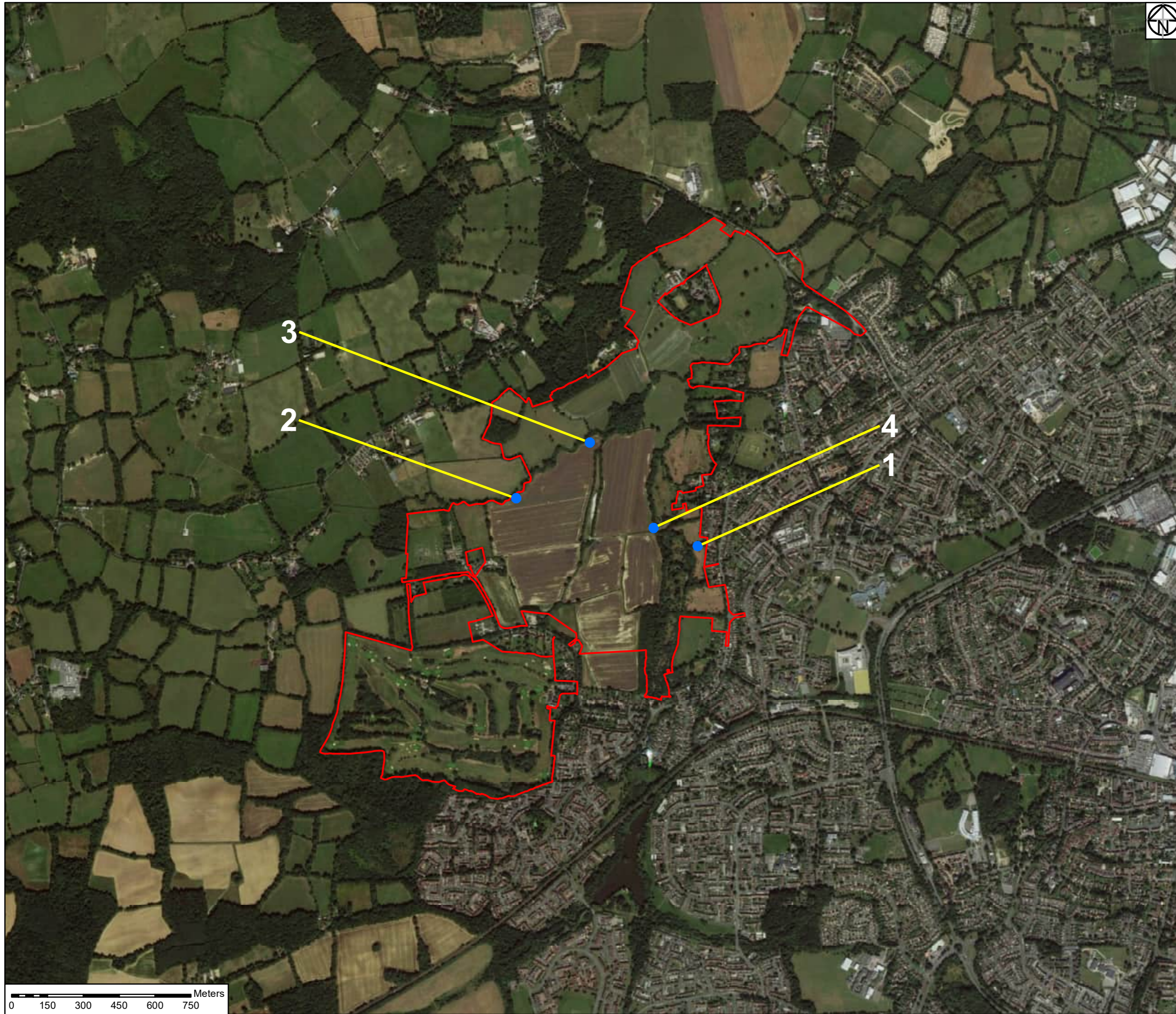
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Approved	D. Lucey	Date	18OCT19	Signed
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Suitability Description: Issued for information

Drawing Number: \_\_\_\_\_ Revision: **P01**

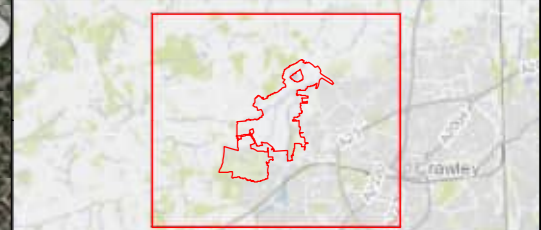


## Figure 8: Brown hairstreak observation locations



**Legend:**

- Site Boundary
- Brown Hairstreak Observation Location



Rev	Date	Description	Drawn	Check	Approv
P01	18/10/19	First Issue	SP	JN	DL

**Client**



**Homes England**

**Site**

Land West of Ifield

**HOMES ENGLAND**  
PROJECT:  
**LAND WEST OF IFIELD**

**Client**

Homes England  
Eastbrook  
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**TITLE:**

**FIGURE 8:  
BROWN HAIRSTREAK  
OBSERVATION LOCATIONS**

Drawn	S. Pradeepa	Date: 18OCT19	Signed
Checked	J. Norman	Date: 18OCT19	Signed
Approved	D. Lucey	Date: 18OCT19	Signed
Scale:	1:15,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10020728

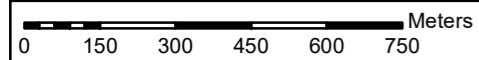
Suitability Description:

Issued for information

Drawing Number:

Revision:

**P01**



## APPENDIX A: Tables

Table 1 – 2018-19 samples collected per sample site and sample method

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
A	AQ1.7	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	26/07/2018	Standing Water	Aquatic
A	AQ1.8	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	26/07/2018	Standing Water	Aquatic
A	AQ1.9	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	26/07/2018	Standing Water	Aquatic
A	AQ2.1	Sifting		28/05/2019	Pond	Aquatic
A	AQ2.2	Sifting		28/05/2019	Small pond	Aquatic
A	AQ2.3	Sifting		29/05/2019	Large Golf Course pond	Aquatic
A	AQ2.4	Sifting		29/05/2019	Large Golf Course pond	Aquatic
A	Sw1 (A1.1)	Sweeping	10 mins	03/07/2018	Meadow edge of Golf Course	Field layer
A	SW2 (A1.4)	Sweeping	10 mins	03/07/2018	Neutral grassland scattered scrub mosaic	Field layer
A	Sw3 (A1.9)	Sweeping	10 mins	03/07/2018	Broadleaved woodland	Field layer
A	Sw4 (A1.11)	Sweeping	10 mins	03/07/2018	Broadleaved woodland	Field layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
A	Sw1 (A2.1)	Sweeping	10mins	04/09/2018	Broadleaved woodland	Field layer
A	B2 (A2.7)	Sweeping	15 mins	04/09/2018	Broadleaved woodland	Field layer
A	Sw2 (A2.2)	Sweeping	10 mins	04/09/2018	Broadleaved woodland	Field layer
A	Sw3 (A2.8)	Sweeping	10 mins	04/09/2018	Neutral grassland	Field layer
A	Sw4 (A2.10)	Sweeping	10 mins	04/09/2018	Rough grassland	Field layer
A	A3.2	Sweeping	10 mins	07/05/2019	Rough grassland	Field layer
A	A3.3	Sweeping	10 mins	07/05/2019	Waste land patch in the centre of Golf Course. Open mosaic style habitat with rubble piles and piles of different sediment with natural colonisation of pioneer vegetation. ruderal vegetation also present. Hedges and trees either side.	Field layer
A	Vac1 (A1.3)	Vacuum sampling	2 mins	03/07/2018	Hedgerow	Ground layer
A	Vac2 (A1.5)	Vacuum sampling	2 mins	03/07/2018	Neutral grassland scattered scrub mosaic	Ground layer
A	Vac3 (A1.10)	Vacuum sampling	2 mins	03/07/2018	Broadleaved woodland	Ground layer
A	Vac4 (A1.12)	Vacuum sampling	2 mins	03/07/2018	Broadleaved woodland	Ground layer
A	Vac2 (A2.2)	Vacuum sampling	2 mins	04/09/2018	Broadleaved woodland	Ground layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
A	Vac 1 (A2.4)	Vacuum sampling	2 mins	04/09/2018	Broadleaved woodland	Ground layer
A	Vac3 (A2.9)	Vacuum sampling	2 mins	04/09/2018	Neutral grassland	Ground layer
A	Vac 4 (A2.3)	Vacuum sampling	2 mins	04/09/2018	Rough grassland	Ground layer
A	A3.1	Vacuum sampling	2 mins	07/05/2019	Rough grassland	Ground layer
A	A3.4	Vacuum sampling	2 mins	07/05/2019	Waste land patch in the centre of Golf Course. Open mosaic style habitat with rubble piles and piles of different sediment with natural colonisation of pioneer vegetation. ruderal vegetation also present. Hedges and trees either side.	Ground layer
A	A3.5	Vacuum sampling	2 mins	09/05/2019	Woodland edge	Ground layer
A	A3.7	Vacuum sampling	2 mins	09/05/2019	Woodland edge	Ground layer
A	A3.9	Vacuum sampling	2 mins	09/05/2019	Woodland edge	Ground layer
A	B1 (A1.2)	Beating	15 mins	03/07/2018	Meadow edge of Golf Course	Shrub/arboreal
A	B2 (A1.6)	Beating	15 mins	03/07/2018	Neutral grassland scattered scrub mosaic	Shrub/arboreal
A	B3 (A1.8)	Beating	15 mins	03/07/2018	Broadleaved woodland	Shrub/arboreal
A	B4 (A1.13)	Beating	15 mins	03/07/2018	Broadleaved woodland	Shrub/arboreal
A	B1 (A2.5)	Beating	15 mins	04/09/2018	Broadleaved woodland	Shrub/arboreal

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
A	A3.6	Beating	15 mins	09/05/2019	Woodland edge	Shrub/arboreal
A	A3.8	Beating	15 mins	09/05/2019	Woodland edge	Shrub/arboreal
A	A3.10	Beating	15 mins	09/05/2019	Woodland edge	Shrub/arboreal
A	Ds1 (A1.7)	Direct Search	15 mins	03/07/2018	Meadow edge of Golf Course	Various
A	Ds2 (A1.7)	Direct Search	15 mins	03/07/2018	Neutral grassland scattered scrub mosaic	Various
B	SW1 (B1.1)	Sweeping	10 mins	04/07/2018	Semi improved neutral grassland	Field layer
B	SW2 (B1.5)	Sweeping	10 mins	04/07/2018	Broadleaved woodland	Field layer
B	SW3 (B1.7)	Sweeping	10 mins	04/07/2018	Semi improved neutral grassland. Scattered trees/ scrub	Field layer
B	SW4 (B1.11)	Sweeping	10 mins	04/07/2018	Broadleaved woodland	Field layer
B	Sw1 (B2.2)	Sweeping	10 mins	30/08/2018	Woodland edge / neutral grassland	Field layer
B	Sw2 (B2.3)	Sweeping	10 mins	30/08/2018	Neutral grassland	Field layer
B	B3.5	Sweeping	10 mins	07/05/2019	Grassland and scrub largely	Field layer
B	B3.2	Sweeping	10 mins	07/05/2019	Bare earth path with grassland either side with trees beyond this.	Field layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
B	Vac1 (B1.3)	Vacuum sampling	2 mins	04/07/2018	Semi improved neutral grassland	Ground layer
B	Vac2 (B1.6)	Vacuum sampling	2 mins	04/07/2018	Broadleaved woodland	Ground layer
B	Vac3 (B1.8)	Vacuum sampling	2 mins	04/07/2018	Semi improved neutral grassland. Scattered trees/ scrub	Ground layer
B	Vac4 (B1.12)	Vacuum sampling	2 mins	04/07/2018	Broadleaved woodland	Ground layer
B	Vac1 (B2.1)	Vacuum sampling	2 mins	30/08/2018	Woodland edge / neutral grassland	Ground layer
B	Vac2 (B2.5)	Vacuum sampling	2 mins	30/08/2018	Neutral grassland	Ground layer
B	B3.3	Vacuum sampling	2 mins	07/05/2019	Grassland and scrub largely	Ground layer
B	B3.1	Vacuum sampling	2 mins	07/05/2019	Bare earth path with grassland either side with trees beyond this.	Ground layer
B	B1 (B1.2)	Beating	15 mins	04/07/2018	Semi improved neutral grassland	Shrub/arboreal
B	B2 (B1.4)	Beating	15 mins	04/07/2018	Broadleaved woodland	Shrub/arboreal
B	B3 (B1.9)	Beating	2 mins	04/07/2018	Semi improved neutral grassland. Scattered trees/ scrub	Shrub/arboreal
B	B4 (B1.10)	Beating	15 mins	04/07/2018	Broadleaved woodland	Shrub/arboreal

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
B	B1 (B2.4)	Beating	15 mins	30/08/2018	Dense scrub and scattered broadleaved trees	Shrub/arboreal
B	B2 (B2.6)	Beating	15 mins	30/08/2018	Woodland edge	Shrub/arboreal
B	B3.4	Beating	15 mins	07/05/2019	Grassland and scrub largely	Shrub/arboreal
C	AQ1.1	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	25/07/2018	Standing water	Aquatic
C	AQ2.5	Sifting		29/05/2019	Large farmland pond	Aquatic
C	SW1 (C1.1)	Sweeping	10 mins	04/07/2018	Hay meadow	Field layer
C	SW2 (C1.4)	Sweeping	10 mins	04/07/2018	Hay meadow with Scrub Edge and bordering broadleaved woodland	Field layer
C	SW3 (C1.5)	Sweeping	10 mins	05/07/2018	Broadleaved woodland	Field layer
C	SW1 (C2.1)	Sweeping	10 mins	05/09/2018	Broadleaved woodland	Field layer
C	Vac1 (C1.2)	Vacuum sampling	2 mins	04/07/2018	Hay meadow	Ground layer
C	Vac3 (C1.8)	Vacuum sampling	2 mins	04/07/2018	Hay meadow with Scrub Edge and bordering broadleaved woodland	Ground layer
C	Vac3 (C1.7)	Vacuum sampling	2 mins	05/07/2018	Broadleaved woodland	Ground layer
C	Vac1 (C2.2)	Vacuum sampling	2 mins	05/09/2018	Broadleaved woodland	Ground layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
C	B2 (C1.3)	Beating	15 mins	04/07/2018	Hay meadow with Scrub Edge and bordering broadleaved woodland	Shrub/arboreal
C	B2 (C1.6)	Beating	15 mins	05/07/2018	Broadleaved woodland	Shrub/arboreal
C	B1 (C2.3)	Beating	15 mins	05/09/2018	Woodland edge	Shrub/arboreal
C	C3.1	Beating	15 mins	07/05/2019	Dense largely Hawthorn hedge	Shrub/arboreal
C	DS1 (C2.4)			08/05/2018	Whole area	Various
C/D	AQ1.2	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	25/07/2018	Running Water	Aquatic
C/D	AQ1.3	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	25/07/2018	Running Water	Aquatic
C/D	AQ1.4	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	25/07/2018	Running Water	Aquatic
C/D	AQ2.8	Sifting		29/05/2019	River mole	Aquatic
C/D	AQ2.9	Sifting		29/05/2019	River mole	Aquatic
D	DS1 (D1.9)	Sifting	15 mins	05/07/2018	Broadleaved woodland	Aquatic

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
D	AQ1.5	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	25/07/2018	Running Water	Aquatic
D	AQ1.6	Pond netting	4 minute sampling method (3 mins sampling, 1 min direct searching)	25/07/2018	Running Water	Aquatic
D	AQ2.6	Sifting		29/05/2019	Ifield brook. Shallow stream with relatively slow moving water.	Aquatic
D	AQ2.7	Sifting		29/05/2019	Ifield brook. Shallow stream with relatively slow moving water.	Aquatic
D	SW1 (D1.2)	Sweeping	10 mins	05/07/2018	Semi improved neutral grassland	Field layer
D	SW2 (D1.6)	Sweeping	10 mins	05/07/2018	Woodland edge / arable field margin	Field layer
D	SW3 (D1.8)	Sweeping	2 mins	05/07/2018	Broadleaved woodland	Field layer
D	SW4 (D1.10)	Sweeping	10 mins	05/07/2018	Arable field margin / ruderal edge of wooded strip	Field layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
D	SW5 (D1.14)	Sweeping	10 mins	05/07/2018	Semi improved neutral grassland, elements of marshy grassland. Bordered by dense unmanaged hedgerows with mature oak standards	Field layer
D	Sw1 (D2.1)	Sweeping	20 mins	03/09/2018	Neutral grassland	Field layer
D	Sw2 (D2.5)	Sweeping	10mins	03/09/2018	Broadleaved woodland	Field layer
D	Vac2 (D2.7)	Sweeping	2mins	05/09/2018	Broadleaved woodland	Field layer
D	D3.2	Sweeping	10 mins	07/05/2019	Woodland	Field layer
D	D3.5	Sweeping	10 mins	07/05/2019	Wet meadow bordered by largely Blackthorn hedge	Field layer
D	Vac1 (D1.3)	Vacuum sampling	10 mins	05/07/2018	Semi improved neutral grassland	Ground layer
D	Vac 2 (D1.5)	Vacuum sampling	2 mins	05/07/2018	Woodland edge / arable field margin	Ground layer
D	Vac3 (D1.7)	Vacuum sampling	2 mins	05/07/2018	Broadleaved woodland	Ground layer
D	Vac4 (D1.12)	Vacuum sampling	2 mins	05/07/2018	Arable field margin / ruderal edge of wooded strip	Ground layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
D	Vac5 (D1.15)	Vacuum sampling	10 mins	05/07/2018	Semi improved neutral grassland, elements of marshy grassland. Bordered by dense unmanaged hedgerows with mature oak standards	Ground layer
D	Vac1 (D2.2)	Vacuum sampling	2 mins	03/09/2018	Neutral grassland	Ground layer
D	Vac3 (D2.10)	Vacuum sampling	2 mins	05/09/2018	Neutral grassland	Ground layer
D	D3.1	Vacuum sampling	2 mins	07/05/2019	Woodland	Ground layer
D	D3.4	Vacuum sampling	2 mins	07/05/2019	Wet meadow bordered by largely Blackthorn hedge	Ground layer
D	B1 (D1.1)	Beating	15 mins	05/07/2018	Hedgerow	Shrub/arboreal
D	B2 (D1.4)	Beating	15 mins	05/07/2018	Woodland/Scrub Edge	Shrub/arboreal
D	B3 (D1.10)	Beating	15 mins	05/07/2018	Broadleaved woodland	Shrub/arboreal
D	B4 (D1.11)	Beating	15 mins	05/07/2018	Arable field margin / ruderal edge of wooded strip	Shrub/arboreal

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
D	B5 (D1.13)	Beating	15 mins	05/07/2018	Semi improved neutral grassland, elements of marshy grassland. Bordered by dense unmanaged hedgerows with mature oak standards	Shrub/arboreal
D	B1 (D2.9)	Beating	15 mins	29/08/2018	Unmanaged hedgerow	Shrub/arboreal
D	B2 (D2.4)	Beating	15mins	29/08/2018	Woodland edge	Shrub/arboreal
D	B1 (D2.3)	Beating	15 mins	03/09/2018	Neutral grassland	Shrub/arboreal
D	B4 (D2.6)	Beating	15 mins	03/09/2018	Broadleaved woodland	Shrub/arboreal
D	D3.3	Beating	15 mins	07/05/2019	Woodland	Shrub/arboreal
D	D3.6	Beating	15 mins	07/05/2019	Wet meadow bordered by largely blackthorn hedge	Shrub/arboreal
D	DS1 (D1.16)	Direct Search	1 hour total	05/07/2018	Arable field margins	Various
E	SW1 (E1.1)	Sweeping	10 mins	06/07/2018	Poor semi improved neutral grassland (recently cut) bordered by tree line and dense scrub on all sides	Field layer

Sample area	Sample code	Sample method	Sampling time	Sample date	Broad habitat	Habitat layer surveyed
E	Sw1 (E2.2)	Sweeping	10 mins	28/08/2018	Unmown semi improved grassland/ tall ruderal	Field layer
E	Vac1 (E1.3)	Vacuum sampling	2 mins	06/07/2018	Poor semi improved neutral grassland (recently cut) bordered by tree line and dense scrub on all sides	Ground layer
E	Vac2 (E2.3)	Vacuum sampling	2 mins	28/08/2018	Unmown semi improved grassland/ tall ruderal	Ground layer
E	B1 (E1.2)	Beating	15 mins	06/07/2018	Poor semi improved neutral grassland (recently cut) bordered by tree line and dense scrub on all sides	Shrub/arboreal
E	B1+2 (E2.1)	Beating	30 mins	28/08/2018	Unmanaged hedgerow	Shrub/arboreal
E	Ds1 (E1.4)	Direct Search	15 mins	06/07/2018	Poor semi improved neutral grassland (recently cut) bordered by tree line and dense scrub on all sides	Various
E	DS1 (E2.4)			28/08/2018	Various	Various

Table 2 – 2018-19 Species recorded per higher taxon

Higher Taxon	Vernacular	Number of species per taxon
Coleoptera	Beetles	198
Diptera	Two-winged Flies	159
Hemiptera	True Bugs	141
Araneae	Spiders	100
Aculeate Hymenoptera	Bees, Ants, Wasps	32
Lepidoptera	Butterflies and moths	23
Orthoptera	Grasshoppers and Crickets	11
Opiliones	Harvestmen	9
Trichoptera	Caddis flies	8
Odonata	Dragonflies and damselflies	6
Isopoda	Woodlice and Slaters	6
Gastropoda	Freshwater snails	5
Amphipoda	Freshwater shrimps	3
Bivalvia	Freshwater mussels	3
Lithobiomorpha	Stone centipedes	3
Pseudoscorpions	Pseudoscorpiones	3
Ephemeroptera	Mayflies	2
Rhynchobdellida	Freshwater leeches	2
Dermaptera	Earwigs	1
Decapoda	Crayfish	1
Dictyoptera	Cockroaches	1
Glomerida	Pill Millipedes	1
Megaloptera	Alderflies	1
	Total	719

Table 3 – Invertebrate species recorded 2018-19 Ifield survey

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
<b>Beetles (Coleoptera)</b>									
A woodworm beetle	<i>Anobium inexpectatum</i>	Anobiidae	Coleoptera	Nationally Scarce (Nb)	x				
A woodworm beetle	<i>Anobium punctatum</i>	Anobiidae	Coleoptera	Widespread				x	
An ant-like flower beetle	<i>Anthicus antherinus</i>	Anthicidae	Coleoptera	Local			x		
An apionid weevil	<i>Aspidapion radiolus</i>	Apionidae	Coleoptera	Local	x				
An apionid weevil	<i>Betulapion simile</i>	Apionidae	Coleoptera	Local	x			x	
An apionid weevil	<i>Ceratapion onopordi</i>	Apionidae	Coleoptera	Widespread	x				
An apionid weevil	<i>Eutrichapion ervi</i>	Apionidae	Coleoptera	Widespread			x	x	x
An apionid weevil	<i>Ischnopterapion loti</i>	Apionidae	Coleoptera	Widespread	x			x	x
An apionid weevil	<i>Ischnopterapion virens</i>	Apionidae	Coleoptera	Widespread	x		x		x
Dog's Mercury Seed Weevil	<i>Kalcapion pallipes</i>	Apionidae	Coleoptera	Local				x	
An apionid weevil	<i>Oxystoma subulatum</i>	Apionidae	Coleoptera	Local	x				
An apionid weevil	<i>Perapion curtirostre</i>	Apionidae	Coleoptera	Widespread	x				x
An apionid weevil	<i>Perapion hydrolapathi</i>	Apionidae	Coleoptera	Widespread					x
An apionid weevil	<i>Perapion violaceum</i>	Apionidae	Coleoptera	Widespread			x	x	x
An apionid weevil	<i>Protapion assimile</i>	Apionidae	Coleoptera	Widespread	x		x	x	

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
An apionid weevil	<i>Protapion difforme</i>	Apionidae	Coleoptera	Nationally Scarce (Nb)			x		
An apionid weevil	<i>Protapion fulvipes</i>	Apionidae	Coleoptera	Widespread	x		x	x	
An apionid weevil	<i>Protapion nigritarse</i>	Apionidae	Coleoptera	Widespread			x		
An apionid weevil	<i>Protapion trifolii</i>	Apionidae	Coleoptera	Widespread	x		x		
A jewel beetle	<i>Agrilus laticornis</i>	Buprestidae	Coleoptera	Local	x				
A byturid beetle	<i>Byturus ochraceus</i>	Byturidae	Coleoptera	Widespread				x	
A malachite beetle	<i>Axinotarsus marginalis</i>	Cantharidae	Coleoptera	Recent UK colonist	x				
A soldier beetle	<i>Cantharis decipiens</i>	Cantharidae	Coleoptera	Widespread	x			x	
A soldier beetle	<i>Cantharis lateralis</i>	Cantharidae	Coleoptera	Widespread	x		x		
A soldier beetle	<i>Cantharis livida</i>	Cantharidae	Coleoptera	Widespread	x				
A soldier beetle	<i>Cantharis nigra</i>	Cantharidae	Coleoptera	Widespread	x		x	x	
A soldier beetle	<i>Cantharis nigricans</i>	Cantharidae	Coleoptera	Widespread	x				
A soldier beetle	<i>Cantharis rufa</i>	Cantharidae	Coleoptera	Widespread				x	
A soldier beetle	<i>Malthinus seriepunctatus</i>	Cantharidae	Coleoptera	Widespread	x				
A soldier beetle	<i>Malthodes fuscus</i>	Cantharidae	Coleoptera	Local	x				
A soldier beetle	<i>Malthodes minimus</i>	Cantharidae	Coleoptera	Widespread	x			x	
A soldier beetle	<i>Rhagonycha fulva</i>	Cantharidae	Coleoptera	Widespread	x		x	x	x

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A soldier beetle	<i>Rhagonycha lignosa</i>	Cantharidae	Coleoptera	Widespread	x				
A soldier beetle	<i>Rhagonycha limbata</i>	Cantharidae	Coleoptera	Widespread	x				
A ground beetle	<i>Amara lunicollis</i>	Carabidae	Coleoptera	Widespread				x	
A ground beetle	<i>Amara plebeja</i>	Carabidae	Coleoptera	Widespread				x	
A ground beetle	<i>Badister bullatus</i>	Carabidae	Coleoptera	Widespread	x				
A ground beetle	<i>Bembidion guttula</i>	Carabidae	Coleoptera	Widespread			x	x	x
A ground beetle	<i>Bembidion lampros</i>	Carabidae	Coleoptera	Widespread					x
A ground beetle	<i>Bembidion lunulatum</i>	Carabidae	Coleoptera	Widespread	x				
A ground beetle	<i>Bembidion mannerheimii</i>	Carabidae	Coleoptera	Widespread	x				
A ground beetle	<i>Bembidion properans</i>	Carabidae	Coleoptera	Widespread	x				x
A ground beetle	<i>Bembidion tetracolum</i>	Carabidae	Coleoptera	Widespread	x				
A ground beetle	<i>Demetrias atricapillus</i>	Carabidae	Coleoptera	Widespread	x			x	x
A ground beetle	<i>Notiophilus biguttatus</i>	Carabidae	Coleoptera	Widespread	x		x		
A ground beetle	<i>Notiophilus substriatus</i>	Carabidae	Coleoptera	Widespread	x			x	
A ground beetle	<i>Paradromius linearis</i>	Carabidae	Coleoptera	Widespread	x		x	x	x
A ground beetle	<i>Philorhizus melanocephalus</i>	Carabidae	Coleoptera	Widespread	x				
A ground beetle	<i>Syntomus foveatus</i>	Carabidae	Coleoptera	Widespread			x		

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A ground beetle	<i>Syntomus obscuroguttatus</i>	Carabidae	Coleoptera	Widespread			x	x	x
A ground beetle	<i>Tachys bistratus</i>	Carabidae	Coleoptera	Nationally Scarce					x
A ground beetle	<i>Trechus quadristriatus</i>	Carabidae	Coleoptera	Widespread				x	
Common Grammoptera	<i>Grammoptera ruficornis</i>	Cerambycidae	Coleoptera	Widespread	x		x	x	
A flea beetle	<i>Altica lythri</i>	Chrysomelidae	Coleoptera	Widespread	x			x	x
A flea beetle	<i>Aphthona euphorbiae</i>	Chrysomelidae	Coleoptera	Widespread	x				
A seed beetle	<i>Bruchidius varius</i>	Chrysomelidae	Coleoptera	Recent UK colonist (widely scattered)			x		
A flea beetle	<i>Chaetocnema arida</i>	Chrysomelidae	Coleoptera	Widely scattered	x		x	x	
A flea beetle	<i>Chaetocnema concinna</i>	Chrysomelidae	Coleoptera	Widespread			x		x
A flea beetle	<i>Chaetocnema hortensis</i>	Chrysomelidae	Coleoptera	Widespread	x		x	x	x
A flea beetle	<i>Crepidodera aurata</i>	Chrysomelidae	Coleoptera	Widespread	x			x	x
A flea beetle	<i>Crepidodera fulvicornis</i>	Chrysomelidae	Coleoptera	Widespread				x	x
A flea beetle	<i>Crepidodera plutus</i>	Chrysomelidae	Coleoptera	Local	x				
A leaf beetle	<i>Cryptocephalus pusillus</i>	Chrysomelidae	Coleoptera	Widespread	x			x	
A leaf beetle	<i>Galerucella nymphaeae</i>	Chrysomelidae	Coleoptera	Widespread	x				
A leaf beetle	<i>Lochmaea crataegi</i>	Chrysomelidae	Coleoptera	Widespread	x				
A flea beetle	<i>Longitarsus atricillus</i>	Chrysomelidae	Coleoptera	Widespread	x		x		x

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A flea beetle	<i>Longitarsus gracilis var poweri</i>	Chrysomelidae	Coleoptera	Widespread	x				
A flea beetle	<i>Longitarsus kutcheriae</i>	Chrysomelidae	Coleoptera	Local				x	x
A flea beetle	<i>Longitarsus luridus</i>	Chrysomelidae	Coleoptera	Widespread				x	x
A flea beetle	<i>Longitarsus melanocephalus</i>	Chrysomelidae	Coleoptera	Widespread	x				
A flea beetle	<i>Neocrepidodera transversa</i>	Chrysomelidae	Coleoptera	Widespread			x		
A leaf beetle	<i>Oulema obscura</i>	Chrysomelidae	Coleoptera	Widespread	x		x		
A flea beetle	<i>Phyllotreta atra</i>	Chrysomelidae	Coleoptera	Widespread				x	
A flea beetle	<i>Phyllotreta exclamationis</i>	Chrysomelidae	Coleoptera	Widespread					x
A flea beetle	<i>Phyllotreta ochripes</i>	Chrysomelidae	Coleoptera	Widespread				x	
A flea beetle	<i>Sphaeroderma rubidum</i>	Chrysomelidae	Coleoptera	Widespread			x	x	x
10-spot Ladybird	<i>Adalia decempunctata</i>	Coccinellidae	Coleoptera	Widespread	x				
Cream-spot Ladybird	<i>Calvia quattuordecimguttata</i>	Coccinellidae	Coleoptera	Widespread	x			x	
A ladybird beetle	<i>Coccidula rufa</i>	Coccinellidae	Coleoptera	Widespread					x
Seven-spot Ladybird	<i>Coccinella septempunctata</i>	Coccinellidae	Coleoptera	Widespread	x		x	x	x
Orange Ladybird	<i>Halysia sedecimguttata</i>	Coccinellidae	Coleoptera	Widespread				x	
Harlequin Ladybird	<i>Harmonia axyridis</i>	Coccinellidae	Coleoptera	Introduced				x	
A ladybird beetle	<i>Nephus redtenbacheri</i>	Coccinellidae	Coleoptera	Widespread	x				x

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
14-spot Ladybird	<i>Propylea quattuordecimpunctata</i>	Coccinellidae	Coleoptera	Widespread	x		x	x	x
22-spot Ladybird	<i>Psyllobora vigintiduopunctata</i>	Coccinellidae	Coleoptera	Widespread	x				
A ladybird beetle	<i>Rhyzobius litura</i>	Coccinellidae	Coleoptera	Widespread	x			x	x
24-spot Ladybird	<i>Subcoccinella 24-punctata</i>	Coccinellidae	Coleoptera	Widespread	x			x	x
16-spot Ladybird	<i>Tytthaspis sedecimpunctata</i>	Coccinellidae	Coleoptera	Widespread	x		x	x	x
Strawberry Blossom Weevil	<i>Anthonomus rubi</i>	Curculionidae	Coleoptera	Widespread	x				
A true weevil	<i>Archarius pyrroceras</i>	Curculionidae	Coleoptera	Widespread	x				
A true weevil	<i>Archarius salicivorus</i>	Curculionidae	Coleoptera	Widespread	x		x	x	
A ceutorhyncine weevil	<i>Ceutorhynchus obstrictus</i>	Curculionidae	Coleoptera	Widespread				x	
A true weevil	<i>Cionus tuberculosus</i>	Curculionidae	Coleoptera	Widespread	x				
A pea weevil	<i>Coelositona cambricus</i>	Curculionidae	Coleoptera	Local					x
Acorn Weevil	<i>Curculio glandium</i>	Curculionidae	Coleoptera	Widespread	x		x	x	x
An acorn weevil	<i>Curculio venosus</i>	Curculionidae	Coleoptera	Local	x				
A broad-nosed weevil	<i>Exomias araneiformis</i>	Curculionidae	Coleoptera	Widespread	x			x	
A broad-nosed weevil	<i>Exomias pellucidus</i>	Curculionidae	Coleoptera	Widespread	x		x		
A true weevil	<i>Hypera rumcis</i>	Curculionidae	Coleoptera	Widespread					x
A hyperine weevil	<i>Hypera venusta</i>	Curculionidae	Coleoptera	Local	x				

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A true weevil	<i>Mecinus pascuorum</i>	Curculionidae	Coleoptera	Widespread				x	
A ceutorhyncine weevil	<i>Nedys quadrimaculatus</i>	Curculionidae	Coleoptera	Widespread				x	
A leaf weevil	<i>Polydrusus cervinus</i>	Curculionidae	Coleoptera	Widespread				x	
A leaf weevil	<i>Polydrusus flavipes</i>	Curculionidae	Coleoptera	Nationally Scarce (Nb)			x		
A leaf weevil	<i>Polydrusus pterygomalis</i>	Curculionidae	Coleoptera	Widespread				x	
A true weevil	<i>Rhinoncus pericarpus</i>	Curculionidae	Coleoptera	Widespread			x		x
A broad-nosed weevil	<i>Sciaphilus asperatus</i>	Curculionidae	Coleoptera	Widespread				x	
A bark beetle	<i>Scolytus intricatus</i>	Curculionidae	Coleoptera	Widespread			x		
Shothole Borer	<i>Scolytus rugulosus</i>	Curculionidae	Coleoptera	Local			x		
A pea weevil	<i>Sitona hispidulus</i>	Curculionidae	Coleoptera	Widespread	x				
A pea weevil	<i>Sitona lineatus</i>	Curculionidae	Coleoptera	Widespread	x			x	x
A pea weevil	<i>Sitona suturalis</i>	Curculionidae	Coleoptera	Widespread	x			x	
A ceutorhyncine weevil	<i>Trichosirocalus troglodytes</i>	Curculionidae	Coleoptera	Widespread				x	
A true weevil	<i>Tychius meliloti</i>	Curculionidae	Coleoptera	Local				x	
A true weevil	<i>Tychius picirostris</i>	Curculionidae	Coleoptera	Widespread	x			x	x
A dasytid beetle	<i>Dasytes aeratus</i>	Dasytidae	Coleoptera	Widespread	x				
A diving beetle (larva)	<i>Acilius sp.</i>	Dytiscidae	Coleoptera	Unknown	x				

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A diving beetle	<i>Acilius sulcatus</i>	Dytiscidae	Coleoptera	Local	x				
A diving beetle	<i>Agabus bipustulatus</i>	Dytiscidae	Coleoptera	Widespread	x				
A diving beetle	<i>Agabus guttatus</i>	Dytiscidae	Coleoptera	Widespread	x	x	x	x	x
Great Diving Beetle	<i>Dytiscus marginalis</i>	Dytiscidae	Coleoptera	Widespread	x				
A diving beetle (larva)	<i>Dytiscus sp.</i>	Dytiscidae	Coleoptera	Unknown	x				
A diving beetle	<i>Hydroporus angustatus</i>	Dytiscidae	Coleoptera	Widespread	x				
A diving beetle	<i>Hydroporus palustris</i>	Dytiscidae	Coleoptera	Widespread			x		
A diving beetle	<i>Hydroporus planus</i>	Dytiscidae	Coleoptera	Widespread	x		x		
A diving beetle	<i>Hydroporus tessellatus</i>	Dytiscidae	Coleoptera	Widespread	x		x		
A diving beetle	<i>Hyphydrus ovatus</i>	Dytiscidae	Coleoptera	Widespread			x		
A diving beetle	<i>Ilybius montanus</i>	Dytiscidae	Coleoptera	Widespread	x		x		
A diving beetle (larva)	<i>Ilybius/Agabus sp.</i>	Dytiscidae	Coleoptera	Unknown	x				
A diving beetle	<i>Laccophilus minutus</i>	Dytiscidae	Coleoptera	Widespread	x				
A diving beetle	<i>Platambus maculatus</i>	Dytiscidae	Coleoptera	Widespread		x	x	x	
A click beetle	<i>Agriotes lineatus</i>	Elateridae	Coleoptera	Widespread				x	
A click beetle	<i>Agriotes pallidulus</i>	Elateridae	Coleoptera	Widespread			x		
A click beetle	<i>Athous haemorrhoidalis</i>	Elateridae	Coleoptera	Widespread	x				

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A click beetle	<i>Denticollis linearis</i>	Elateridae	Coleoptera	Widespread				x	
A click beetle	<i>Kibunea minuta</i>	Elateridae	Coleoptera	Widespread	x				
A riffle beetle	<i>Elmis aenea</i>	Elminthidae	Coleoptera	Widespread			x	x	
A whirligig beetle	<i>Gyrinus substriatus</i>	Gyrinidae	Coleoptera	Widespread			x	x	
A crawling water beetle	<i>Haliplus lineatocollis</i>	Haliplidae	Coleoptera	Widespread	x		x	x	
A crawling water beetle	<i>Haliplus ruficollis</i>	Haliplidae	Coleoptera	Widespread	x		x	x	
A helophorid beetle	<i>Helophorus aequalis</i>	Helophoridae	Coleoptera	Widespread	x				
A helophorid beetle	<i>Helophorus brevipalpis</i>	Helophoridae	Coleoptera	Widespread	x				
A helophorid beetle	<i>Helophorus grandis</i>	Helophoridae	Coleoptera	Widespread	x				
A hydraenid beetle	<i>Hydraena riparia/britteni</i>	Hydraenidae	Coleoptera	Unknown			x	x	
A water scavenger beetle	<i>Anacaena limbata</i>	Hydrophilidae	Coleoptera	Widespread			x		
A water scavenger beetle	<i>Anacaena lutescens</i>	Hydrophilidae	Coleoptera	Widespread			x		
A water scavenger beetle	<i>Cercyon impressus</i>	Hydrophilidae	Coleoptera	Widespread				x	
A water scavenger beetle	<i>Enochrus testaceus</i>	Hydrophilidae	Coleoptera	Widespread	x				
A water scavenger beetle	<i>Helochaeres lividus</i>	Hydrophilidae	Coleoptera	Widespread			x		
A water scavenger beetle	<i>Laccobius sinuatus</i>	Hydrophilidae	Coleoptera	Widespread		x		x	
A water scavenger beetle	<i>Megasternum concinnum</i>	Hydrophilidae	Coleoptera	Widespread	x			x	x

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A malachite beetle	<i>Axinotarsus pulicarius</i>	Malachiidae	Coleoptera	RDB3 'rare' (pre-1994)/'Vulnerable' (post-2001 IUCN guidelines)			x		
A malachite beetle	<i>Malachius bipustulatus</i>	Malachiidae	Coleoptera	Widespread	x		x		x
A tumbling flower beetle	<i>Mordellistena pusillus</i>	Mordellidae	Coleoptera	Nationally Scarce				x	
Larger Noterus	<i>Noterus clavicornis</i>	Noteridae	Coleoptera	Widespread	x		x		
Lurid Flower Beetle	<i>Oedemera lurida</i>	Oedemeridae	Coleoptera	Widespread					x
Thick-kneed Flower Beetle	<i>Oedemera nobilis</i>	Oedemeridae	Coleoptera	Widespread	x			x	x
Red-headed Cardinal Beetle	<i>Pyrochroa serraticornis</i>	Pyrochroidae	Coleoptera	Widespread	x	x	x	x	x
A dung beetle	<i>Aphodius granarius</i>	Scarabaeidae	Coleoptera	Local	x	x	x	x	x
A dung beetle	<i>Aphodius sticticus</i>	Scarabaeidae	Coleoptera	Local				x	
A scirtid beetle	<i>Cyphon padi</i>	Scirtidae	Coleoptera	Widespread	x				
A scaptiid beetle	<i>Anaspis fasciata</i>	Scaptiidae	Coleoptera	Widespread			x	x	
A scaptiid beetle	<i>Anaspis frontalis</i>	Scaptiidae	Coleoptera	Widespread	x		x	x	
A scaptiid beetle	<i>Anaspis garneysi</i>	Scaptiidae	Coleoptera	Local	x		x	x	
A scaptiid beetle	<i>Anaspis maculata</i>	Scaptiidae	Coleoptera	Widespread	x		x	x	
A scaptiid beetle	<i>Anaspis regimbarti</i>	Scaptiidae	Coleoptera	Widespread	x		x		
A rove beetle	<i>Anotylus sculpturatus/mutator</i>	Staphylinidae	Coleoptera	Unknown			x		
A pselaphid beetle	<i>Brachygluta haematica</i>	Staphylinidae	Coleoptera	Local				x	

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A rove beetle	<i>Drusilla canaliculata</i>	Staphylinidae	Coleoptera	Widespread	x			x	
A rove beetle	<i>Lathrobium brunnipes</i>	Staphylinidae	Coleoptera	Widespread				x	
A rove beetle	<i>Lithocharis nigriceps</i>	Staphylinidae	Coleoptera	Local				x	x
A rove beetle	<i>Platystethus nitens</i>	Staphylinidae	Coleoptera	Local					x
A rove beetle	<i>Quedius fumatus</i>	Staphylinidae	Coleoptera	Widespread	x				
A rove beetle	<i>Rugilus orbiculatus</i>	Staphylinidae	Coleoptera	Local			x	x	
A rove beetle	<i>Sepedophilus nigripennis</i>	Staphylinidae	Coleoptera	Widespread				x	x
A rove beetle	<i>Stenus aceris</i>	Staphylinidae	Coleoptera	Local	x				
A rove beetle	<i>Stenus bifoveolatus</i>	Staphylinidae	Coleoptera	Widespread	x				
A rove beetle	<i>Stenus bimaculatus</i>	Staphylinidae	Coleoptera	Widespread	x				
A rove beetle	<i>Stenus brunnipes</i>	Staphylinidae	Coleoptera	Widespread	x			x	x
A rove beetle	<i>Stenus cicindeloides</i>	Staphylinidae	Coleoptera	Widespread			x		
A rove beetle	<i>Stenus clavicornis</i>	Staphylinidae	Coleoptera	Widespread					x
A rove beetle	<i>Stenus flavipes</i>	Staphylinidae	Coleoptera	Widespread	x			x	x
A rove beetle	<i>Stenus fulvicornis</i>	Staphylinidae	Coleoptera	Widespread	x		x	x	x
A rove beetle	<i>Stenus impressus</i>	Staphylinidae	Coleoptera	Widespread	x		x	x	x
A rove beetle	<i>Stenus nitidiusculus</i>	Staphylinidae	Coleoptera	Widespread			x		

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A rove beetle	<i>Stenus ossium</i>	Staphylinidae	Coleoptera	Widespread	x			x	x
A rove beetle	<i>Stenus pallipes</i>	Staphylinidae	Coleoptera	Local				x	
A rove beetle	<i>Stenus picipes</i>	Staphylinidae	Coleoptera	Widespread	x		x	x	x
A rove beetle	<i>Stenus providus</i>	Staphylinidae	Coleoptera	Widespread	x			x	x
A rove beetle	<i>Stenus similis</i>	Staphylinidae	Coleoptera	Widespread			x	x	x
A rove beetle	<i>Tachinus pallipes</i>	Staphylinidae	Coleoptera	Local	x				
A rove beetle	<i>Tachyporus chrysomelinus</i>	Staphylinidae	Coleoptera	Widespread	x		x	x	
A rove beetle	<i>Tachyporus hypnorum</i>	Staphylinidae	Coleoptera	Widespread	x			x	
A rove beetle	<i>Tachyporus nitidulus</i>	Staphylinidae	Coleoptera	Widespread	x				
A rove beetle	<i>Tachyporus solutus</i>	Staphylinidae	Coleoptera	Local				x	
A darkling beetle	<i>Lagria hirta</i>	Tenebrionidae	Coleoptera	Widespread			x		
A throscid beetle	<i>Trixagus carinifrons</i>	Throscidae	Coleoptera	Local					x
A throscid beetle	<i>Trixagus obtusus</i>	Throscidae	Coleoptera	Local			x		
<b>Two-winged flies (Diptera)</b>									
An anthomyzid fly	<i>Anthomyza gracilis</i>	Anthomyzidae	Diptera	Widespread	x		x	x	
An anthomyzid fly	<i>Paranthomyza nitida</i>	Anthomyzidae	Diptera	Widespread	x			x	
Striped Slender Robberfly	<i>Leptogaster cylindrica</i>	Asilidae	Diptera	Widespread	x		x	x	

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A bibionid fly	<i>Bibio marci</i>	Bibionidae	Diptera	Widespread	x				
A bibionid fly	<i>Dilophus febrilis</i>	Bibionidae	Diptera	Widespread	x				
A bibionid fly	<i>Dilophus femoratus</i>	Bibionidae	Diptera	Widespread	x				
A silver fly	<i>Chamaemyia aridella</i>	Chamaemyiidae	Diptera	Widespread	x				x
A non-biting midge (larva)	<i>Chironomidae sp.</i>	Chironomidae	Diptera	Unknown	x	x	x	x	
A grass fly	<i>Aphanotrigonum trilineatum</i>	Chloropidae	Diptera	Local				x	
A grass fly	<i>Cetema elongatum</i>	Chloropidae	Diptera	Widespread			x		
A grass fly	<i>Cetema neglectum</i>	Chloropidae	Diptera	Widespread	x		x	x	x
A grass fly	<i>Cetema simile</i>	Chloropidae	Diptera	Widespread				x	
A grass fly	<i>Chlorops serenus</i>	Chloropidae	Diptera	Local	x				
A grass fly	<i>Conioscinella mimula</i>	Chloropidae	Diptera	Local	x				
A grass fly	<i>Dicraeus scibilis</i>	Chloropidae	Diptera	Nationally Scarce				x	
A grass fly	<i>Elachiptera diastema</i>	Chloropidae	Diptera	Widespread				x	
A grass fly	<i>Elachiptera tuberculifera</i>	Chloropidae	Diptera	Widespread				x	
A grass fly	<b><i>Oscinella maura</i></b>	Chloropidae	Diptera	Local	x				
A grass fly	<i>Lasiambia coxalis</i>	Chloropidae	Diptera	Data Deficient	x				
A grass fly	<i>Lasiochaeta pubescens</i>	Chloropidae	Diptera	Local	x		x		x

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A grass fly	<i>Lasiosina herpini</i>	Chloropidae	Diptera	Local	x				
A grass fly	<i>Meromyza athletica</i>	Chloropidae	Diptera	Widespread			x		
A grass fly	<i>Meromyza bohémica</i>	Chloropidae	Diptera	Widespread	x		x	x	
A grass fly	<i>Meromyza femorata</i> agg.	Chloropidae	Diptera	Insufficiently known (UK pre-1994)			x		
A grass fly	<i>Meromyza ornata</i>	Chloropidae	Diptera	Unknown			x		
A grass fly	<i>Microcercis antennata</i>	Chloropidae	Diptera	Local			x		
A grass fly	<i>Oscinella cariciphila</i>	Chloropidae	Diptera	Unknown	x				
A grass fly	<i>Oscinella frit</i>	Chloropidae	Diptera	Widespread	x		x	x	
A grass fly	<i>Oscinella nigerrima</i>	Chloropidae	Diptera	Unknown	x		x	x	
A grass fly	<i>Oscinella vindicata</i>	Chloropidae	Diptera	Widespread	x		x	x	
A grass fly	<i>Oscinomorpha minutissima</i>	Chloropidae	Diptera	Widespread			x		
A grass fly	<i>Oscinisoma cognatum</i>	Chloropidae	Diptera	Local	x				
A grass fly	<i>Oscinomorpha</i> sp. <i>indet.</i>	Chloropidae	Diptera	Unknown			x		
A mosquito	<i>Culex pipiens</i>	Culicidae	Diptera	Widespread			x	x	
A diastatid fly	<i>Diastata costata</i>	Diastatidae	Diptera	Widespread	x				
A long-legged fly	<i>Achalcus bimaculatus</i>	Dolichopodidae	Diptera	Nationally Scarce				x	
A long-legged fly	<i>Chrysotus blepharosceles</i>	Dolichopodidae	Diptera	Widespread	x			x	

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A long-legged fly	<i>Chrysotus cilipes</i>	Dolichopodidae	Diptera	Widespread	x				
A long-legged fly	<i>Chrysotus gramineus</i>	Dolichopodidae	Diptera	Widespread	x		x	x	x
A long-legged fly	<i>Chrysotus palustris</i>	Dolichopodidae	Diptera	Local				x	
A long-legged fly	<i>Dolichopus festivus</i>	Dolichopodidae	Diptera	Widespread	x		x	x	
A long-legged fly	<i>Dolichopus griseipennis</i>	Dolichopodidae	Diptera	Local	x				
A long-legged fly	<i>Dolichopus plumipes</i>	Dolichopodidae	Diptera	Widespread	x		x		
A long-legged fly	<i>Dolichopus trivialis</i>	Dolichopodidae	Diptera	Widespread	x			x	
A long-legged fly	<i>Dolichopus virgultorum</i>	Dolichopodidae	Diptera	Nationally Scarce	x		x	x	x
A long-legged fly	<i>Dolichopus wahlbergi</i>	Dolichopodidae	Diptera	Widespread	x			x	x
A long-legged fly	<i>Micromorphus sp. C</i>	Dolichopodidae	Diptera	Unknown			x		
A dolichopodid fly	<i>Poecilobothrus nobilitatus</i>	Dolichopodidae	Diptera	Widespread	x				
A lesser fruit fly	<i>Drosophila fenestrarum</i>	Drosophilidae	Diptera	Widespread				x	
A lesser fruit fly	<i>Drosophila suzukii</i>	Drosophilidae	Diptera	Widespread (Recent UK colonist)			x		
A lesser fruit fly	<i>Scaptomyza pallida</i>	Drosophilidae	Diptera	Widespread	x			x	x
An empid fly	<i>Empis lutea</i>	Empidae	Diptera	Widespread	x			x	
A dance fly	<i>Empis aestiva</i>	Empidae	Diptera	Widespread	x				
A dance fly	<i>Empis nigripes</i>	Empidae	Diptera	Widespread	x				

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A dance fly	<i>Empis nuntia</i>	Empididae	Diptera	Widespread	x				
A dance fly	<i>Empis scutellata</i>	Empididae	Diptera	Local	x				
A dance fly	<i>Empis tessellata</i>	Empididae	Diptera	Widespread	x				
A dance fly	<i>Empis trigramma</i>	Empididae	Diptera	Widespread	x				
A dance fly	<i>Hilara anglodanica</i>	Empididae	Diptera	Widespread	x				
A dance fly	<i>Hilara maura</i>	Empididae	Diptera	Widespread	x				
A shore fly	<i>Philygria interstincta</i>	Ephydriidae	Diptera	Widespread			x	x	x
A shore fly	<i>Psilopa nitidula</i>	Ephydriidae	Diptera	Widespread	x			x	
A shore fly	<i>Scatella tenuicosta (lacustris)</i>	Ephydriidae	Diptera	Widespread	x				
A shore fly	<i>Trimerina madizans</i>	Ephydriidae	Diptera	Local					x
A heleomyzid fly	<i>Suillia variegata</i>	Heleomyzidae	Diptera	Widespread	x				
A louse fly	<i>Ornithophila sp.</i>	Hippoboscidae	Diptera	Unknown			x		
A dance fly	<i>Crossopalpus minimus</i>	Hybotidae	Diptera	Unknown	x				
A dance fly	<i>Drapetis ephippiata</i>	Hybotidae	Diptera	Widespread	x				
A dance fly	<i>Euthyneura halidayi</i>	Hybotidae	Diptera	Local	x				
A dance fly	<i>Hybos culiciformis</i>	Hybotidae	Diptera	Widespread	x				
A dance fly	<i>Ocydromia glabricula</i>	Hybotidae	Diptera	Widespread			x	x	

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A dance fly	<i>Platypalpus agilis</i>	Hybotidae	Diptera	Widespread	x				
A dance fly	<i>Platypalpus calceatus</i>	Hybotidae	Diptera	Widespread	x				
A dance fly	<i>Platypalpus pectoralis</i>	Hybotidae	Diptera	Widespread	x				
A fungus gnat	<i>Monocentrotia lundstromi</i>	Keroplastidae	Diptera	Local					x
A lauxaniid fly	<i>Calliopum simillimum</i>	Lauxaniidae	Diptera	Widespread			x	x	
A lauxaniid fly	<i>Meiosimyza decipiens</i>	Lauxaniidae	Diptera	Widespread	x				
A lauxaniid fly	<i>Meiosimyza illota</i>	Lauxaniidae	Diptera	Local	x				
A lauxaniid fly	<i>Meiosimyza rorida</i>	Lauxaniidae	Diptera	Widespread	x				
A lauxaniid fly	<i>Minettia fasciata</i>	Lauxaniidae	Diptera	Widespread	x			x	
A lauxaniid fly	<i>Minettia longipennis</i>	Lauxaniidae	Diptera	Widespread				x	
A lauxaniid fly	<i>Sapromyza halidayi</i>	Lauxaniidae	Diptera	Widespread				x	
A lauxaniid fly	<i>Sapromyza sexpunctata</i>	Lauxaniidae	Diptera	Widespread	x			x	x
A lauxaniid fly	<i>Tricholauxania praeusta</i>	Lauxaniidae	Diptera	Widespread	x				
A short-palped crane fly	<i>Dicranomyia lutea</i>	Limoniidae	Diptera	Widespread				x	
A short-palped crane fly	<i>Dicranophragma separatum</i>	Limoniidae	Diptera	Local	x				
A short-palped crane fly	<i>Limonia nubeculosa</i>	Limoniidae	Diptera	Widespread				x	
A short-palped crane fly	<i>Limonia phragmitidis</i>	Limoniidae	Diptera	Widespread				x	

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A short-palped crane fly	<i>Limonia trivittata</i>	Limoniidae	Diptera	Widespread				x	
A short-palped crane fly	<i>Molophilus ochraceus</i>	Limoniidae	Diptera	Widespread	x				
A pointed-wing fly	<i>Lonchoptera bifurcata</i>	Lonchopteridae	Diptera	Widespread			x		
A pointed-wing fly	<i>Lonchoptera lutea</i>	Lonchopteridae	Diptera	Widespread	x		x	x	
A muscid fly (larva)	<i>Muscidae sp.</i>	Muscidae	Diptera	Unknown		x		x	
An opomyzid fly	<i>Geomyza balachowskyi</i>	Opomyzidae	Diptera	Widespread	x				
An opomyzid fly	<i>Geomyza balachowskyi/hackmani</i>	Opomyzidae	Diptera	Unknown			x		x
An opomyzid fly	<i>Geomyza nartshukae</i>	Opomyzidae	Diptera	Unknown				x	x
An opomyzid fly	<i>Geomyza subnigra</i>	Opomyzidae	Diptera	Nationally Scarce					x
An opomyzid fly	<i>Geomyza tripunctata</i>	Opomyzidae	Diptera	Widespread	x		x	x	
An opomyzid fly	<i>Opomyza florum</i>	Opomyzidae	Diptera	Widespread	x		x	x	
An opomyzid fly	<i>Opomyza germinationis</i>	Opomyzidae	Diptera	Widespread	x		x	x	x
An opomyzid fly	<i>Opomyza petrei</i>	Opomyzidae	Diptera	Widespread	x		x	x	x
A big-headed fly	<i>Eudorylas inferus</i>	Pipunculidae	Diptera	Unknown				x	
A big-headed fly	<i>Tomosvaryella minima</i>	Pipunculidae	Diptera	Near Threatened - IUCN post-1994	x				
A picture-winged fly	<i>Rivellia syngenesiae</i>	Platystomatidae	Diptera	Widespread				x	x
A psilid fly	<i>Chamaepsila nigricornis</i>	Psilidae	Diptera	Widespread	x				

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A phantom crane fly (larva)	<i>Ptychopteridae sp.</i>	Ptychopteridae	Diptera	Unknown	x				
Yellow Dung Fly	<i>Scathophaga stercoraria</i>	Scathophagidae	Diptera	Widespread	x				
A snail-killing fly	<i>Limnia unguicornis</i>	Sciomyzidae	Diptera	Widespread			x	x	
A snail-killing fly	<i>Pherbellia dubia</i>	Sciomyzidae	Diptera	Widespread				x	
A snail-killing fly	<i>Pherbellia scutellaris</i>	Sciomyzidae	Diptera	Local	x				
Net-winged Snailkiller	<i>Pherbina coryleti</i>	Sciomyzidae	Diptera	Widespread	x		x	x	x
A snail-killing fly	<i>Tetanocera elata</i>	Sciomyzidae	Diptera	Widespread	x			x	
A sepsid fly	<i>Sepsis cynipsea</i>	Sepsidae	Diptera	Widespread			x		
A sepsid fly	<i>Sepsis flavimana</i>	Sepsidae	Diptera	Widespread	x		x	x	
A sepsid fly	<i>Sepsis fulgens</i>	Sepsidae	Diptera	Widespread	x			x	
A sepsid fly	<i>Sepsis orthocnemis</i>	Sepsidae	Diptera	Widespread	x		x		
A sepsid fly	<i>Sepsis punctum</i>	Sepsidae	Diptera	Widespread	x				
A sepsid fly	<i>Themira annulipes</i>	Sepsidae	Diptera	Widespread				x	
Murky-legged Black Legionnaire	<i>Beris chalybata</i>	Stratiomyidae	Diptera	Widespread	x			x	
Common Orange Legionnaire	<i>Beris vallata</i>	Stratiomyidae	Diptera	Widespread				x	
Broad Centurion	<i>Chloromyia formosa</i>	Stratiomyidae	Diptera	Widespread	x			x	
Bright Four-spined Legionnaire	<i>Chorisops nagatomii</i>	Stratiomyidae	Diptera	Local					x

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
Dull-four-spined Legionnaire	<i>Chorisops tibialis</i>	Stratiomyidae	Diptera	Widespread	x				x
Black-horned Gem	<i>Microchrysa polita</i>	Stratiomyidae	Diptera	Widespread	x				
Dark-winged Black	<i>Pachygaster atra</i>	Stratiomyidae	Diptera	Widespread	x		x		
Yellow-legged Black	<i>Pachygaster leachii</i>	Stratiomyidae	Diptera	Widespread				x	
Twin-spot Centurion	<i>Sargus bipunctatus</i>	Stratiomyidae	Diptera	Widespread				x	
A hoverfly	<i>Baccha elongata</i>	Syrphidae	Diptera	Widespread				x	
A hoverfly	<i>Episyrphus balteatus</i>	Syrphidae	Diptera	Widespread	x			x	
A hoverfly	<i>Eumerus funeralis</i>	Syrphidae	Diptera	Widespread	x				
A hoverfly	<i>Eupeodes corollae</i>	Syrphidae	Diptera	Widespread			x		
A hoverfly	<i>Eupeodes latifasciatus</i>	Syrphidae	Diptera	Local	x				x
A hoverfly	<i>Helophilus pendulus</i>	Syrphidae	Diptera	Widespread	x				x
A hoverfly	<i>Melanostoma mellinum</i>	Syrphidae	Diptera	Widespread	x		x	x	x
A hoverfly	<i>Melanostoma scalare</i>	Syrphidae	Diptera	Widespread	x	x	x	x	x
Narcissus Fly	<i>Merodon equestris</i>	Syrphidae	Diptera	Widespread	x				
A hoverfly	<i>Myathropa florea</i>	Syrphidae	Diptera	Widespread	x				
A hoverfly	<i>Platycheirus rosarum</i>	Syrphidae	Diptera	Widespread				x	x
A hoverfly	<i>Platycheirus scutatus</i> (agg.)	Syrphidae	Diptera	Unknown	x	x	x	x	x

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A hoverfly	<i>Rhingia campestris</i>	Syrphidae	Diptera	Widespread				x	
A hoverfly	<i>Sphaerophoria scripta</i>	Syrphidae	Diptera	Widespread				x	
A hoverfly	<i>Sphaerophoria sp.</i>	Syrphidae	Diptera	Unknown				x	
A hoverfly	<i>Sphaerophoria taeniata</i>	Syrphidae	Diptera	Local				x	x
A hoverfly	<i>Syritta pipiens</i>	Syrphidae	Diptera	Widespread					x
A hoverfly	<i>Syrphus ribesii</i>	Syrphidae	Diptera	Unknown				x	
A hoverfly	<i>Volucella pellucens</i>	Syrphidae	Diptera	Widespread	x				
Notch-horned Cleg	<i>Haematopota pluvialis</i>	Tabanidae	Diptera	Widespread				x	
A tephritid fly	<i>Acinia corniculata</i>	Tephritidae	Diptera	RDB1 'Endangered' (pre-1994 IUCN criteria)				x	
A tephritid fly	<i>Anomoia purmunda</i>	Tephritidae	Diptera	Local				x	
A tephritid fly	<i>Chaetorellia jaceae</i>	Tephritidae	Diptera	Local				x	
A tephritid fly	<i>Chaetostomella cylindrica</i>	Tephritidae	Diptera	Local				x	
A picture-winged fly	<i>Myopites inulaedysentericae (apicatus)</i>	Tephritidae	Diptera	Rare (RDB3) pre-1994 criteria				x	
A tephritid fly	<i>Sphenella marginata</i>	Tephritidae	Diptera	Widespread	x				
A tephritid fly	<i>Urophora jaceana</i>	Tephritidae	Diptera	Widespread	x			x	
A picture-winged fly	<i>Urophora stylata</i>	Tephritidae	Diptera	Widespread			x		

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A long-palped crane fly	<i>Nephrotoma cornicina</i>	Tipulidae	Diptera	Local					x
A long-palped crane fly	<i>Nephrotoma quadrifaria</i>	Tipulidae	Diptera	Widespread				x	
A long-palped crane fly	<i>Tipula lunata</i>	Tipulidae	Diptera	Widespread				x	x
A crane fly (larva)	<i>Tipulidae sp.</i>	Tipulidae	Diptera	Unknown		x	x	x	
A ulidiid fly	<i>Herina lugubris</i>	Ulidiidae	Diptera	Local				x	
<b>True bugs (Hemiptera)</b>									
Hawthorn Shieldbug	<i>Acanthosoma haemorrhoidale</i>	Acanthosomatidae	Hemiptera	Widespread		x		x	x
A flowerbug	<i>Anthocoris confusus</i>	Anthocoridae	Hemiptera	Widespread	x		x	x	x
A flowerbug	<i>Anthocoris nemoralis</i>	Anthocoridae	Hemiptera	Widespread				x	x
Common Flower Bug	<i>Anthocoris nemorum</i>	Anthocoridae	Hemiptera	Widespread	x		x	x	x
A flower bug	<i>Cardiastethus fasciventris</i>	Anthocoridae	Hemiptera	Local	x				
A minute pirate bug	<i>Orius majusculus</i>	Anthocoridae	Hemiptera	Widespread	x			x	
A pirate bug	<i>Orius niger</i>	Anthocoridae	Hemiptera	Widespread					x
A flowerbug	<i>Temnostethus gracilis</i>	Anthocoridae	Hemiptera	Local					x
A flowerbug	<i>Xylocoris cursitans</i>	Anthocoridae	Hemiptera	Local				x	
Alder Spittlebug	<i>Aphrophora alni</i>	Aphrophoridae	Hemiptera	Widespread	x		x		
A froghopper	<i>Neophilaenus lineatus</i>	Aphrophoridae	Hemiptera	Widespread	x		x	x	x

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Common Froghopper	<i>Philaenus spumarius</i>	Aphrophoridae	Hemiptera	Widespread	x		x	x	x
A stiltbug	<i>Metatropis rufescens</i>	Berytidae	Hemiptera	Widespread				x	
A leafhopper	<i>Adarrus ocellaris</i>	Cicadellidae	Hemiptera	Widespread				x	x
A leafhopper	<i>Agallia consobrina</i>	Cicadellidae	Hemiptera	Widespread				x	
A leafhopper	<i>Alebra wahlbergi</i>	Cicadellidae	Hemiptera	Widespread			x	x	x
A leafhopper	<i>Allygus mixtus</i>	Cicadellidae	Hemiptera	Widespread			x		
A leafhopper	<i>Anoscopus serratulae</i>	Cicadellidae	Hemiptera	Widespread	x		x	x	x
A leafhopper	<i>Aphrodes makarovi</i>	Cicadellidae	Hemiptera	Widespread			x	x	x
A leafhopper	<i>Arocephalus punctum</i>	Cicadellidae	Hemiptera	Widespread				x	
A leafhopper	<i>Arthaldeus pascuellus</i>	Cicadellidae	Hemiptera	Widespread	x		x	x	x
A leafhopper	<i>Athysanus argentarius</i>	Cicadellidae	Hemiptera	Widespread	x			x	
A leafhopper	<i>Cicadella viridis</i>	Cicadellidae	Hemiptera	Widespread			x	x	
A leafhopper	<i>Conosanus obsoletus</i>	Cicadellidae	Hemiptera	Widespread			x	x	x
A leafhopper	<i>Deltocephalus pulicaris</i>	Cicadellidae	Hemiptera	Widespread	x		x	x	
A leafhopper	<i>Doratura stylata</i>	Cicadellidae	Hemiptera	Widespread	x				
A leafhopper	<i>Eupteryx florida</i>	Cicadellidae	Hemiptera	Widespread	x				
A leafhopper	<i>Eupteryx urticae</i>	Cicadellidae	Hemiptera	Widespread	x				

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A leafhopper	<i>Euscelis incisus</i>	Cicadellidae	Hemiptera	Widespread			x	x	
A leafhopper	<i>lassus lanio</i>	Cicadellidae	Hemiptera	Widespread	x			x	x
A leafhopper	<i>Lamprotettix nitidulus</i>	Cicadellidae	Hemiptera	Local					x
A leafhopper	<i>Lindbergina aurovittata</i>	Cicadellidae	Hemiptera	Widespread	x				
A leafhopper	<i>Macropsis scotti</i>	Cicadellidae	Hemiptera	Widespread				x	
A leafhopper	<i>Macustus grisescens</i>	Cicadellidae	Hemiptera	Widespread				x	
A leafhopper	<i>Megopthalmus scabripennis</i>	Cicadellidae	Hemiptera	Widespread	x			x	x
A leafhopper	<i>Paluda adumbrata</i>	Cicadellidae	Hemiptera	Local	x				
A mirid bug	<i>Phytocoris ulmi</i>	Cicadellidae	Hemiptera	Widespread	x		x	x	x
A leafhopper	<i>Strepsanus sordidus</i>	Cicadellidae	Hemiptera	Widespread	x				
A lacehopper	<i>Reptalus panzeri</i>	Cixiidae	Hemiptera	Nationally Scarce	x				
A lacehopper	<i>Tachycixius pilosus</i>	Cixiidae	Hemiptera	Widespread	x			x	
Dock Bug	<i>Coreus marginatus</i>	Coreidae	Hemiptera	Widespread	x	x	x	x	x
A lesser waterboatman	<i>Corixa punctata</i>	Corixidae	Hemiptera	Widespread	x		x	x	
A lesser waterboatman	<i>Hesperocorixa linnaei</i>	Corixidae	Hemiptera	Widespread	x		x	x	
A lesser waterboatman	<i>Hesperocorixa moesta</i>	Corixidae	Hemiptera	Local			x		
A lesser waterboatman	<i>Hesperocorixa sahbergi</i>	Corixidae	Hemiptera	Widespread	x	x	x	x	

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A corixid bug	<i>Micronecta scholtzi</i>	Corixidae	Hemiptera	Widespread	x				
A lesser waterboatman	<i>Sigara lateralis</i>	Corixidae	Hemiptera	Widespread			x		
A lesser waterboatman	<i>Sigara scotti</i>	Corixidae	Hemiptera	Widespread	x				
A planthopper	<i>Conomelus anceps</i>	Delphacidae	Hemiptera	Widespread	x		x	x	
A planthopper	<i>Criomorpha albomarginatus</i>	Delphacidae	Hemiptera	Widespread	x				
A planthopper	<i>Dicranotropis hamata</i>	Delphacidae	Hemiptera	Widespread	x				x
A planthopper	<i>Javesella dubia</i>	Delphacidae	Hemiptera	Widespread	x		x		
A planthopper	<i>Javesella pellucida</i>	Delphacidae	Hemiptera	Widespread	x		x	x	x
A planthopper	<i>Kelisia guttula</i>	Delphacidae	Hemiptera	Widespread	x				
A planthopper	<i>Stenocranus minutus</i>	Delphacidae	Hemiptera	Widespread	x			x	
A pond skater	<i>Gerris lacustris</i>	Gerridae	Hemiptera	Widespread	x	x	x	x	
Water Measurer	<i>Hydrometra stagnorum</i>	Hydrometridae	Hemiptera	Widespread	x				
A ground bug	<i>Cymus melanocephalus</i>	Lygaeidae	Hemiptera	Widespread	x			x	
A ground bug	<i>Drymus brunneus</i>	Lygaeidae	Hemiptera	Widespread	x				
A ground bug	<i>Drymus sylvaticus</i>	Lygaeidae	Hemiptera	Widespread	x			x	
European Clinchbug	<i>Ischnodemus sabuleti</i>	Lygaeidae	Hemiptera	Widespread	x			x	x
Birch Catkin Bug	<i>Kleidocerys resedae</i>	Lygaeidae	Hemiptera	Widespread	x			x	

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A ground bug	<i>Nysius senecionis</i>	Lygaeidae	Hemiptera	Recent UK colonist	x				
A ground bug	<i>Peritrechus geniculatus</i>	Lygaeidae	Hemiptera	Widespread	x				x
A ground bug	<i>Scolopostethus affinis</i>	Lygaeidae	Hemiptera	Widespread	x				
A ground bug	<i>Scolopostethus thomsoni</i>	Lygaeidae	Hemiptera	Widespread	x			x	
A ground bug	<i>Stygnocoris sabulosus</i>	Lygaeidae	Hemiptera	Widespread	x				
A mirid bug	<i>Amblytylus nasutus</i>	Miridae	Hemiptera	Widespread				x	
A mirid bug	<i>Atractotomus mali</i>	Miridae	Hemiptera	Widespread	x			x	x
Black-kneed Capsid	<i>Blepharidopterus angulatus</i>	Miridae	Hemiptera	Widespread					x
A mirid bug	<i>Campyloneura virgula</i>	Miridae	Hemiptera	Widespread	x		x	x	
A mirid bug	<i>Capsus ater</i>	Miridae	Hemiptera	Widespread			x		
A mirid bug	<i>Charagochilus gyllenhalii</i>	Miridae	Hemiptera	Local				x	
Potato Capsid	<i>Closterotomus norwegicus</i>	Miridae	Hemiptera	Widespread				x	
A mirid bug	<i>Deraeocoris flavilinea</i>	Miridae	Hemiptera	Widespread			x	x	
A mirid bug	<i>Deraeocoris lutescens</i>	Miridae	Hemiptera	Widespread	x			x	x
A mirid bug	<i>Deraeocoris ruber</i>	Miridae	Hemiptera	Widespread					x
A mirid bug	<i>Dicyphus epilobii</i>	Miridae	Hemiptera	Widespread	x			x	
A mirid bug	<i>Dicyphus stachydis</i>	Miridae	Hemiptera	Widespread	x		x	x	

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A mirid bug	<i>Dryophilocoris flavoquadrimaculatus</i>	Miridae	Hemiptera	Widespread	x				
A mirid bug	<i>Halticus luteicollis</i>	Miridae	Hemiptera	Widespread	x				
A mirid bug	<i>Harpocera thoracica</i>	Miridae	Hemiptera	Widespread	x			x	
A mirid bug	<i>Heterotoma planicornis</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Leptopterna dolabrata</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Liocoris tripustulatus</i>	Miridae	Hemiptera	Widespread	x				
A mirid bug	<i>Lopus decolor</i>	Miridae	Hemiptera	Widespread			x	x	
Common Green Capsid	<i>Lygocoris pabulinus</i>	Miridae	Hemiptera	Widespread	x				
A mirid bug	<i>Lygus pratensis</i>	Miridae	Hemiptera	RDB3 'rare'	x			x	x
Tarnished Plant Bug	<i>Lygus rugilipennis</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Mecomma ambulans</i>	Miridae	Hemiptera	Widespread	x			x	
A mirid bug	<i>Megacoelum infusum</i>	Miridae	Hemiptera	Widely scattered					x
A grass bug	<i>Megaloceroea recticornis</i>	Miridae	Hemiptera	Widespread	x			x	x
A mirid bug	<i>Miris striatus</i>	Miridae	Hemiptera	Widespread	x			x	
A mirid bug	<i>Neolygus contaminatus</i>	Miridae	Hemiptera	Widespread	x				
A grass bug	<i>Notostira elongata</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Oncotylus viridiflavus</i>	Miridae	Hemiptera	Widespread				x	

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A mirid bug	<i>Orthops campestris</i>	Miridae	Hemiptera	Widespread				x	
A mirid bug	<i>Orthops kalmii</i>	Miridae	Hemiptera	Widespread					x
A mirid bug	<i>Orthotylus marginalis</i>	Miridae	Hemiptera	Widespread	x				
A mirid bug	<i>Phylus coryli</i>	Miridae	Hemiptera	Widespread				x	
A mirid bug	<i>Phylus palliceps</i>	Miridae	Hemiptera	Local					x
A mirid bug	<i>Phytocoris longipennis</i>	Miridae	Hemiptera	Widespread	x			x	
A mirid bug	<i>Phytocoris tiliae</i>	Miridae	Hemiptera	Widespread	x				x
A mirid bug	<i>Phytocoris varipes</i>	Miridae	Hemiptera	Widespread	x			x	x
A mirid bug	<i>Pinalitus cervinus</i>	Miridae	Hemiptera	Widespread				x	x
A mirid bug	<i>Pithanus maerkeli</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Plagiognathus arbustorum</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Plagiognathus chryanthemi</i>	Miridae	Hemiptera	Widespread	x			x	
A mirid bug	<i>Psallus haematodes</i>	Miridae	Hemiptera	Widespread					x
A mirid bug	<i>Psallus varians</i>	Miridae	Hemiptera	Widespread	x				x
A grass bug	<i>Stenodema calcarata</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A grass bug	<i>Stenodema laevigata</i>	Miridae	Hemiptera	Widespread	x		x	x	x
A mirid bug	<i>Stenotus binotatus</i>	Miridae	Hemiptera	Widespread	x		x	x	x

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A mirid bug	<i>Tytthus pygmaeus</i>	Miridae	Hemiptera	Local				x	
Tree Damselbug	<i>Himacerus apterus</i>	Nabidae	Hemiptera	Widespread	x		x	x	x
A damselbug	<i>Himacerus boops</i>	Nabidae	Hemiptera	Local	x				
Grey Damselbug	<i>Himacerus major</i>	Nabidae	Hemiptera	Widespread				x	
Field Damselbug	<i>Nabis ferus</i>	Nabidae	Hemiptera	Widespread	x		x	x	x
Broad Damselbug	<i>Nabis flavomarginatus</i>	Nabidae	Hemiptera	Widespread	x			x	
Marsh Damselbug	<i>Nabis limbatus</i>	Nabidae	Hemiptera	Widespread	x		x	x	x
Common Damselbug	<i>Nabis rugosus</i>	Nabidae	Hemiptera	Widespread	x		x	x	x
Saucer Bug	<i>Ilyocoris cimicoides</i>	Naucoridae	Hemiptera	Local	x				
Water Scorpion	<i>Nepa cinerea</i>	Nepidae	Hemiptera	Widespread			x		
Common Backswimmer	<i>Notonecta glauca</i>	Notonectidae	Hemiptera	Widespread	x		x	x	
A backswimmer	<i>Notonecta maculata</i>	Notonectidae	Hemiptera	Widespread	x		x	x	
Bishop's Mitre Shieldbug	<i>Aelia acuminata</i>	Pentatomidae	Hemiptera	Widespread		x		x	
Hairy Shieldbug	<i>Dolycoris baccarum</i>	Pentatomidae	Hemiptera	Widespread	x			x	x
Parent Bug	<i>Elasmucha grisea</i>	Pentatomidae	Hemiptera	Widespread	x				
Brassica Bug	<i>Eurydema oleracea</i>	Pentatomidae	Hemiptera	Widespread				x	x
Common Green Shieldbug	<i>Palomena prasina</i>	Pentatomidae	Hemiptera	Widespread		x		x	x

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Red-legged Shieldbug	<i>Pentatoma rufipes</i>	Pentatomidae	Hemiptera	Widespread	x	x			
Turtle Shieldbug	<i>Podops inuncta</i>	Pentatomidae	Hemiptera	Widespread				x	x
Blue Shieldbug	<i>Zicrona caerulea</i>	Pentatomidae	Hemiptera	Widespread				x	
A rhopalid bug	<i>Corizus hyoscyami</i>	Rhopalidae	Hemiptera	Local				x	
A rhopalid bug	<i>Myrmus mirmicoides</i>	Rhopalidae	Hemiptera	Widespread	x			x	
A rhopalid bug	<i>Rhopalus subrufus</i>	Rhopalidae	Hemiptera	Widespread	x			x	x
A rhopalid bug	<i>Stictopleurus punctonervosus</i>	Rhopalidae	Hemiptera	Recent UK recolonist	x			x	
Tortoise Shieldbug	<i>Eurygaster testudinaria</i>	Scutelleridae	Hemiptera	Widespread	x				x
A lacebug	<i>Physatocheila dumetorum</i>	Tingidae	Hemiptera	Widespread	x		x		x
A lacebug	<i>Tingis ampliata</i>	Tingidae	Hemiptera	Widespread	x			x	
A water cricket	<i>Velia caprai</i>	Veliidae	Hemiptera	Widespread		x	x	x	
<b>Spiders (Araneae)</b>									
An anyphaenid spider	<i>Anyphaena accentuata</i>	Anyphaenidae	Araneae	Widespread	x			x	x
An orb-web spider	<i>Agalenatea redii</i>	Araneidae	Araneae	Local	x		x	x	x
An orb-web spider	<i>Araneus diadematus</i>	Araneidae	Araneae	Widespread	x				x
Garden Spider	<i>Araneus quadratus</i>	Araneidae	Araneae	Widespread				x	
An orb-web spider	<i>Araneus triguttatus</i>	Araneidae	Araneae	Local				x	

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An orb-web spider	<i>Araniella opisthographa</i>	Araneidae	Araneae	Widespread	x				
Wasp Spider	<i>Argiope bruennichi</i>	Araneidae	Araneae	Local	x				
An orb-web spider	<i>Cercidia prominens</i>	Araneidae	Araneae	Nationally Scarce	x			x	
An orb-web spider	<i>Cyclosa conica</i>	Araneidae	Araneae	Widespread	x		x		
An orb-web spider	<i>Gibbaranea gibbosa</i>	Araneidae	Araneae	Local	x		x	x	x
An orb-web spider	<i>Hyposinga pygmaea</i>	Araneidae	Araneae	Widespread	x			x	
An orb-web spider	<i>Larinioides cornutus</i>	Araneidae	Araneae	Widespread	x			x	
An orb-web spider	<i>Mangora acalypha</i>	Araneidae	Araneae	Local	x			x	
An orb-web spider	<i>Neoscona adianta</i>	Araneidae	Araneae	Local				x	
An orb-web spider	<i>Nuctenea umbratica</i>	Araneidae	Araneae	Widespread	x				
An orb-web spider	<i>Zilla diodia</i>	Araneidae	Araneae	Local	x				
An orb-web spider	<i>Zygiella atrica</i>	Araneidae	Araneae	Widespread			x		
An orb-web spider	<i>Zygiella x-notata</i>	Araneidae	Araneae	Widespread				x	
A clubionid spider	<i>Cheiracanthium erraticum</i>	Clubionidae	Araneae	Local				x	
A clubionid spider	<i>Clubiona comta</i>	Clubionidae	Araneae	Widespread	x		x	x	
A clubionid spider	<i>Clubiona subtilis</i>	Clubionidae	Araneae	Local	x			x	
A clubionid spider	<i>Clubiona terrestris</i>	Clubionidae	Araneae	Widespread	x				

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
A cribellate spider	<i>Dictyna uncinata</i>	Clubionidae	Araneae	Widespread	x		x	x	x
A cribellate spider	<i>Dictyna arundinacea</i>	Dictynidae	Araneae	Widespread				x	
A cribellate spider	<i>Dictyna latens</i>	Dictynidae	Araneae	Local					x
A cribellate spider	<i>Lathys humilis</i>	Dictynidae	Araneae	Local	x		x	x	
A gnaphosid spider	<i>Zelotes sp.</i>	Gnaphosidae	Araneae	Unknown	x				
A linyphiid spider	<i>Bathyphantes gracilis</i>	Linyphiidae	Araneae	Widespread				x	x
A linyphiid spider	<i>Bathyphantes nigrinus</i>	Linyphiidae	Araneae	Widespread				x	x
A linyphiid spider	<i>Ceratinella scabrosa</i>	Linyphiidae	Araneae	Local	x				
A linyphiid spider	<i>Ceratinopsis stativa</i>	Linyphiidae	Araneae	Nationally Scarce	x				
A linyphiid spider	<i>Diplostyla concolor</i>	Linyphiidae	Araneae	Widespread				x	x
A linyphiid spider	<i>Entelecara acuminata</i>	Linyphiidae	Araneae	Local				x	
A linyphiid spider	<i>Erigone atra</i>	Linyphiidae	Araneae	Widespread			x	x	
A linyphiid spider	<i>Erigone dentipalpis</i>	Linyphiidae	Araneae	Widespread			x	x	
A linyphiid spider	<i>Gongylidium rufipes</i>	Linyphiidae	Araneae	Widespread	x			x	
A linyphiid spider	<i>Hylyphantes graminicola</i>	Linyphiidae	Araneae	Local	x				
A linyphiid spider	<i>Linyphia hortensis</i>	Linyphiidae	Araneae	Widespread				x	
A linyphiid spider	<i>Linyphia triangularis</i>	Linyphiidae	Araneae	Widespread	x			x	x

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A linyphiid spider	<i>Microlinyphia pusilla</i>	Linyphiidae	Araneae	Widespread	x				
A linyphiid spider	<i>Neriene clathrata</i>	Linyphiidae	Araneae	Widespread	x			x	x
A linyphiid spider	<i>Neriene montana</i>	Linyphiidae	Araneae	Widespread				x	
A linyphiid spider	<i>Neriene peltata</i>	Linyphiidae	Araneae	Widespread	x		x	x	
A linyphiid spider	<i>Palliduphantes ericaeus</i>	Linyphiidae	Araneae	Widespread			x		
A linyphiid spider	<i>Pocadicnemis pumila</i>	Linyphiidae	Araneae	Widespread	x				
A linyphiid spider	<i>Tenuiphantes flavipes</i>	Linyphiidae	Araneae	Widespread	x		x		
A linyphiid spider	<i>Tenuiphantes mengei</i>	Linyphiidae	Araneae	Widespread	x		x		x
A linyphiid spider	<i>Tenuiphantes tenuis</i>	Linyphiidae	Araneae	Widespread	x		x	x	x
A linyphiid spider	<i>Tenuiphantes zimmermanni</i>	Linyphiidae	Araneae	Widespread	x		x	x	
A linyphiid spider	<i>Trematocephalus cristatus</i>	Linyphiidae	Araneae	Nationally Scarce	x			x	
A liocranid spider	<i>Phrurolithus festivus</i>	Liocranidae	Araneae	Widespread				x	
A lycosid spider	<i>Pardosa amentata</i>	Lycosidae	Araneae	Widespread	x				
A lycosid spider	<i>Pardosa nigriceps</i>	Lycosidae	Araneae	Widespread				x	
A lycosid spider	<i>Pardosa prativaga</i>	Lycosidae	Araneae	Widespread	x			x	
A lycosid spider	<i>Pardosa pullata</i>	Lycosidae	Araneae	Widespread				x	x
A lycosid spider	<i>Pirata latitans</i>	Lycosidae	Araneae	Local	x				

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A lycosid spider	<i>Pirata piraticus</i>	Lycosidae	Araneae	Widespread			x		
A lycosid spider	<i>Pirata uliginosus</i>	Lycosidae	Araneae	Local				x	
A lycosid spider	<i>Trochosa terricola</i>	Lycosidae	Araneae	Widespread	x				
A pirate spider	<i>Ero cambridgei</i>	Mimetidae	Araneae	Widespread				x	
A pirate spider	<i>Ero furcata</i>	Mimetidae	Araneae	Widespread	x			x	
A philodromid spider	<i>Philodromus albidus</i>	Philodromidae	Araneae	Local	x		x	x	
A philodromid spider	<i>Philodromus aureolus</i>	Philodromidae	Araneae	Widespread	x		x		
A philodromid spider	<i>Philodromus dispar</i>	Philodromidae	Araneae	Widespread				x	
A philodromid spider	<i>Philodromus sp.</i>	Philodromidae	Araneae	unknown			x		
A philodromid spider	<i>Thanatus striatus</i>	Philodromidae	Araneae	Nationally Scarce			x	x	
A philodromid spider	<i>Tibellus oblongus</i>	Philodromidae	Araneae	Widespread	x		x		
A philodromid spider	<i>Tibellus oblongus</i>	Philodromidae	Araneae	Widespread	x			x	
Nursery Web Spider	<i>Pisaura mirabilis</i>	Pisauridae	Araneae	Widespread	x		x	x	x
A jumping spider	<i>Europhrys frontalis</i>	Salticidae	Araneae	Widespread	x				
A jumping spider	<i>Heliophanus cupreus</i>	Salticidae	Araneae	Widespread	x			x	
A jumping spider	<i>Heliophanus flavipes</i>	Salticidae	Araneae	Widespread	x				
A jumping spider	<i>Sibianor aurocinctus</i>	Salticidae	Araneae	Nationally Scarce	x			x	

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A tetragnathid spider	<i>Metellina menzei</i>	Tetragnathidae	Araneae	Widespread	x			x	
A tetragnathid spider	<i>Metellina segmentata</i>	Tetragnathidae	Araneae	Widespread			x	x	x
A tetragnathid spider	<i>Pachygnatha clercki</i>	Tetragnathidae	Araneae	Widespread			x	x	
A tetragnathid spider	<i>Pachygnatha degeeri</i>	Tetragnathidae	Araneae	Widespread	x		x	x	x
A tetragnathid spider	<i>Tetragnatha extensa</i>	Tetragnathidae	Araneae	Widespread	x				
A tetragnathid spider	<i>Tetragnatha montana</i>	Tetragnathidae	Araneae	Widespread	x		x	x	
A tetragnathid spider	<i>Tetragnatha nigrita</i>	Tetragnathidae	Araneae	Local					x
A tetragnathid spider	<i>Tetragnatha pinicola</i>	Tetragnathidae	Araneae	Local	x			x	
A tetragnathid spider	<i>Tetragnatha sp.</i>	Tetragnathidae	Araneae	unknown			x		
A theridiid spider	<i>Anelosimus vittatus</i>	Theridiidae	Araneae	Widespread	x		x	x	x
A theridiid spider	<i>Crustulina guttata</i>	Theridiidae	Araneae	Local					x
A theridiid spider	<i>Enoplognatha latimana</i>	Theridiidae	Araneae	Widespread	x		x	x	x
A theridiid spider	<i>Enoplognatha ovata</i>	Theridiidae	Araneae	Widespread	x		x	x	x
A theridiid spider	<i>Episinus maculipes</i>	Theridiidae	Araneae	Nationally Scarce	x				
A theridiid spider	<i>Neottiura bimaculatum</i>	Theridiidae	Araneae	Widespread	x		x	x	
A theridiid spider	<i>Paidiscura pallens</i>	Theridiidae	Araneae	Widespread	x		x	x	
A theridiid spider	<i>Phylloneta sisypchia</i>	Theridiidae	Araneae	Widespread	x				x

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A theridiid spider	<i>Theridion varians</i>	Theridiidae	Araneae	Widespread	x		x	x	
A thomisid spider	<i>Diaea dorsata</i>	Thomisidae	Araneae	Local				x	
A theridiid spider	<i>Episinus angulatus</i>	Thomisidae	Araneae	Local	x			x	
Crab Spider	<i>Misumena vatia</i>	Thomisidae	Araneae	Widespread	x			x	
A thomisid spider	<i>Ozyptila brevipes</i>	Thomisidae	Araneae	Local	x		x	x	x
A thomisid spider	<i>Xysticus audax</i>	Thomisidae	Araneae	Local				x	
A thomisid spider	<i>Xysticus cristatus</i>	Thomisidae	Araneae	Widespread	x			x	x
A thomisid spider	<i>Xysticus sp.</i>	Thomisidae	Araneae	unknown			x		
A thomisid spider	<i>Xysticus ulmi</i>	Thomisidae	Araneae	Local					x
A zorid spider	<i>Zora spinimana</i>	Zoridae	Araneae	Widespread	x		x	x	x
<b>Bees, ants and wasps (Aculeate Hymenoptera)</b>									
Hawthorn Mining Bee	<i>Andrena chrysoseles</i>	Andrenidae	Hymenoptera	Widespread	x	x	x	x	x
Orange-tailed Mining Bee	<i>Andrena haemorrhoa</i>	Andrenidae	Hymenoptera	Widespread	x	x	x	x	x
Coppice Mining Bee	<i>Andrena helvola</i>	Andrenidae	Hymenoptera	Widespread			x	x	
Grey-patch Mining Bee	<i>Andrena nitida</i>	Andrenidae	Hymenoptera	Widespread	x	x	x	x	x
Honey Bee	<i>Apis mellifera</i>	Apidae	Hymenoptera	Widespread				x	
Garden Bumblebee	<i>Bombus hortorum</i>	Apidae	Hymenoptera	Widespread	x	x	x	x	x

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Tree Bumblebee	<i>Bombus hypnorum</i>	Apidae	Hymenoptera	Widespread (recent UK colonist)	x	x			
Large Red-tailed Bumblebee	<i>Bombus lapidarius</i>	Apidae	Hymenoptera	Widespread		x		x	
White-tailed/Buff-tailed Bumblebee	<i>Bombus lucorum/terrestris</i>	Apidae	Hymenoptera	Widespread	x	x		x	
Common Carder Bee	<i>Bombus pascuorum</i>	Apidae	Hymenoptera	Widespread	x	x		x	
Early Bumblebee	<i>Bombus pratorum</i>	Apidae	Hymenoptera	Widespread	x	x	x	x	x
Painted Nomad Bee	<i>Nomada fucata</i>	Apidae	Hymenoptera	Local	x				
Panzer's Mining Bee	<i>Nomada panzeri</i>	Apidae	Hymenoptera	Widespread	x	x	x	x	x
A crabronid wasp	<i>Ectemnius continuus</i>	Crabronidae	Hymenoptera	Widespread	x				
Brown Ant	<i>Lasius brunneus</i>	Formicidae	Hymenoptera	Nationally Scarce	x			x	
Yellow Meadow Ant	<i>Lasius flavus</i>	Formicidae	Hymenoptera	Widespread	x				
Black Ant	<i>Lasius niger</i>	Formicidae	Hymenoptera	Widespread	x		x	x	
A myrmicine ant	<i>Myrmica rubra</i>	Formicidae	Hymenoptera	Widespread	x			x	x
A myrmicine ant	<i>Myrmica ruginodis</i>	Formicidae	Hymenoptera	Widespread	x		x	x	x
A myrmicine ant	<i>Myrmica scabrinodis</i>	Formicidae	Hymenoptera	Widespread	x		x	x	x
A myrmicine ant	<i>Stenammina debile</i>	Formicidae	Hymenoptera	Local	x				
Bronze Furrow Bee	<i>Halictus tumulorum</i>	Halictidae	Hymenoptera	Widespread	x				
Bloomed Furrow Bee	<i>Lasioglossum albipes</i>	Halictidae	Hymenoptera	Widespread				x	

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Sharp-collared Furrow Bee	<i>Lasioglossum malachurum</i>	Halictidae	Hymenoptera	Nationally Scarce (Nb)					x
Least Furrow Bee	<i>Lasioglossum minutissimum</i>	Halictidae	Hymenoptera	Local					x
Green Furrow Bee	<i>Lasioglossum morio</i>	Halictidae	Hymenoptera	Widespread				x	
Lobe-spurred Furrow Bee	<i>Lasioglossum pauxillum</i>	Halictidae	Hymenoptera	Nationally Scarce (Nb)			x	x	x
Bull-headed Furrow Bee	<i>Lasioglossum zonulum</i>	Halictidae	Hymenoptera	Local	x				
Clover Mellita	<i>Melitta leporina</i>	Melittidae	Hymenoptera	Local	x				
Wall Mason Wasp	<i>Ancistrocerus parietinus</i>	Vespidae	Hymenoptera	Widespread					x
European Hornet	<i>Vespa crabro</i>	Vespidae	Hymenoptera	Widespread	x	x			x
German Wasp	<i>Vespula germanica</i>	Vespidae	Hymenoptera	Widespread					x
<b>Butterflies and moths (Lepidoptera)</b>									
Rosy Footman	<i>Miltochrista miniata</i>	Erebidae	Lepidoptera	Local	x				
Vapourer	<i>Orgyia antiqua</i>	Erebidae	Lepidoptera	Widespread	x				
Blood-vein	<i>Timandra comae</i>	Geometridae	Lepidoptera	S41 'research only'	x				
Large Skipper	<i>Ochlodes sylvanus</i>	Hesperiidae	Lepidoptera	Widespread	x		x		
Purple Hairstreak	<i>Favonius quercus</i>	Lycaenidae	Lepidoptera	Widespread	x				
Small Copper	<i>Lycaena phlaeas</i>	Lycaenidae	Lepidoptera	Widespread	x				x
Common Blue	<i>Polyommatus icarus</i>	Lycaenidae	Lepidoptera	Widespread	x				

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Brown Hairstreak	<i>Thecla betulae</i>	Lycaenidae	Lepidoptera	S41 'priority species'; Post-2001 IUCN Vulnerable'		x		x	
Sallow Moth	<i>Cirrhia icteritia</i>	Noctuidae	Lepidoptera	S41 'research only'				x	
Ringlet	<i>Aphantopus hyperantus</i>	Nymphalidae	Lepidoptera	Widespread	x	x		x	
Silver-washed Fritillary	<i>Argynnis paphia</i>	Nymphalidae	Lepidoptera	Widespread	x	x			
Small Heath	<i>Coenonympha pamphilus</i>	Nymphalidae	Lepidoptera	S41 'priority species'; Post-2001 IUCN 'Near Threatened'			x		
Meadow Brown	<i>Maniola jurtina</i>	Nymphalidae	Lepidoptera	Widespread	x	x	x	x	x
Marbled White	<i>Melanargia galathea</i>	Nymphalidae	Lepidoptera	Widespread		x			
Speckled Wood	<i>Pararge aegeria</i>	Nymphalidae	Lepidoptera	Widespread	x			x	x
Comma	<i>Polygonia c-album</i>	Nymphalidae	Lepidoptera	Widespread				x	
Gatekeeper	<i>Pyronia tithonus</i>	Nymphalidae	Lepidoptera	Widespread	x				x
Small Skipper	<i>Thymelicus sylvestris</i>	Nymphalidae	Lepidoptera	Widespread	x	x		x	
Red Admiral	<i>Vanessa atalanta</i>	Nymphalidae	Lepidoptera	Widespread (migrant)				x	x
Orange-tip	<i>Anthocharis cardamine</i>	Pieridae	Lepidoptera	Widespread				x	
Large White	<i>Pieris brassicae</i>	Pieridae	Lepidoptera	Widespread	x			x	x
Small White	<i>Pieris rapae</i>	Pieridae	Lepidoptera	Widespread		x			
Six-spot Burnet	<i>Zygaena filipendulae</i>	Zygaenidae	Lepidoptera	Widespread				x	

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<b>Grasshoppers, crickets and allies (Orthoptera, Dermaptera, Dictyoptera)</b>									
Common Earwig	<i>Forficula auricularia</i>	Forficulidae	Dermaptera	Widespread	x			x	x
Dusky Cockroach	<i>Ectobius lapponicus</i>	Blattellidae	Dictyoptera	Nationally Scarce	x			x	x
Lesser Marsh Grasshopper	<i>Chorthippus albomarginatus</i>	Acrididae	Orthoptera	Widespread	x		x		
Field Grasshopper	<i>Chorthippus brunneus</i>	Acrididae	Orthoptera	Widespread	x		x	x	
Meadow Grasshopper	<i>Chorthippus parallelus</i>	Acrididae	Orthoptera	Widespread	x	x	x	x	x
Common Green Grasshopper	<i>Omocestus viridulus</i>	Acrididae	Orthoptera	Widespread			x		
Long-winged Conehead	<i>Conocephalus fuscus</i>	Conocephalidae	Orthoptera	Widespread	x			x	x
A conehead	<i>Conocephalus sp.</i>	Conocephalidae	Orthoptera	Unknown			x		
Oak Bush-cricket	<i>Meconema thalassinum</i>	Meconematidae	Orthoptera	Widespread				x	
Common Groundhopper	<i>Tetris undulata</i>	Tetrigidae	Orthoptera	Widespread			x	x	
Slender Groundhopper	<i>Tetrix subulata</i>	Tetrigidae	Orthoptera	Widespread	x			x	x
Roesel's Bush-cricket	<i>Metrioptera roeselii</i>	Tettigoniidae	Orthoptera	Widespread	x	x	x		
Dark Bush-cricket	<i>Pholidoptera griseoaptera</i>	Tettigoniidae	Orthoptera	Widespread	x	x			
<b>Harvestmen (Opiliones)</b>									
A harvestman	<i>Nemastoma bimaculatum</i>	Nemastomatidae	Opiliones	Widespread	x				
A harvestman	<i>Dicranopalpus ramosus</i>	Phalangiidae	Opiliones	Widespread	x		x	x	x

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A harvestman	<i>Leiobunum rotundum</i>	Phalangiiidae	Opiliones	Widespread	x		x	x	
A harvestman	<i>Lophopilio palpinalis</i>	Phalangiiidae	Opiliones	Widespread	x		x		
A harvestman	<i>Mitopus morio</i>	Phalangiiidae	Opiliones	Widespread	x				
A harvestman	<i>Oligolophus tridens</i>	Phalangiiidae	Opiliones	Widespread			x	x	
A harvestman	<i>Paroligolophus agrestis</i>	Phalangiiidae	Opiliones	Widespread	x		x	x	x
A harvestman	<i>Phalangium opilio</i>	Phalangiiidae	Opiliones	Widespread			x	x	
A harvestman	<i>Platybunus triangularis</i>	Phalangiiidae	Opiliones	Widespread	x			x	
<b>Caddisflies (Trichoptera)</b>									
A caddis fly larva	<i>Athripsodes aterrimus</i>	Leptoceridae	Trichoptera	Widespread			x	x	
A caddis fly larva	<i>Athripsodes cinereus</i>	Leptoceridae	Trichoptera	Widespread		x		x	
A caddis fly larva	<i>Leptocerus tineiformis</i>	Leptoceridae	Trichoptera	Widespread			x	x	
A caddis fly larva	<i>Mystacides longicornis</i>	Leptoceridae	Trichoptera	Widespread			x	x	
A caddis fly larva	<i>Grammotaulius nigropunctatus</i>	Limnephilidae	Trichoptera	Widespread			x	x	
A caddis fly larva	<i>Limnephilus centralis</i>	Limnephilidae	Trichoptera	Widespread			x	x	
A caddis fly larva	<i>Limnephilus decipiens</i>	Limnephilidae	Trichoptera	Local	x	x	x	x	
A caddis fly larva	<i>Agrypnia varia</i>	Phryganeidae	Trichoptera	Widespread	x	x		x	
<b>Dragonflies and damselflies (Odonata)</b>									

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Southern Hawker	<i>Aeshna cyanea</i>	Aeshnidae	Odonata	Widespread	x				
Migrant Hawker	<i>Aeshna mixta</i>	Aeshnidae	Odonata	Widespread	x			x	
Beautiful Demoiselle	<i>Calopteryx virgo</i>	Calopterygidae	Odonata	Widespread		x		x	
Azure Damselfly	<i>Coenagrion puella</i>	Coenagridae	Odonata	Widespread	x				
Blue-tailed Damselfly	<i>Ischnura elegans</i>	Coenagriidae	Odonata	Widespread	x				
Scarce chaser	<i>Libellula fulva</i>	Libellulidae	Odonata	IUCN Post-2001 'Near Threatened'	x				
<b>Woodlice, hoglice and slaters (Isopoda)</b>									
A pill woodlouse	<i>Armadillidium nasatum</i>	Armadillidiidae	Isopoda	Local	x				
Common Pill Woodlouse	<i>Armadillidium vulgare</i>	Armadillidiidae	Isopoda	Widespread	x				x
Water Hog-louse	<i>Asellus aquaticus</i>	Asellidae	Isopoda	Widespread	x	x	x	x	
Common Shiny Woodlouse	<i>Oniscus asellus</i>	Oniscidae	Isopoda	Widespread	x			x	
Common Striped Woodlouse	<i>Philoscia muscorum</i>	Philoscidae	Isopoda	Widespread	x		x	x	x
Common Rough Woodlouse	<i>Porcellio scaber</i>	Porcellionidae	Isopoda	Widespread	x			x	
<b>Water snails (Gastropoda)</b>									
Wandering Snail	<i>Radix balthica</i>	Lymnaeidae	Hygrophila	Widespread	x		x	x	
Common Bladder Snail	<i>Physa fontinalis</i>	Physidae	Hygrophila	Widespread		x		x	
Great Ramshorn Snail	<i>Planorbarius corneus</i>	Planorbidae	Hygrophila	Widespread	x				

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Margined Ramshorn	<i>Planorbis planorbis</i>	Planorbidae	Hygrophila	Widespread			x	x	
Jenkin's Spire Snail	<i>Potamopyrgus antipodarum</i>	Taetidae	Littorinimorpha	Widespread (intoduced)		x	x	x	
<b>Freshwater shrimps and crayfish (Malacostraca)</b>									
A freshwater shrimp	<i>Crangonyx pseudogracilis</i>	Crangonyctidae	Amphipoda	Widespread (intoduced)	x		x		
A freshwater shrimp	<i>Gammarus lacustris</i>	Gammaridae	Amphipoda	Widespread			x	x	
A freshwater shrimp	<i>Gammarus pulex</i>	Gammaridae	Amphipoda	Widespread		x	x	x	
Signal Crayfish	<i>Pacifastacus leniusculus</i>	Astacidae	Decapoda	Widespread (intoduced)		x		x	
<b>Freshwater mussels (Bivalvia)</b>									
Duck Mussel	<i>Anodonta anatina</i>	Unionidae	Unionoida	Widespread		x		x	
Capped Orb-mussel	<i>Musculium lacustre</i>	Sphaeriidae	Veneroida	Widespread	x				
Horny Orb Mussel	<i>Sphaerium corneum</i>	Sphaeriidae	Veneroida	Widespread		x	x	x	
<b>Stone Centipedes (Lithobiomorpha)</b>									
A stone centipede	<i>Lithobius crassipes</i>	Lithobiidae	Lithobiomorpha	Local			x		
A stone centipede	<i>Lithobius forficatus</i>	Lithobiidae	Lithobiomorpha	Widespread	x				
A stone centipede	<i>Lithobius microps</i>	Lithobiidae	Lithobiomorpha	Widespread				x	x
<b>Pseudoscorpions (Pseudoscorpiones)</b>									
A pseudoscorpion	<i>Chthonius ischnocheles</i>	Chthoniidae	Pseudoscorpione s	Widespread			x		

Common name	Scientific name	Family	Order	UK status	Are a A	Are a B	Are a C	Are a D	Are a E
Straight-fingered Chthonid	<i>Chthonius orthodactylus</i>	Chthoniidae	Pseudoscorpione s	Local				x	
A pseudoscorpion	<i>Neobisium muscorum</i>	Neobisiidae	Pseudoscorpione s	Widespread	x				
<b>Mayflies (Ephemeroptera)</b>									
Pond Olive	<i>Cloeon dipterum</i>	Baetidae	Ephemeroptera	Widespread	x		x	x	
Ditch Dun	<i>Habrophlebia fusca</i>	Leptophlebiidae	Ephemeroptera	Widespread		x	x	x	
<b>Leeches (Rhynchobdellida)</b>									
A leech	<i>Glossiphonia complanata</i>	Glossiphoniidae	Rhynchobdellida	Widespread			x	x	
A leech	<i>Helobdella stagnalis</i>	Glossiphoniidae	Rhynchobdellida	Widespread	x		x	x	
<b>Pill Millipedes (Glomerida)</b>									
A pill millipede	<i>Glomeris marginata</i>	Glomeridae	Glomerida	Widespread				x	
<b>Alderflies (Megaloptera)</b>									
An alder fly	<i>Sialis lutaria</i>	Sialidae	Megaloptera	Widespread			x		

Table 4 – Species of recognised conservation status

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
An orb-web spider	<i>Cercidia prominens</i>	Araneidae	Araneae	Nationally Scarce	Area A, D	General grassland and woodland field layer	Open Habitats; Tall Sward and Scrub	There are scattered records of <i>Cercidia prominens</i> in both England, Scotland and Wales; however, the majority of records are from southeast England, in particular from Surrey and East Sussex. Roberts (1995) describes the favoured habitat of this spider as being 'At the base of vegetation, often at the edge of banks, footpaths and other clearings.' Bee et al. (2017) are more specific, stating that <i>Cercidia</i> 'Occurs on heathland and chalk grassland, often in sparsely vegetated areas', where it spins its orb-web close to the ground. During the survey, a number of specimens of this distinctive spider were recorded from both Area A and D.
A linyphiid spider	<i>Ceratinopsis stativa</i> ( <i>Styloctetor stativus</i> )	Linyphiidae	Araneae	Nationally Scarce	Area A	General grassland and woodland field layer	Open Habitats; Tall Sward and Scrub	<i>Ceratinopsis stativa</i> is listed as nationally scarce in a review by Harvey et al (2017). Although there are scattered records in the UK as far north as Northumberland, the spider has mainly been recorded from the southeast and East Anglia. There are several widely scattered records from Sussex. The species is primarily associated with grassland habitat including calcareous grassland, but it has also been recorded from wetland habitats supporting sphagnum (Roberts, 1993). During the survey the insect was recorded from the Ifield Golf Course (Area A), a site which supported significant areas of grassland habitat.

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
A linyphiid spider	<i>Trematocephalus cristatus</i>	Linyphiidae	Araneae	Nationally Scarce	Area A,D	Ancient woodland and hedgerow	Tree Associated; Arboreal	<i>The majority of UK records for Trematocephalus cristatus are from the southeast English counties of Surrey and Sussex and the spider has been historically recorded from several sites within close proximity to the Ifield survey area, including a record from within 5km of the site. According to Harvey et al (eds.) (2002) the spider can be quite numerous at sites where it is found. T. cristatus 'occurs on the foliage of various trees and bushes, especially oak, birch and gorse, in a variety of situations such as woodland, heathland, gardens, parkland, etc'. (Harvey et al (eds.), 2002). During the survey both male and female spiders were beaten from deciduous foliage in Area D.</i>
A philodromid spider	<i>Thanatus striatus</i>	Philodromidae	Araneae	Nationally Scarce	Area D	General grassland and woodland field layer	Open Habitats; Tall Sward and Scrub	<i>The main UK stronghold of Thanatus striatus includes coastal sites around the Thames Gateway in south Essex and north Kent; however, there are also a number of inland records and the spider has been well recorded in Surrey and there are several records from inland sites in Sussex. Harvey et al. (2002) states that 'T. striatus occurs on the ground at the base of vegetation in sandy grassland, heathland and dunes but also in tussocky grassland on sea walls, in brackish grassland, saltmarsh, dyke edges, waste ground and old sand pits.' During the current survey several specimens of the spider was recorded only from grassland or field margin habitat in Area D.</i>

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
A jumping spider	<i>Sibianor aurocinctus</i>	Salticidae	Araneae	Nationally Scarce	Area A	General grassland and woodland field layer	Open Habitats; Short Sward and Bare Ground; Bare Sand and Chalk	<i>Sibianor aurocinctus</i> is a rare jumping spider which is more or less restricted to southeast England, where it is commonest in the Thames Corridor area (Bee et al, 2017). There are relatively few Sussex records; however, there is a pre-1980 record of the spider within five kilometres east of the survey area. The spider has no clear habitat affinity other than being associated with dry, sparsely vegetated habitats including heathland, chalk grasslands and brownfield sites. During the survey the spider was recorded from the Ifield Golf Course (Area A), a site which supported areas of short, free-draining dry grassland habitat in mosaic with scrub at the edge of broadleaved woodland habitat.
A theridiid spider	<i>Episinus maculipes</i>	Theridiidae	Araneae	Nationally Scarce	Area A	General grassland and woodland field layer	Tree Associated; Arboreal	<i>Episinus maculipes</i> has until recently been considered an extreme rarity in the UK; however, there has been an increase in recording in recent years and the species is now listed as nationally scarce. Whilst the majority of records are from sites near the coast between Cornwall and Kent, the species has also been recorded inland and there are Sussex records within less than 18 kilometres east and 25 kilometres west of the survey area. According to Bee et al (2017), the spider occurs in woodland edge and on the coast in vegetated cliff habitats, often in association with Ivy. During the survey the spider was recorded from the Ifield Golf Course (Area A), a site which supported significant areas of areas of scrub at

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								<i>the edge of broadleaved woodland habitat, alongside wet and dry grassland habitat.</i>
A woodworm beetle	<i>Anobium inexpectatum</i>	Anobiidae	Coleoptera	Nationally Scarce (Nb)	Area A	Broadleaved woodland/ Scrub Edge	Tree Associated; Decaying wood	<i>Anobium inexpectatum</i> is a wood-boring beetle closely related to the commoner woodworm beetle <i>A. punctatum</i> . The male specimen was determined by morphological characters and comparison of genital capsules. In the UK, <i>A. inexpectatum</i> has been recorded widely across the southern half of the UK, with a concentration of records in north Kent and there are several records from West Sussex. The beetle is, according to Hyman and Parsons (1992) found in 'Woodland, pasture woodland, neglected orchards, quarries and old, ivy covered buildings'. Unlike closely related species, the beetle breeds almost exclusively in the stems of old Ivy <i>Hedera helix</i> . During the 2018 survey the insect was beaten from woodland edge or woodland habitat in Area A.
An apionid weevil	<i>Protapion difforme</i>	Apionidae	Coleoptera	Nationally Scarce (Nb)	Area C	Broadleaved woodland edge	Open Habitats; Tall Sward and Scrub	<i>Protapion difforme</i> is one of a number of species of the Apionidae family recorded during the survey. The species is largely confined to the southern half of the UK and it is arguably most frequently recorded from the southeast. The beetle has been recorded from several locations in West Sussex. <i>P. difforme</i> has been associated with knotgrass <i>Polygonum</i> spp., though Hyman and Parsons (1992) suggest that it may be more closely associated with clovers <i>Trifolium</i> spp. <i>P. difforme</i> is associated

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								<i>with habitats including, according to Hyman and Parsons (1992) 'Damp grassland, wetland, disturbed ground, hedgebanks and along ditches'. During the survey, the weevil was beaten from woodland edge habitat in Area C. The habitat in this unit was also characterised by wet grassland, which is likely to provide the typical habitat for this species. Ground dwelling apionids are frequently beaten from trees and scrubs.</i>
A ground beetle	<i>Tachys bistriatus</i>	Carabidae	Coleoptera	Nationally Scarce	Area E	Tall sward grassland and tall herb vegetation	Wetland; Marshland	<i>Tachys bistriatus</i> is described in Luff (2007) as being 'very scarce' and 'Extremely local in southern and eastern England'. The species was listed as Nationally Scarce (Least Concern) in a status review by Telfer (2016). The majority of records are from the extreme south of England, close to the south coast, although there are scattered records as far north as Yorkshire. In Sussex, there are post-1990 records in the Haywards Heath and Horsham areas. This minute ground beetle is associated with 'damp sand and clay near fresh water'. During the survey the insect was recorded from damp meadowland close to a hedgerow in Area E.
A leaf weevil	<i>Polydrusus flavipes</i>	Curculionidae	Coleoptera	Nationally Scarce (Nb)	Area C	Broadleaved woodland	Tree Associated; Arboreal	<i>Polydrusus flavipes</i> is a scarce weevil in the UK with records widely scattered as far north as the extreme north of England. However, most records are from southeast England. According to Hyman and Parsons (1992), the weevil is primarily associated with 'young oak

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								and aspen', being also possibly occurring on 'hazel, beech, birch and hawthorn', although Hyman and Parsons (1992) also state that the beetle 'has also been noted from mature oaks in parkland'. The recorded habitat includes open and coppiced broadleaved woodland and pasture woodland. During the survey, the beetle was beaten from broadleaved woodland/woodland edge in Area C. The habitat supported Pedunculate Oak <i>Quercus robur</i> , Ash <i>Fraxinus excelsior</i> woodland, with understorey trees including Hawthorn <i>Crataegus monogyna</i> and Field Maple <i>Acer campestre</i> .
A malachite beetle	<i>Axinotarsus pulicarius</i>	Malachiidae	Coleoptera	RDB3 'rare' (pre-1994)/'Vulnerable' (post-2001 IUCN guidelines)	Area C	Broadleaved woodland groundlayer	Open Habitats; Tall Sward and Scrub	In addition to a specimen conforming to the more widespread recent UK colonist, <i>Axinotarsus marginalis</i> recorded from Area A, a male specimen collected from Area C keyed out as <i>Anixotarsus pulicarius</i> . <i>A. pulicarius</i> is a rare and seldom recorded malachite beetle, with records in the UK being restricted to a few sites in the Thames Corridor area and Surrey, and according it has apparently been lost from former coastal localities in Kent. In a review by Alexander (2014), the beetle was classed Nationally Rare (RDB3) and with a threat status of 'Vulnerable'. The nearest record to the Ifield survey area is from near Fairmile in Surrey, approximately 25km northwest of the site. According to Alexander (2014), the larvae is thought to develop in stems, or at the roots of plants in areas of damp grassland and coastal shingle, whilst the

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								adult is associated with flowers and flowering grasses in rank herbage and ruderal vegetation. Alexander (2014) conjectures that habits with permanently moist soils may be important for <i>A. pulicarius</i> . During the survey the insect was recorded from Area C, this site supported wet grassland within paleochannels and other riparian habitat. The wet grassland comprised grasses such as Marsh Foxtail <i>Alopecurus geniculatus</i> and Floating Sweet Grass <i>Glyceria fluitans</i> .
A tumbling flower beetle	<i>Mordellistena variegata</i>	Mordellidae	Coleoptera	Nationally Scarce	Area D	Deciduous hedgerow/ deciduous woodland	Not attributed	In a recent status revision by Alexander et al (2015), <i>Mordellistena variegata</i> was listed as nationally scarce. The insect has a patchily recorded distribution with records being confined to the southern half of the UK. There are a number of records from the West Midlands south of Birmingham, with relatively fewer records stretching eastwards to Norfolk. In the south, the insect is confined to the southeast, with a number of records from Surrey, Sussex and Kent, south of London. There is a historic record of the insect from approximately 3 kilometres west of the survey area, at Rusper. Like other tumbling flower beetles, <i>M. variegata</i> is a saproxylic species. The larvae develop in delignified rotting wood and the beetle has been recorded from a range of broadleaved trees including Pedunculate Oak <i>Quercus robur</i> , Field Maple <i>Acer campestre</i> and Rowan <i>Sorbus aucuparia</i> . The insect is also sometimes associated with traditionally managed fruit orchards. During the

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								survey the beetle was beaten from habitat comprising Pedunculate Oak, Hawthorn, Hazel, Ash and other broadleaved trees.
Dusky Cockroach	<i>Ectobius lapponicus</i>	Blattellidae	Dictyoptera	Nationally Scarce	Area A,D,E	Grassland/woodland margin	Open Habitats; Tall Sward and Scrub	<i>Dusky Cockroach Ectobius lapponicus</i> is one of three species of cockroach native to the UK. Like the other two species, <i>Dusky Cockroach</i> is mainly restricted to southern England where the majority of records are from central counties south of London. There are several records from Sussex including a record from Ifield Golf Course (Area A) within the Ifield survey area. Whilst the insect tends to be fairly common where it occurs, it was classed Nationally Scarce in a review by Sutton (2015). <i>Dusky Cockroach</i> occurs in a fairly diverse range of predominately, dry habitats including woodland margins, scrub and grassland on both calcareous and acidic soils. During the survey the insect was recorded from areas A,D and E and appears to be well represented within the general area.
A grass fly	<i>Dicraeus scibilis</i>	Chloropidae	Diptera	Nationally Scarce	Area D	General grassland and woodland field layer	Open Habitats; Tall Sward and Scrub	<i>Dicraeus scibilis</i> is one of several flies of the family chloropidae recorded during the survey. The insect is, according to Falk et al (2016) 'Very localised and infrequently recorded, except on the north Kent Marshes where it is locally frequent'. However, it has been recorded

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								from a number of southern English counties including Sussex. Whilst the fly is most strongly associated with coastal grassland, including saltmarsh and dune habitats, inland records are mainly from water meadows and unimproved pastures. The biology of the species is unknown, however, Falk et al (2016) speculates that the 'Larvae probably develop in grass seeds like related species'. During the survey, <i>D. scibilis</i> was recorded from grassland habitat in Area D, this area is bordered by the Ifield Brook and River Mole.
A grass fly	<i>Lasiambia coxalis</i>	Chloropidae	Diptera	Data Deficient	Area A		Open Habitats; Tall Sward and Scrub	<i>Lasiambia coxalis</i> is a rare species of the family chloropidae, or grass flies. Unlike most other chloropids, <i>L. coxalis</i> is a larval parasite within the eggs of grasshoppers (Acrididae). However, little information could be found on this species in the UK, either in terms of distribution or biology. During the survey the fly was recorded from Area A, the Ifield Golf Course, where it was likely to be associated with grasshoppers occurring within the taller sward edge habitat.
A grass fly	<i>Meromyza femorata</i> agg.	Chloropidae	Diptera	Insufficiently known (UK pre-1994)	Area C	General grassland	Open Habitats; Tall Sward and Scrub	<i>Meromyza femorata</i> agg. is an aggregate of chloropid flies which was classed in the data deficient category in terms of pre-1994 classification. The fly has been widely recorded across the southern half of the UK with many records being coastal. Like other grass flies, <i>M. femorata</i> probably feeds on grasses. During the survey the insect was recorded from Area C. An area

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								<i>which included drier grassland and damper paleochannel habitat.</i>
A long-legged fly	<i>Achalcus bimaculatus</i>	Dolichopodidae	Diptera	Nationally Scarce	Area D	General grassland and woodland field layer/riparian margin	Wetland; Peatland	<i>Achalcus bimaculatus, a species of long-legged fly was classed as nationally scarce in a review by Drake (2018). The species was described as new to science as recently as 1997. The fly appears to have a very thinly scattered recorded distribution, mainly across the southern half of the UK, and has been recorded in 6-15 hectads since 1990 scattered from Cornwall to Norfolk. According to Drake (2018), A. bimaculatus is a wetland species found in fen, poor fen, reedbed and carr (probably strays from adjacent open mire), usually of high quality; and is found mainly on peat soils. During the survey the fly was recorded only from Area D, probably within the riparian woodland habitat.</i>
A long-legged fly	<i>Dolichopus virgultorum</i>	Dolichopodidae	Diptera	Nationally Scarce	Area A,C,D,E		Wetland; Peatland	<i>Dolichopus virgultorum is an uncommon species of long-legged fly. The insect has been historically recorded in scattered locations in southern England and South Wales, with several records from West Sussex including records immediately south of Dorking and also around Uckfield and Tonbridge Wells to the east of the survey area. In a recent review by Drake (2018) the fly is said to be 'showing an apparent increase in frequency but not expansion of range', and that it is 'likely to be associated mainly with damp (but not saturated) ground or water margins in broadleaf</i>

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								woodland and scrub rather than more open habitats'. <i>D. virgultorum</i> was well recorded during the 2018-19 survey being recorded from Areas A, C, D and E.
A short-palped cranefly	<i>Limonia trivittata</i>	Limoniidae	Diptera	Nationally Scarce	Area D	General grassland and woodland field layer/riparian margin	Tree Associated; Shaded Woodland Floor/Wet woodland. Wetland; Running water/Wet woodland.	<i>Limonia trivittata</i> is local species of short-palped cranefly associated with wetland and wet woodland habitats. The insect has been recorded from scattered localities across the UK and from several localities in Sussex, including a record from near Horsham, approximately seven kilometres from the survey area. Falk (1991) describes the favoured habitat of <i>L. trivittata</i> as 'Wet woodlands on calcareous soils, especially besides rivers'. Although the biology is said to be 'unknown', Falk refers to a probable association with <i>Butterbur Petasites hybridus</i> , suggesting that the larvae may develop 'in petioles or rootstocks'. During the survey <i>L. trivittata</i> was recorded from Area D, this area supporting riparian woodland habitat.
An opomyzid fly	<i>Geomyza subnigra</i>	Opomyzidae	Diptera	Nationally Scarce	Area E		Open Habitats; Tall Sward and Scrub	<i>Geomyza subnigra</i> is the rarest of several two-winged flies of the family Opomyzidae recorded during the survey. The insect has been recorded from widely scattered locations in southern England and Wales as well as from Scotland. The nearest known record to the survey area is from north of Woking, Surrey around 35km northwest of the survey area, a relatively small distance in consideration of the sparsity of national records. According to Falk et al (2016) <i>G. subnigra</i> has been recorded

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								from mainly dry habitats including 'dry grassland on chalk downs, heathland, dunes and shingle ridges behind beaches'. Adults of the insect have been recorded from around the roots of grasses including False Oat-grass <i>Arrhenatherum elatius</i> , Tufted Hair-grass <i>Deschampsia cespitosa</i> . Falk et al (2016) suggest that the species may be more widespread than records indicate, due to its illusive nature and that vacuum sampling (used during the current survey) may be a more effective capture method than sweep netting. During the survey <i>G. subnigra</i> was recorded from unmown field edge habitat in Area E.
Painted Nomad Bee	<i>Nomada fucata</i>	Pipunculidae	Diptera	Nationally scarce (Na)	Area A		Open Habitats; Short Sward and Bare Ground; Rich flower resource	<i>Nomada fucata</i> is a cuckoo bee which lays its eggs in the nest of its host the Yellow-legged Mining Bee <i>Andrena flavipes</i> . The insect, like its host is associated with a range of habitats including, according to Falk (2015), 'soft rock cliffs, chalk downland and brownfield sites such as quarries and sandpits. The bee nectars as an adult on various shrubs, yellow composites, buttercups and cinquefoils. <i>N. fucata</i> has a largely found in southern UK where it occurs most commonly in coastal habitats. However, the range has expanded in recent decades. There are a number of confirmed and unconfirmed records from sites north of the survey area in Surrey and also in West Sussex to the south. During the 2019 survey the bee was recorded from the Ifield Golf Course (Area A), its host <i>Andrena</i>

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								<i>flavipes</i> was not recorded, but is likely to also occur on site.
A big-headed fly	<i>Tomosvaryella minima</i>	Pipunculidae	Diptera	Near Threatened - IUCN post-1994	Area A		Open Habitats; Short Sward and Bare Ground; Bare Sand and Chalk	<i>Tomosvaryella minima</i> is an uncommon species of big-headed fly which is currently classed under post-2001 IUCN guidelines as <i>pNear Threatened</i> . According to Falk and Chandler (2005) the fly has been mainly recorded from East Anglia with one record from South Wales and the insect does not appear to have been previously recorded from Sussex. Falk and Chandler describe the favoured habitat of the species as 'Dry, sandy areas, both on coastal dunes and inland on heaths in the Brecklands'. The biology of <i>T. minima</i> is not known, but other members of the genus <i>Tomosvaryella</i> are internal parasites as larvae of leafhoppers (Cicadellidae). During this survey the fly was recorded only from the Ifield Golf Course (Area A), a site which has areas of dry sandy and short grassland and exposed sand areas in the form of sand traps.

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
A tephritid fly	<i>Acinia corniculata</i>	Tephritidae	Diptera	RDB1 'Endangered' (pre-1994 IUCN criteria)	Area D	General grassland and woodland field layer	Open Habitats; Tall Sward and Scrub	<i>Acinia corniculata</i> is a rare species of tephritid fly which has been recorded from a few, widely scattered localities in the UK. Most records are from southeast England, with additional records from the Isle of Wight, East Anglia and North Wales. Whilst the species is undoubtedly rare, it has been increasingly recorded since a review by Falk (1991) when it was classed 'Endangered' under pre-1994 IUCN criteria; at this point the fly was known only from three locations nationally. <i>A. corniculata</i> has been recorded from Sussex and adjoining Surrey with the nearest record to the Ifield site being from Ranmore Common, around c15km northwest of the site. The insect is associated with meadows, fens and drier grassland habitats and the larvae are known to develop from the flowerheads of Common Knapweed <i>Centaurea nigra</i> . Falk (1991) recommends that herb-rich grassland sites supporting <i>A. corniculata</i> should be managed on grazing and or cutting rotation, with Common Knapweed left uncut until after seeds are set. During the survey a single specimen was collected from grassland habitat in Area D. The specimen was authenticated by Dr Tony Irwin (Senior natural history curator at Norwich Museum).

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
A picture-winged fly	<i>Myopites inulaedyssentericae</i> ( <i>apicatus</i> )	Tephritidae	Diptera	Rare (RDB3) pre-1994 criteria	Area D	General grassland and woodland field layer	Open Habitats; Tall Sward and Scrub	<i>Myopites inulaedyssentericae</i> (previously known as <i>M. apicatus</i> ) is currently classed as RDB3 'rare' under pre-1994 criteria. The fly has been recorded from sites across southern England, with most records being from the solent area, including the Isle of Wight. The fly has been recorded from near Leatherhead, north of Dorking and from several sites to the south in Sussex. The fly develop in the flowerheads of Fleabane <i>Pulicaria dysenterica</i> (White, 1988) and possibly other plants. Fleabane was common in the damper areas and field margins within the survey area, where the fly was recorded from Area D.
A lacehopper	<i>Reptalus panzeri</i>	Cixiidae	Hemiptera	Nationally Scarce	Area A	Broadleaved woodland/ Scrub Edge	Open Habitats; Short Sward and Bare Ground	<i>Reptalus panzeri</i> (previously known as <i>Oliarus panzeri</i> ), is a generally uncommon species of lacehopper, which is largely restricted to southeast England in the UK, where it can be relatively common in the London area. There are a few records from Sussex, including a record from Newhaven in 2003, though it is uncertain whether or not it has been recorded in the Crawley area. According to Kirby (1992), the ecology of the insect is 'somewhat obscure', though it has been 'found on a number of occasions in areas which are periodically waterlogged, but dry out and crack in the summer'. There is a theory that the cracking may be important by enabling the insect to oviposit below normal ground level. The adults are recorded both from grassland and from shrubs

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								and bushes; however, it is considered to be a predominately grassland insect. During the survey, <i>R. panzeri</i> was beaten from the woodland edge habitat of the Ifield Golf Course. There are a variety of wet and dry grassland habitats including ephemeral ponds and ditches in this area.
A mirid bug	<i>Lygus pratensis</i>	Miridae	Hemiptera	RDB3 'rare'	Area A,C,D,E	Grassland/woodland margin	Open Habitats; Scrub Heath and woodland	<i>Lygus pratensis</i> is one of a group of very similar species in the same genus, which can only reliably separated by microscopic examination. This mirid bug was formerly regarded as rare in the UK, but has undergone a significant range expansion in recent years. According to Kirby (1992), <i>L. pratensis</i> was most frequently recorded from ancient forest rides, although there are also records of the species being recorded from low-growing more open situations and also from open heathland. Many of the records for this species are from south-east England including the Thames Gateway and the species has been recorded in Sussex and nearby Surrey. During the survey <i>L. pratensis</i> specimens were swept from grassland, and scrub habitat in Areas A,C,D and E, another <i>Lygus</i> species, the Tarnished Plant Bug <i>L. rugilipennis</i> was also recorded.
Brown Ant	<i>Lasius brunneus</i>	Formicidae	Hymenoptera	Nationally Scarce	Area D	Ancient woodland and hedgerow	Tree Associated; Decaying wood	In the UK, <i>Lasius brunneus</i> is mainly confined to the central and southern counties of England. It has been recorded from West Sussex, but not within close proximity to the survey area.

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								<i>The species is associated with mature, but still living deciduous trees and whilst the ant has often been associated with oak Quercus spp., it also occurs on other trees. The ant uses tunnels beneath the bark, but nests deeper within the trunk or within the root system. During the survey, several specimens were beaten from ancient woodland or hedgerow habitat in Area D.</i>
Sharp-collared Furrow Bee	<i>Lasioglossum malachurum</i>	Halictidae	Hymenoptera	Nationally Scarce (Nb)	Area E	Poor SI grassland adjacent dense, unmanaged hedgerows	Open Habitats; Short Sward and Bare Ground; Rich flower resource	<i>Sharp-collared Furrow Bee Lasioglossum malachurum was once a great rarity in the UK, but has undergone a significant range expansion in recent decades. The insect now occurs across much of southern England, but is still rare in the west with only scattered records from Wales and Cornwall. Sharp-collared Furrow Bee has been recorded at a number of sites both in Sussex and nearby in Surrey. The insect is eusocial and nests in 'dense and occasionally extensive aggregations' (Else and Edwards, 2018), Nest sites are usually on level, or gently sloping exposed or sparsely ground. The bee is widely polylectic collecting both pollen and nectar from a wide range of flowering herbs and shrubs. The species is also catholic in its habitat choice, occurring in a wide range of different habitats, including agricultural land. During the survey, L. malachurum was recorded only from field margin habitat in Area E.</i>

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
Lobe-spurred Furrow Bee	<i>Lasioglossum pauxillum</i>	Halictidae	Hymenoptera	Nationally Scarce (Nb)	Area D	Woodland groundlayer and arable field margins	Open Habitats; Short Sward and Bare Ground; Rich flower resource	Formerly a rare species in the UK, Lobe-spurred Furrow Bee has increased its UK range in recent years and has now been recorded over much of southern England and therefore its conservation status is likely to be revised. There are several records from West Sussex. The species is associated with a range of habitats including chalk grassland and open woodland. It nests in bare ground forming small to large nesting aggregations. The bee is polylectic, nectaring on various flowering herbs. The species was recorded from field margin, open grassland and open edges of woodland during the 2018 survey. (sources: Else and Edwards (2018) and Edwards and Broad (2005).
Blood-vein	<i>Timandra comae</i>	Geometridae	Lepidoptera	S41 'research only'	Area A	Pond edge	Open Habitats; Tall Sward and Scrub	The Blood-vein is one of a number of moth species which are still generally widespread and common in England, but were included in the 'research only' category of Section 41 list as 'Species of principal importance' due to a recorded decline in the UK in recent decades. Bloodvein is associated primarily with 'damp places with rank, herb-rich vegetation including hedgerow ditches, woodland rides, wet meadows and gardens .' (Waring and Townsend, 2003). Larval foodplants include docks <i>Rumex</i> spp., knotgrass <i>Polygonum</i> spp. During the survey Blood-vein was recorded only from within the Ifield Golf Course (Area A); however, the species is likely to occur within suitable habitat across the site as a whole.

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
Sallow Moth	<i>Cirrhia icteritia</i>	Noctuidae	Lepidoptera	S41 'research only'	Area D	Woodland groundlayer and arable field margins	Tree Associated; Arboreal	<i>The Sallow Moth is one of a number of moth species which are still generally widespread and common in England, but were included in the 'research only' category of Section 41 list as 'Species of principal importance' due to a recorded decline in the UK in recent decades. The insect is associated with damp woodland, heathland and marshland habitats; the larvae feed initially on Sallow Salix cinerea catkins and then on herbaceous plants. During the survey the moth was recorded from Area D.</i>
Brown Hairstreak	<i>Thecla betulae</i>	Lycaenidae	Lepidoptera	S41 'priority species'; Post-2001 IUCN 'Vulnerable'	Area B, D	Neutral grassland with dense unmanaged blackthorn scrub and mature trees	Tree Associated; Arboreal	<i>brown hairstreak Thecla betulae is a local species of butterfly occurring in southern Britain. Due to a significant recorded decline in recent decades due to hedgerow removal and changes in management including mechanised flailing of hedgerows, the species has been included as a S41 species. The species is also listed as 'Vulnerable' under post 2001 IUCN criteria. brown hairstreak is associated with hedgerows, shrub and woodland edge where the larval foodplant Blackthorn Prunus spinosa is a prominent component. Management is important and in particular, hedgerows and Scrub Edge habitats not managed by annual flailing are required. The butterfly also favours habitat with mature standard trees such as Ash Fraxinus excelsior and hedgerows with a good structural succession, where Bramble Rubus fruticosus agg., and tall herbs such as Hemp Agrimony Eupatoria cannabinum and Fleabane Pulicaria dysenterica are</i>

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								present. Due to several historic records of brown hairstreak on and in close proximity to the saurvey area, a transect was undertaken during the current survey. Adult butterflies were recorded along unmanaged hedgerows and Scrub Edge habitat in Areas A and B.
Small Heath	<i>Coenonympha pamphilus</i>	Nymphalidae	Lepidoptera	S41 'priority species'; Post-2001 IUCN 'Near Threatened'	Area C	Short sward grassland	Open Habitats; Short Sward and Bare Ground; Open Short Sward	Small Heath <i>Coenonympha pamphilus</i> is a small butterfly which is still widespread and common over the whole of the UK; however, a dramatic recorded decline within recent decades has led to the species being included as an S41 and S42 'Species of principal importance' in England and Wales respectively. The species has also been classed under post-2001 IUCN criteria as 'Near Threatened'. The butterfly is found in open, sunny habitats including grassland, heaths, meadows, sand dunes etc. Adults favour areas with short sward. Larvae feed on various grasses including bent grasses <i>Agrostis</i> spp., fescues <i>Festuca</i> spp. and meadow grasses <i>Poa</i> spp. During the survey Small Heath was recorded in semi-improved grassland habitat in Areas B and C.
Scarce chaser	<i>Libellula fulva</i>	Libellulidae	Odonata	IUCN Post-2001 'Near Threatened'	Area A	Pond edge	Wetland; Running water; Slow flowing rivers	The Scarce chaser <i>Libellula fulva</i> was once a rare species restricted to a few lowland river systems in southern and eastern England in the UK; however, according to Brooks and Cham (2004), the dragonfly has since the mid 2000s 'expanded its range at rate faster than all other species in Britain except the Small Red-eyed Damselfly.' There are a number of records from West Sussex,

Common name	Scientific name	Family	Order	UK status	Recorded sample Area	Recorded habitat	Pantheon affinities	Description
								<p>particularly towards the west of the survey area near Horsham. Whilst the dragonfly has expanded its UK range, it has been afforded 'Near Threatened' status under post-2001 IUCN criteria due to the threat posed by development of its favoured habitat which includes the flood-plains of slow-flowing rivers and marshes with dense, abundant vegetation. An adult male Scarce darter was recorded adjacent to one of the ponds within the Ifield Golf Course (Area A) during the survey. Whilst an adult were recorded, no larvae of this species was recorded during the aquatic component of the survey; whilst this does not constitute proof that the dragonfly does not breed on site, it is typically associated with backwaters and ditches rather than ponds as breeding habitat and the riparian habitat on site was heavily shaded and arguably unsuitable as breeding habitat for Scarce chaser.</p>

## Combined field survey areas - Pantheon output tables

Table 5: Habitats and resources: Broad biotopes (Combined sites)

Broad biotopei	No. of species	% representation	SQI	Conservation status	Species with conservation status
Open Habitats	359	8	117	5 NSi; 2 Nbi; 2 [Na]; 1 Section 41 Priority Species; 2 NTi; 1 [RDB 1]; 2 NRi; 1 VUi; 1 pNS; 1 [Nb]; 2 [RDB 3]; 1 Section 41 Priority Species - research only	18
Tree Associated	165	5	113	2 NSi; 1 Section 41 Priority Species; 1 pNT; 1 pNS; 1 Nbi; 1 Legal Protectioni; 1 VUi; 1 Section 41 Priority Species - research only; 1 Notablei	7
Wetland	138	5	113	3 NSi; 1 Notablei; 1 NTi	5
Coastal	2	<1	100		

Table 6: Habitats and resources: Habitats (Combined sites)

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Tall sward & scrub <a href="http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub">http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub</a>	305	11	4 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 pNS; 1 [RDB 3]; 1 Section 41 Priority Species - research only; 1 [RDB 1]; 1 Nb <a href="http://www.brc.ac.uk/pantheon/lexicon/nb">http://www.brc.ac.uk/pantheon/lexicon/nb</a> ; 1 NR <a href="http://www.brc.ac.uk/pantheon/lexicon/nr">http://www.brc.ac.uk/pantheon/lexicon/nr</a> ; 1 VU <a href="http://www.brc.ac.uk/pantheon/lexicon/vu">http://www.brc.ac.uk/pantheon/lexicon/vu</a>	116	10
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Arboreal <a href="http://www.brc.ac.uk/pantheon/lexicon/arboreal">http://www.brc.ac.uk/pantheon/lexicon/arboreal</a>	79	6	1 Nb <a href="http://www.brc.ac.uk/pantheon/lexicon/nb">http://www.brc.ac.uk/pantheon/lexicon/nb</a> ; 1 Section 41 Priority Species; 1 Legal Protection <a href="http://www.brc.ac.uk/pantheon/lexicon/l">http://www.brc.ac.uk/pantheon/lexicon/l</a>	111	5

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
				egal-protection; 1 VU <a href="http://www.brc.ac.uk/pantheon/lexicon/vu">http://www.brc.ac.uk/pantheon/lexicon/vu</a> ; 2 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 Section 41 Priority Species - research only		
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	75	9	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	108	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Shaded Woodland Floor <a href="http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor">http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor</a>	60	5	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	105	1
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	44	4	2 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	121	2
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	44	3	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 2 [Na]; 2 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a> ; 1 Section 41 Priority Species; 1 Nb <a href="http://www.brc.ac.uk/pantheon/lexicon/nb">http://www.brc.ac.uk/pantheon/lexicon/nb</a> ; 1 [Nb]; 1 NR <a href="http://www.brc.ac.uk/pantheon/lexicon/nr">http://www.brc.ac.uk/pantheon/lexicon/nr</a>	130	7
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	32	3	1 pNT; 1 pNS	129	1

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	24	2	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a> ; 1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a>	126	2
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	9	3	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	133	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	9	4	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	133	1
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Lake <a href="http://www.brc.ac.uk/pantheon/lexicon/lake">http://www.brc.ac.uk/pantheon/lexicon/lake</a>	7	6		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Upland <a href="http://www.brc.ac.uk/pantheon/lexicon/upland">http://www.brc.ac.uk/pantheon/lexicon/upland</a>	1	<1		100	
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Saltmarsh <a href="http://www.brc.ac.uk/pantheon/lexicon/saltmarsh">http://www.brc.ac.uk/pantheon/lexicon/saltmarsh</a>	1	<1		100	
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Brackish pools & ditches <a href="http://www.brc.ac.uk/pantheon/lexicon/brackish-pools-ditches">http://www.brc.ac.uk/pantheon/lexicon/brackish-pools-ditches</a>	1	<1		100	

Table 7: Habitats and resources: ISIS specific assemblage types (Combined sites)

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Bark & sapwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay">http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay</a>	20	4	116			A212	Favourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Rich flower resource <a href="http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource">http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource</a>	19	8	100	2 [Na]; 1 [Nb]	3	F002	Favourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub Edge <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-edge">http://www.brc.ac.uk/pantheon/lexicon/scrub-edge</a>	18	8	117	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	F001	Favourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Open Short Sward <a href="http://www.brc.ac.uk/pantheon/lexicon/open-short-sward">http://www.brc.ac.uk/pantheon/lexicon/open-short-sward</a>	7	4	100	1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a> ; 1 Section 41 Priority Species	1	F112	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub-heath & Moorland <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland">http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland</a>	6	2	100	1 [RDB 3]	1	F003	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Bare sand & chalk <a href="http://www.brc.ac.uk/pantheon/lexicon/bare-sand-chalk">http://www.brc.ac.uk/pantheon/lexicon/bare-sand-chalk</a>	4	<1	350	1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a> ; 1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 NR <a href="http://www.brc.ac.uk/pantheon/lexicon/nr">http://www.brc.ac.uk/pantheon/lexicon/nr</a>	2	F111	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	Open water on disturbed mineral sediments <a href="http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments">http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments</a>	3	8	100			W211	Unfavourable

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Epiphyte Fauna <a href="http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna">http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna</a>	3	15	100			A215	Favourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Heartwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/heartwood-decay">http://www.brc.ac.uk/pantheon/lexicon/heartwood-decay</a>	2	1	250			A211	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	Undisturbed fluctuating marsh <a href="http://www.brc.ac.uk/pantheon/lexicon/undisturbed-fluctuating-marsh">http://www.brc.ac.uk/pantheon/lexicon/undisturbed-fluctuating-marsh</a>	2	5	100			W221	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	Slow-flowing rivers <a href="http://www.brc.ac.uk/pantheon/lexicon/slow-flowing-rivers">http://www.brc.ac.uk/pantheon/lexicon/slow-flowing-rivers</a>	1	4	100	1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a>	1	W125	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	Seepage <a href="http://www.brc.ac.uk/pantheon/lexicon/seepage">http://www.brc.ac.uk/pantheon/lexicon/seepage</a>	1	2	100			W126	Unfavourable
		Epiphyte Fauna <a href="http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna">http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna</a>	1	5	100			A215	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	Reed-fen & pools <a href="http://www.brc.ac.uk/pantheon/lexicon/reed-fen-pools">http://www.brc.ac.uk/pantheon/lexicon/reed-fen-pools</a>	1	<1	400	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	W314	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	Open water in acid mire <a href="http://www.brc.ac.uk/pantheon/lexicon/open-water-in-acid-mire">http://www.brc.ac.uk/pantheon/lexicon/open-water-in-acid-mire</a>	1	5	100			W311	Unfavourable

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Saltmarsh <a href="http://www.brc.ac.uk/pantheon/lexicon/saltmarsh">http://www.brc.ac.uk/pantheon/lexicon/saltmarsh</a>	Saltmarsh & transitional brackish marsh <a href="http://www.brc.ac.uk/pantheon/lexicon/saltmarsh-transitional-brackish-marsh">http://www.brc.ac.uk/pantheon/lexicon/saltmarsh-transitional-brackish-marsh</a>	1	<1	100			M311	Unfavourable

## Area A - Pantheon output tables

Table 8: Habitats and resources: Broad biotopes (Area A)

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	228	5	110	1 [Na]; 4 NS <i>i</i> ; 1 Nb <i>i</i> ; 1 [RDB 3]; 1 Section 41 Priority Species - research only; 1 NT <i>i</i> ; 1 NR <i>i</i>	9
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	108	3	114	2 NS <i>i</i> ; 1 pNT; 1 pNS	3
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	83	3	107	1 NT <i>i</i> ; 1 NS <i>i</i>	2

Table 9: Habitats and resources: Habitats (Area A)

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Tall sward & scrub <a href="http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub">http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub</a>	196	7	3 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 Section 41 Priority Species - research only	105	4
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Arboreal <a href="http://www.brc.ac.uk/pantheon/lexicon/arboreal">http://www.brc.ac.uk/pantheon/lexicon/arboreal</a>	55	4	2 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	111	2
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	48	6		100	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Shaded Woodland Floor <a href="http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor">http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor</a>	34	3		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	28	2	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 NR <a href="http://www.brc.ac.uk/pantheon/lexicon/nr">http://www.brc.ac.uk/pantheon/lexicon/nr</a> ; 1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a> ; 1 [Na]; 1 Nb <a href="http://www.brc.ac.uk/pantheon/lexicon/nb">http://www.brc.ac.uk/pantheon/lexicon/nb</a>	148	4
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	26	2	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	124	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	24	2	1 pNS; 1 pNT	139	1

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	10	<1	1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a>	100	1
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	5	2		00	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	5	2		00	
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Lake <a href="http://www.brc.ac.uk/pantheon/lexicon/lake">http://www.brc.ac.uk/pantheon/lexicon/lake</a>	4	3		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Upland <a href="http://www.brc.ac.uk/pantheon/lexicon/upland">http://www.brc.ac.uk/pantheon/lexicon/upland</a>	2	1		00	

Table 10: Habitats and resources: ISIS specific assemblage types (Area A)

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Bark & sapwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay">http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay</a>	15	3	121			A212	Unfavorable

Broad biotope	Habitat	SAT	No. of species	% representation	S Q I	Conservation status	Species with conservation status	Code	Reported condition
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub Edge <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-edge">http://www.brc.ac.uk/pantheon/lexicon/scrub-edge</a>	12	5	125	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	F001	Favourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Rich flower resource <a href="http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource">http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource</a>	11	5	100	1 [Na]	1	F002	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub-heath & Moorland <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland">http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland</a>	3	<1	100	1 [RDB 3]	1	F003	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Open Short Sward <a href="http://www.brc.ac.uk/pantheon/lexicon/open-short-sward">http://www.brc.ac.uk/pantheon/lexicon/open-short-sward</a>	3	2	100			F112	Unfavourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Epiphyte Fauna <a href="http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna">http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna</a>	3	15	100			A215	Favourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Bare sand & chalk <a href="http://www.brc.ac.uk/pantheon/lexicon/bare-sand-chalk">http://www.brc.ac.uk/pantheon/lexicon/bare-sand-chalk</a>	3	<1	433	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 NR <a href="http://www.brc.ac.uk/pantheon/lexicon/nr">http://www.brc.ac.uk/pantheon/lexicon/nr</a> ; 1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a>	2	F111	Unfavourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Heartwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/heartwood-decay">http://www.brc.ac.uk/pantheon/lexicon/heartwood-decay</a>	2	1	250			A211	Unfavourable

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	Open water on disturbed mineral sediments <a href="http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments">http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments</a>	2	5	100			W211	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	Slow-flowing rivers <a href="http://www.brc.ac.uk/pantheon/lexicon/slow-flowing-rivers">http://www.brc.ac.uk/pantheon/lexicon/slow-flowing-rivers</a>	1	4	100	1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a>	1	W125	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	Open water in acid mire <a href="http://www.brc.ac.uk/pantheon/lexicon/open-water-in-acid-mire">http://www.brc.ac.uk/pantheon/lexicon/open-water-in-acid-mire</a>	1	5	100			W311	Unfavourable
		Epiphyte Fauna <a href="http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna">http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna</a>	1	5	100			A215	Unfavourable

## Area C- Pantheon output tables

Table 11: Habitats and resources: Broad biotopes (Area C)

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	118	3	111	1 Section 41 Priority Species; 1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a> ; 1 [Na]; 1 VU <a href="http://www.brc.ac.uk/pantheon/lexicon/vu">http://www.brc.ac.uk/pantheon/lexicon/vu</a> ; 1 NR <a href="http://www.brc.ac.uk/pantheon/lexicon/nr">http://www.brc.ac.uk/pantheon/lexicon/nr</a> ; 1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 Nb <a href="http://www.brc.ac.uk/pantheon/lexicon/nb">http://www.brc.ac.uk/pantheon/lexicon/nb</a>	5

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	60	2	110	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	43	1	107	1 Nb <a href="http://www.brc.ac.uk/pantheon/lexicon/nb">http://www.brc.ac.uk/pantheon/lexicon/nb</a>	1
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	2	<1	100		

Table 12: Habitats and resources: Habitats (Area C)

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Tall sward & scrub <a href="http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub">http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub</a>	108	4	1 Nb <i>i</i> ; 1 VU <i>i</i> ; 1 NR <i>i</i> ; 1 NS <i>i</i>	113	3
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	36	4		100	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Arboreal <a href="http://www.brc.ac.uk/pantheon/lexicon/arboreal">http://www.brc.ac.uk/pantheon/lexicon/arboreal</a>	22	2	1 Nb <i>i</i>	114	1
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	15	1	1 NS <i>i</i>	140	1
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	12	1		100	

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Shaded Woodland Floor <a href="http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor">http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor</a>	11	<1		100	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	11	<1		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	10	<1	1 [Na]; 1 NTi; 1 Section 41 Priority Species	100	2
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Lake <a href="http://www.brc.ac.uk/pantheon/lexicon/lake">http://www.brc.ac.uk/pantheon/lexicon/lake</a>	3	2		100	
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	1	<1		100	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	1	<1		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Upland <a href="http://www.brc.ac.uk/pantheon/lexicon/upland">http://www.brc.ac.uk/pantheon/lexicon/upland</a>	1	<1		100	
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Saltmarsh <a href="http://www.brc.ac.uk/pantheon/lexicon/saltmarsh">http://www.brc.ac.uk/pantheon/lexicon/saltmarsh</a>	1	<1		100	
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Brackish pools & ditches <a href="http://www.brc.ac.uk/pantheon/lexicon/brackish-pools-ditches">http://www.brc.ac.uk/pantheon/lexicon/brackish-pools-ditches</a>	1	<1		100	

Table 13: Habitats and resources: ISIS specific assemblage types (Area C)

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Bark & sapwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay">http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay</a>	10	2	100			A212	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Rich flower resource <a href="http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource">http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource</a>	8	3	100	1 [Na]	1	F002	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub Edge <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-edge">http://www.brc.ac.uk/pantheon/lexicon/scrub-edge</a>	4	2	100			F001	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	Open water on disturbed mineral sediments <a href="http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments">http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments</a>	2	5	100			W211	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub-heath & Moorland <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland">http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland</a>	1	<1	100			F003	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Open Short Sward <a href="http://www.brc.ac.uk/pantheon/lexicon/open-short-sward">http://www.brc.ac.uk/pantheon/lexicon/open-short-sward</a>	1	<1	100	1 NT <a href="http://www.brc.ac.uk/pantheon/lexicon/nt">http://www.brc.ac.uk/pantheon/lexicon/nt</a> ; 1 Section 41 Priority Species	1	F112	Unfavourable

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Saltmarsh <a href="http://www.brc.ac.uk/pantheon/lexicon/saltmarsh">http://www.brc.ac.uk/pantheon/lexicon/saltmarsh</a>	Saltmarsh & transitional brackish marsh <a href="http://www.brc.ac.uk/pantheon/lexicon/saltmarsh-transitional-brackish-marsh">http://www.brc.ac.uk/pantheon/lexicon/saltmarsh-transitional-brackish-marsh</a>	1	<1	100			M311	Unfavourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Epiphyte Fauna <a href="http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna">http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna</a>	1	5	100			A215	Unfavourable

## Area D - Pantheon output tables

Table 14: Habitats and resources: Broad biotopes (Area D)

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	212	5	118	1 [RDB 1]; 1 [Na]; 4 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 pNS; 2 [RDB 3]	9
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	91	3	110	1 Section 41 Priority Species; 1 Legal Protection <a href="http://www.brc.ac.uk/pantheon/lexicon/legal-protection">http://www.brc.ac.uk/pantheon/lexicon/legal-protection</a> ; 1 VU <a href="http://www.brc.ac.uk/pantheon/lexicon/vu">http://www.brc.ac.uk/pantheon/lexicon/vu</a> ; 1 Section 41 Priority Species - research only; 1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	4

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	72	3	117	2 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	3
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	1	<1	100		

Table 15: Habitats and resources: Habitats (Area D)

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Tall sward & scrub <a href="http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub">http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub</a>	182	7	3 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 pNS; 1 [RDB 3]; 1 [RDB 1]	119	6
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Arboreal <a href="http://www.brc.ac.uk/pantheon/lexicon/arboreal">http://www.brc.ac.uk/pantheon/lexicon/arboreal</a>	46	3	1 Section 41 Priority Species; 1 Legal Protection <a href="http://www.brc.ac.uk/pantheon/lexicon/legal-protection">http://www.brc.ac.uk/pantheon/lexicon/legal-protection</a> ; 1 VU <a href="http://www.brc.ac.uk/pantheon/lexicon/vu">http://www.brc.ac.uk/pantheon/lexicon/vu</a> ; 1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a> ; 1 Section 41 Priority Species - research only	107	3
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	38	5		108	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Shaded Woodland Floor <a href="http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor">http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor</a>	34	3	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	109	1

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	22	2	1 [Na]; 1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	114	2
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	21	2	2 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	130	2
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	19	2	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	133	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	13	1		123	
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Lake <a href="http://www.brc.ac.uk/pantheon/lexicon/lake">http://www.brc.ac.uk/pantheon/lexicon/lake</a>	4	3		100	
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	4	1	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	175	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	4	2	1 Notable <a href="http://www.brc.ac.uk/pantheon/lexicon/notable">http://www.brc.ac.uk/pantheon/lexicon/notable</a>	175	1
Coastal <a href="http://www.brc.ac.uk/pantheon/lexicon/coastal">http://www.brc.ac.uk/pantheon/lexicon/coastal</a>	Brackish pools & ditches <a href="http://www.brc.ac.uk/pantheon/lexicon/brackish-pools-ditches">http://www.brc.ac.uk/pantheon/lexicon/brackish-pools-ditches</a>	1	<1		100	

Table 16: Habitats and resources: ISIS specific assemblage types (Area D)

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Rich flower resource <a href="http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource">http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource</a>	12	5	100	1 [Na]	1	F002	Unfavourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Bark & sapwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay">http://www.brc.ac.uk/pantheon/lexicon/bark-sapwood-decay</a>	9	2	100			A212	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub Edge <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-edge">http://www.brc.ac.uk/pantheon/lexicon/scrub-edge</a>	9	4	133	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	F001	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub-heath & Moorland <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland">http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland</a>	4	1	100	1 [RDB 3]	1	F003	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Bare sand & chalk <a href="http://www.brc.ac.uk/pantheon/lexicon/bare-sand-chalk">http://www.brc.ac.uk/pantheon/lexicon/bare-sand-chalk</a>	3	<1	200	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	F111	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	Open Short Sward <a href="http://www.brc.ac.uk/pantheon/lexicon/open-short-sward">http://www.brc.ac.uk/pantheon/lexicon/open-short-sward</a>	3	2	100			F112	Unfavourable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	Reed-fen & pools <a href="http://www.brc.ac.uk/pantheon/lexicon/reed-fen-pools">http://www.brc.ac.uk/pantheon/lexicon/reed-fen-pools</a>	1	<1	400	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	W314	Unfavourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Epiphyte Fauna <a href="http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna">http://www.brc.ac.uk/pantheon/lexicon/epiphyte-fauna</a>	1	5	100			A215	Unfavourable

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	Seepage <a href="http://www.brc.ac.uk/pantheon/lexicon/seepage">http://www.brc.ac.uk/pantheon/lexicon/seepage</a>	1	2	100			W126	Unfavorable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	Open water on disturbed mineral sediments <a href="http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments">http://www.brc.ac.uk/pantheon/lexicon/open-water-on-disturbed-mineral-sediments</a>	1	2	100			W211	Unfavorable
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	Undisturbed fluctuating marsh <a href="http://www.brc.ac.uk/pantheon/lexicon/undisturbed-fluctuating-marsh">http://www.brc.ac.uk/pantheon/lexicon/undisturbed-fluctuating-marsh</a>	1	3	100			W221	Unfavorable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	Heartwood decay <a href="http://www.brc.ac.uk/pantheon/lexicon/heartwood-decay">http://www.brc.ac.uk/pantheon/lexicon/heartwood-decay</a>	1	<1	400			A211	Unfavorable

## Area E- Pantheon output tables

Table 17: Habitats and resources: Broad biotopes (Area E)

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
Open Habitats	126	3	102	1 [Na]; 1 [Nb]; 1 [RDB 3]; 1 NSi	4
Tree Associated	38	1	100		
Wetland	22	<1	143	2 NSi	2

Table 18: Habitats and resources: Habitats (Area E)

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Tall sward & scrub <a href="http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub">http://www.brc.ac.uk/pantheon/lexicon/tall-sward-scrub</a>	108	4	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	103	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Arboreal <a href="http://www.brc.ac.uk/pantheon/lexicon/arboreal">http://www.brc.ac.uk/pantheon/lexicon/arboreal</a>	25	2		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground <a href="http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground">http://www.brc.ac.uk/pantheon/lexicon/short-sward-bare-ground</a>	14	1	1 [Na]; 1 [Nb]	100	2
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Shaded Woodland Floor <a href="http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor">http://www.brc.ac.uk/pantheon/lexicon/shaded-woodland-floor</a>	10	<1		100	
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Marshland <a href="http://www.brc.ac.uk/pantheon/lexicon/marshland">http://www.brc.ac.uk/pantheon/lexicon/marshland</a>	9	1	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	138	1
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Peatland <a href="http://www.brc.ac.uk/pantheon/lexicon/peatland">http://www.brc.ac.uk/pantheon/lexicon/peatland</a>	9	<1	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	167	1
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood <a href="http://www.brc.ac.uk/pantheon/lexicon/decaying-wood">http://www.brc.ac.uk/pantheon/lexicon/decaying-wood</a>	5	<1		100	
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Running water <a href="http://www.brc.ac.uk/pantheon/lexicon/running-water">http://www.brc.ac.uk/pantheon/lexicon/running-water</a>	4	<1		100	
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	4	2		100	

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
Wetland <a href="http://www.brc.ac.uk/pantheon/lexicon/wetland">http://www.brc.ac.uk/pantheon/lexicon/wetland</a>	Wet woodland <a href="http://www.brc.ac.uk/pantheon/lexicon/wet-woodland">http://www.brc.ac.uk/pantheon/lexicon/wet-woodland</a>	4	1		100	
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Upland <a href="http://www.brc.ac.uk/pantheon/lexicon/upland">http://www.brc.ac.uk/pantheon/lexicon/upland</a>	1	<1		100	

Table 19: Habitats and resources: SS-specific assemblage scores (Area E)

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Rich flower resource <a href="http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource">http://www.brc.ac.uk/pantheon/lexicon/rich-flower-resource</a>	9	4	100	1 [Na]; 1 [Nb]	2	F002	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub Edge <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-edge">http://www.brc.ac.uk/pantheon/lexicon/scrub-edge</a>	6	3	150	1 NS <a href="http://www.brc.ac.uk/pantheon/lexicon/ns">http://www.brc.ac.uk/pantheon/lexicon/ns</a>	1	F001	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>		Scrub-heath & Moorland <a href="http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland">http://www.brc.ac.uk/pantheon/lexicon/scrub-heath-Moorland</a>	3	<1	100	1 [RDB 3]	1	F003	Unfavourable
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood	Bark & sapwood decay	2	<1	100			A212	Unfavourable

Broad biotope	Habitat	SAT	No. of species	% representation	S QI	Conservation status	Species with conservation status	Code	Reported condition
Tree Associated <a href="http://www.brc.ac.uk/pantheon/lexicon/tree-associated">http://www.brc.ac.uk/pantheon/lexicon/tree-associated</a>	Decaying wood	Epiphyte Fauna	1	5	100			A215	Unfavourable
Open Habitats <a href="http://www.brc.ac.uk/pantheon/lexicon/open-habitats">http://www.brc.ac.uk/pantheon/lexicon/open-habitats</a>	Short sward & bare ground	Open Short Sward	1	<1	100			F112	Unfavourable
Wetland	Marshland	Undisturbed fluctuating marsh	1	3	100			W221	Unfavourable

Table 20 – 2018 brown hairstreak transect results table

Brown hairstreak location number (corresponds to locations illustrated in Appendix 2 Figure 8)	Date seen	Area number	Habitat	When seen	Number seen
1	30/08/2018	B	Neutral grassland with dense unmanaged blackthorn scrub and mature trees	Seen during field sampling	1
2	30/08/2019	D	Mature Ash and unmanaged Blackthorn	Seen during brown hairstreak transect	1 (Single female seen on Blackthorn at head height. More potential individuals around Ash canopy.)
3	30/08/2019	D	Mature Ash and unmanaged Blackthorn	Seen during brown hairstreak transect	1
4	30/08/2019	D	Mature Blackthorn wood edge	Seen during brown hairstreak transect	1

## **APPENDIX B: Invertebrate Scoping Study**

# INVERTEBRATE SCOPING STUDY

Land West of Ifield

July 2018



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# Land West of Ifield

## Invertebrate Scoping Report

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Date JULY 2018

### VERSION CONTROL

Version	Date	Author	Changes
001	July 2018	Jon Mellings	Issue of final document

This report dated 20 July 2018 has been prepared for Homes England (the “Client”) in accordance with the terms and conditions of appointment dated 04 May 2018 (the “Appointment”) between the Client and **Arcadis Consulting (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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## Summary

An invertebrate scoping study was undertaken in response to a proposed planning application to potentially develop land comprising a network of fields, native semi-natural broadleaved woodland and a golf course situated to the west of Ifield, near Crawley, West Sussex.

Ecological information including designated site and historically recorded species data resulting from a data-search conducted by Sussex Biodiversity Record Centre (SxBRC) was consulted and a habitat only field survey covering the entire site (other than land where permission had not been granted), was conducted between 7<sup>th</sup> and 8<sup>th</sup> June 2018.

The site to the east of the Ifield Brook is subject to a non-statutory Local Wildlife Site (LWS) designation and the network of small hay meadows and scrub edge habitat, together with an area of semi-natural broadleaved woodland, supported habitat of significant potential value for scrub edge, grassland, arboreal and wood-decay invertebrates.

Habitat within the margins of the Ifield golf course was also found to support herb-rich grassland and scrub habitat of high potential for grassland, scrub-edge and arboreal invertebrates and similarly, the scrub/hedgerow and woodland edge habitat throughout the site supported a resource with potential to support species such as Brown Hairstreak (*Thecla betulae*), a Section 41 'Species of Principal Importance' and other species/assemblages associated with mature woody habitat.

A feature of the site was the number of mature and veteran Pedunculate Oak and Ash trees. These occurred within the hedgerows, riparian margins and as in-field standards as well as within small blocks of native semi-natural broadleaved woodland providing a significant potential resource for specialist arboreal, epiphyte and wood-decay invertebrates.

The site as a whole supported significant wetland habitat. Several well-vegetated ponds with potential to support aquatic invertebrates of conservation value occurred within the golf course and one within meadowland to the north of the site. Whilst the River Mole and Ifield Brook channels were for the most part heavily shaded, the silted, slow-flowing channels potentially supported breeding habitat for the 'Vulnerable' listed Brilliant Emerald Dragonfly (*Somatochlora metallica*), which has been recorded historically within close proximity to the site.

Besides the habitat within the LWS and the golf course, there were two small fields supporting herb-rich grassland habitat, also with hedge and scrub edge habitat with potential to support invertebrate habitat of conservation importance. The habitats within the site were representative of habitats in the landscape as a whole, which featured a number of broadleaved semi-natural woodlands including ancient woodland such as House Copse and Glover's Wood Sites of Special Scientific Interest (SSSIs), butterflies such as White Admiral (*Limenitis camilla*) and Purple Emperor (*Apatura iris*), both ancient woodland specialists and other specialist woodland invertebrates have been recorded on and around the site.

Due to the potential of woodland, scrub and uncut hedgerows and some of the site's meadowland and wetland habitats, detailed invertebrate surveys have been recommended within the survey area. Due to the importance of the site and surrounding landscape for the Brown Hairstreak, surveys to establish the occupancy of this species within the survey area have also been recommended. In addition, survey of the riparian corridors including the River Mole and the Ifield Brook for larvae of the Brilliant Emerald dragonfly may also be considered.

# 1 Introduction

The following report details the findings of a scoping study undertaken by Jon Mellings BSc (hons) MCIEEM on behalf of Arcadis to evaluate the potential invertebrate conservation value of an area of land located at Ifield to the west of Crawley, West Sussex. Survey findings aim to identify any habitats or species of higher conservation potential which may require further, more detailed survey. It is understood that the survey findings will contribute to existing ecological information collected to inform a planning application to develop the site.

The survey covered a complex of fields historically managed for mixed agricultural use together with areas of broadleaved woodland and wetland habitat including ponds, wet ditches and the Ifield Brook, which crosses the site from north to south. The Ifield golf course located at the southern end of the red-line area was also included in the survey.

Prior to scoping the site, existing post-1980 invertebrate records for the site provided by Sussex Biodiversity Records Centre (SxBRC) to inform the ecological surveys being undertaken by and on behalf of Arcadis were consulted. Due to historic records of Brown Hairstreak (*Thecla betulae*) both within and in close proximity to the site, some attention was paid to record the presence and distribution of suitable habitat for this species during the survey. Brown Hairstreak is currently classed as 'Vulnerable' in the UK under post-2001 IUCN guidelines, as well as being listed as a 'Species of Principal Importance' in England and Wales under Section 41 (42 Wales) of the Natural Environment and Rural Communities Act (2006) NERC Act.

## 2 Aims and Objectives

### 2.1 Aim

The main aim of the surveys was to scope the potential conservation value of invertebrate habitat within the site of a potential development on a parcel of land lying west of Ifield, near Crawley, West Sussex.

### 2.2 Objectives

1. To conduct a desk study of designated sites and invertebrate species recorded within close proximity of the site at Ifield;
2. To conduct a baseline invertebrate habitat scoping survey of the site at Ifield;
3. To produce a brief report including findings, an evaluation of key habitat and historically recorded species and an appraisal of the potential conservation value of the site's habitats for invertebrates;
4. Provide brief recommendations for further invertebrate surveys, potential development constraints and mitigation opportunities as required.

## 3 Method

The methodology described below is based on recommendations for surveying grassland and scrub/broad-leaved woodland edge habitats for invertebrate conservation evaluation outlined in Drake *et al.* (2007).

### 3.1 Desk Study

Prior to conducting fieldwork, existing information pertaining to the invertebrate fauna of the site was reviewed. This report includes a review of historic invertebrate records as well as statutory and non-statutory sites of nature conservation importance from within a two-kilometre radius of the survey area. Historic and

statutory/non-statutory site data consulted was supplied to Arcadis by Sussex Biodiversity Records Centre (SxBRC) for the purpose of the current and associated projects. The data search includes species records from 1980 onwards.

## 3.2 Field Survey

### 3.2.1 Timing

The site was surveyed over a two-day period including 7<sup>th</sup> and 8<sup>th</sup> June 2018.

The entire site was walked and detailed, geo-referenced target notes recorded in which habitat features were recorded. Target notes referenced both features of particular value as invertebrate habitat and general habitat as an *aide-memoire*. A photographic record was also made of key features recorded during the survey, these providing resolution to target note data.

### 3.2.2 Incidental species recording

No sampling was undertaken during the survey; however, a basic list of species identifiable without requirement of microscopic identification was collected.

## 3.3 Limitations

Importantly, incidental species recorded during the survey included more visible and easily spotted species. These consist mainly of common generalist invertebrates and cannot be seen alone as constituting an adequate representation of the sites invertebrate fauna. It is imperative, therefore, that the species records cannot be seen as a substitute for more detailed and targeted invertebrate sampling and species records are purely presented as background information purposes.

Local record centre species data provides positive records of species recorded; however, the species records within a given area are dependent on the recording effort of individuals and are often biased towards certain well-recorded groups e.g. butterflies and moths, dragonflies and damselflies etc. and the paucity of recording of less easily recognised species cannot be seen as proof of a lack or absence of such species.

The site was walked in its entirety and every effort was made to record habitat features of potential conservation value for invertebrates at a suitable resolution to inform a robust scoping study. However, the recognition of key habitat features with potential to support important invertebrate species or species assemblages is based on knowledge and experience. It cannot be guaranteed that habitats considered to have high conservation potential would be confirmed as such if surveyed in detail, or conversely, some habitat features supporting uncommon species or species assemblages may have been overlooked during the survey.

## 3.4 Landscape scale

### 3.4.1 Sites subject to statutory nature conservation designations

Sites subject to statutory designations due to their nature conservation interest within or within close proximity to the site are as follows:

#### ***Sites of Special Scientific Interest (SSSI)***

- **House Copse SSSI** - 650m south of the Ifield golf course. Small ancient woodland site with continuity of woodland cover since the middle ages. Designated for the rarity value of the woodland

type with Small-leaved Lime (*Tilia cordata*) and Hornbeam (*Carpinus betulus*) previously managed as coppice under oak (*Quercus* sp.) standards. No invertebrate references in the citation.

- **Buchan Hill Ponds SSSI** – 1.8km south of the Ifield golf course. Three ponds considered to be the best example in West Sussex of Wealden hammer ponds on acidic Tunbridge Wells sands. A nationally uncommon woodland type occurs around the ponds and the site supports a 'rich dragonfly fauna' which includes 'two particularly notable species'. These include Hairy Dragonfly (*Brachytron pratense*) and Brilliant Emerald (*Somatochlora metallica*). Downy Emerald (*Cordulia aenea*) also occurs on the site. (Note, neither Hairy Dragonfly or Brilliant Emerald are currently classed as Nationally Scarce).
- **Glover's Wood SSSI** - 2.5km northwest of the site. A substantial semi-natural broadleaved woodland site, part of which is considered to be primary woodland supporting a very rich woodland ground flora, together with small quantities of Small-leaved Lime and Wych Elm (*Ulmus glabra*). Glover's Wood is also noted for supporting some 'rare crane flies'. Species mentioned include *Molophilus lackschewitzianus* as well as more local species, including *Tipula pabulina*.

### 3.4.2 Non-statutory nature conservation sites

Sites subject to non-statutory designations due to their nature conservation interest within the site boundary or within close proximity to the site are as follows:

#### **Local Nature Reserves (LNR)**

- **Target Hill Park LNR** – 1.8km southeast of the Ifield golf course. Comprises a mosaic of habitats including wetlands, woodlands, meadow and scrub areas, with created wetlands including ponds and scrapes. Site is listed as supporting Small Heath (*Coenonympha pamphilus*) (S41. Research only) as well as a range of common butterflies and large numbers of Five-spot Burnet moths (*Zygaena trifolii*).

#### **Sites of Nature Conservation Interest (SNCI)**

- **Ifield Brook Wood and Meadows, Crawley SNCI** – comprises part of the survey area immediately east of Ifield Brook. The site is summarised in the citation as: 'A number of relatively herb-rich meadows enclosed by thick hedges, Ifield Brook itself and some woodland. The value of the site lies in its combination of different habitats, the relatively unimproved nature of many of the fields and its proximity to a large town.' According to the citation, 'six species of butterfly and four species of damselfly' have been recorded from the site. This information has little value relating to the assessment of the site which is likely to support many more species of either taxon as well as species from a range of other invertebrate orders.
- **Hyde Hill, Ifield SNCI** – contiguous with the Ifield Golf Course part of the survey area. The site is summarised in the citation as being 'of considerable local importance to nature conservation' and 'the combination of habitats, with semi-natural woodland, thick hedgerows, streams and rough grassland, is an important feature. The site supports a number of uncommon plants and butterflies, plus a diversity of breeding birds.' The site has been noted for the '26 species of butterfly' recorded and 'a number of uncommon or localised species, such as Dingy Skipper, Purple Hairstreak, White Admiral, Silver-washed Fritillary and Ringlet' which have been recorded in recent years.
- **Ifield Pond and surroundings, Crawley SNCI** – c200m south of survey area. The site is summarised within the citation as 'this large pond, situated on the edge of Crawley, is of considerable local importance notably on account of its bird life, dragonflies and amphibians. The pond is bisected by a railway line. The main pond is south of the railway, though the area to the

north is also of great wildlife value.’ Other than the reference to dragonflies, no specific invertebrate species are mentioned.

- **Woldhurstlea Wood, Glossops Green SNCI** – 1km southeast of survey area. The site is summarised within the citation as follows: ‘Woldhurstlea Wood which is surrounded by houses and a school playing field is of considerable local importance to nature conservation. Much of this small wood is semi-natural and it has many characteristics of an ancient semi-natural woodland, including a rich ground flora. The bird life is fairly diverse. There are well-used paths, much enjoyed by the public.’ No specific reference to invertebrates is made in the citation.
- **Willoughby Fields, Crawley SNCI** – 400m northeast of survey area. The site is summarised within the citation as follows: ‘Willoughby Fields is a large site containing several unimproved grassland fields with a network of hedgerows, areas of scrub and small copses that lies between the River Mole and an un-named stream on the outskirts of Langley Green in Crawley. The site is well used by the public for informal recreation and it adjoins a rugby club. A considerable amount of tree and hedge planting has been carried out on the site.’ The citation mentions Brown Hairstreak butterflies as being a breeding species ‘in the hedges and scrub’.
- **Wood near Lower Prestwood Farm SNCI** – 730m west of survey area. The site is summarised within the citation as follows: ‘This woodland is dominated by Hornbeam and Ash, mainly as trees grown from coppice. There are very few mature standards remaining as most have been felled. Birch and particularly Sycamore are also frequent in some areas. The shrub layer, consisting of several species, forms variable cover and there is a dense species-rich ground flora.’ No specific reference to invertebrates is made in the citation.
- **Orltons Copse, Crawley SNCI** – 1.4km west of survey area. The site is summarised within the citation as follows: ‘This site consists of two large areas of Oak/Hornbeam woodland separated by smaller areas of Oak/Hazel and Oak/Hazel/Ash woodland. There are several small streams throughout and a hay meadow. This mixture of habitats provides for a rich bird community.’ No specific reference to invertebrates is made in the citation.
- **Kilwood Copse SNCI** – 1.3km southwest of survey area. This woodland is of variable structure but in the main, it consists of Oak and Hornbeam. Unusually, Small-leaved Lime is also present throughout. There are two small ponds included but these are over-grown and of little aquatic interest at present. No specific reference to invertebrates is made in the citation.

### ***Other sites/habitats of conservation value***

A number of sites lying in close proximity to the site are classed as ancient broadleaved woodland. Most significant areas of ancient broadleaved woodland include an area contiguous to the northern section of the site west of Ifield Court Farm, contiguous to the southern boundary of the Ifield golf course incorporating Hyde Hill SNCI and The Grove, contiguous to the site boundary at Old Pound Nursery. Within the site the southern area of Ifield Brook Wood is also classed as ancient woodland.

### **3.4.3 Invertebrate species of higher conservation value recorded**

Historic invertebrate records provided as part of a data-search by Sussex Biodiversity Record Centre (SxBRC) to inform the project include a number of rare, uncommon and threatened UK species. These include species listed as ‘Species of Principal Importance’ within Section 41 (England) of the Natural Environment and Rural Communities Act (NERC Act), 2006, as well as species classed within the various pre and post 2001 IUCN categories based on their known conservation status within the UK as a whole.

The SxBRC report includes a note relating to ‘sensitive records’ which states in relation to Wood White and Duke of Burgundy butterflies that ‘these two rare butterfly species have a very restricted range in Sussex and so records are reported at a 1km resolution on advice from Butterfly Conservation Sussex Branch.’ Neither

species is recorded within the data search, therefore, it can be assumed that neither species is known to occur within the search area.

Post-1980 SxBRC invertebrates of recognised conservation status recorded within the boundary of the survey area included the following species:

### **Grasshoppers and crickets (Orthoptera)**

**Long-winged Conehead (*Conocephalus fuscus*)** (Sussex Rare). Recorded 2001 on site and several other post-2000 records outside the site. As recently as the early 1980s Long-winged Conehead was confined to a few mainly coastal sites in southern England. However, the species undertook a huge range expansion during subsequent decades and now is a common and widespread species over much of the southern half of the UK. It is uncertain why the species was chosen as a Sussex Rare species; however, there do seem to be relatively fewer records within Sussex than in adjacent south coast counties. The species can be found in a range of grassland habitats, generally preferring less improved grasslands with taller sward grasslands.

**Roesel's Bush-cricket (*Metriopectera roeseli*)** (Sussex Rare). Recorded 2001 in several locations on site and several post-2000 records outside of the site boundary. Like Long-winged Conehead, Roesel's Bush-cricket was also a very rare insect in the UK prior to a post 1970s range expansion and now occupies a similar range to that species. In Sussex, the insect seems to be relatively well recorded with a number of records across the county. The species occurs in a range of tall sward grassland and scrub-edge habitats and is now something of a habitat generalist.

### **Butterflies and moths (Lepidoptera)**

**Brown Hairstreak (*Thecla betulae*)** (Post-2001 IUCN 'Vulnerable'; S41 priority species). Recorded in several locations on-site between 1997 and 2001; recorded on a number of occasions outside of the site boundary from 1991 to 2017. Brown Hairstreak lives in self-contained colonies that breed in the same area year after year. The species requires habitat with an abundance of Blackthorn (*Prunus spinosa*), within hedgerows and scrub edges which are not subject to frequent flaying. The insect frequents the tops of tall trees, such as Ash (*Fraxinus excelsior*) and shrubs and is, therefore, elusive. In the UK West Sussex is cited in UK Butterflies (Eeles, 2002-2018) as being amongst the UK strongholds for the species.

**White Admiral (*Limenitis camilla*)** (Post-2001 IUCN 'Vulnerable'; S41 priority species). Recorded on site around Rectory Farm in 2010; recorded on several occasions outside of the site boundary between 1991 and 2013. White Admiral is a woodland species associated with woodland rides and shady woodland, with large patches of Bramble (*Rubus fruticosus* agg.) and a resource of its larval foodplant, Honeysuckle (*Lonicera periclymenum*). According to Butterfly Conservation (2018), the butterfly has declined dramatically in the UK over the past 20 years, hence its current conservation status.

**Small Heath (*Coenonympha pamphilus*)** (Post-2001 IUCN 'Near Threatened'; S41 priority species). Recorded both within and outside the site between 1990 and 2016. Also recorded on site during 2018 scoping study (see section 3.5.2). Small Heath is found in a range of habitat types including grasslands, heathland and woodland clearings. The butterfly favours habitat with shorter swards than other brown butterflies. Whilst Small Heath is still widespread and common in the UK, the butterfly has undergone a severe long-term population decline hence its current conservation status and inclusion as a S41 Species of Principal Importance (for research only).

**Bulrush Veneer (*Calamotropha paludella*)** (Nationally Scarce (Nb); Sussex Rare). Recorded on site in 2010. This micromoth is associated with wetland habitats such as 'fens, marshes, broads and the margins of flooded gravel pits' (Sterling and Parsons, 2012). The larval foodplant is Reedmace (*Typha latifolia*) (sometimes known as 'bulrush').

**White-barred Knot-horn (*Elegia similella*)** (Nationally Scarce (Nb); Sussex Rare). Recorded on site on two occasions in 2003. This species of micromoth is associated with mature oaks occurring in oak woodlands and parkland habitats (Sterling and Parsons, 2012). Oak is the larval foodplant of the species which feeds in a silk web.

**Green-brindled Crescent (*Allophyes oxyacanthae*)** (S41 – Research only). Larvae recorded on site in 2013. This species is one of a number of moths added to Section 41 of the NERC Act under the ‘research only category’. Research only species include species still generally common and widespread in the UK, but which have undergone a significant recorded decline in recent years. Green-brindled Crescent is associated with broadleaved woodland, scrub and hedgerow habitats and the larval foodplants include Hawthorns (*Crataegus* spp.), Blackthorn and some other common woody species (Waring and Townsend, 2003).

**Chequered Pearl (*Evergestis pallidata*)** (Sussex Rare) Recorded on one location on site at Ifield Court in 2003. This species is associated with ‘damp, open woodland, marshy places, scrub’ according to Sterling and Parsons (2012). The gregarious larvae feed on various brassicas, but it is mainly associated with Winter-cress (*Barbarea vulgaris*). Chequered Pearl is considered by Sterling and Parsons (2012) to be a local species in the UK.

## **Beetles (Coleoptera)**

**A weevil (*Dorytomus ictor*)** (Nationally Scarce (Nb)). Recorded on one location on site at Ifield Court in 2003. *Dorytomus ictor* is one of several UK species of the genus which is primarily associated with arboreal, woodland habitats. Hyman and Parsons (1992) described the species as being ‘widespread and local in central and southern Great Britain’. According to Hyman and Parsons (1992) the species is primarily associated with Lombardy Poplar (*Populus nigra* var *italica*) and probably native Black Poplar (*P. nigra*) and doubtfully Aspen (*P. tremula*). It is thought that the larvae develop in the catkins of the host trees.

Additional species of recognised conservation status recorded within a two-kilometre radius of the site are listed, together with the above in Appendix A, Table 1. These include Post-2001 IUCN species classed as ‘Near Threatened’ or rarer, species classed as nationally scarce in UK based on grid square occupancy, and species classed as ‘Species of Principal Importance’ in England under Section 41 of the NERC Act (2006) including both priority species and species included for research only. Species listed as being of local importance in Sussex are listed as ‘Sussex Rare’.

Note: A number of species of moth in particular are listed under S41 for ‘research only’, due to a recorded decline in the UK over recent decades.

## **3.5 2018 Scoping Study Survey**

### **3.5.1 Survey Area**

The area covered by the survey is outlined in Appendix B, Figure 1. Due to its large size, the survey area has been divided into zones (Areas A, B, C, D, E) and individual compartments within these areas have been numbered as compartments (1 to 38).

#### **General habitat**

Other than the Ifield golf course to the south of the survey area, the site largely comprises mixed agricultural land, with grassland pasture/meadowland occupying the majority of the site, but with a significant block of arable land (planted with barley at the time of survey), towards the centre of the site, south of the River Mole and west of Ifield Brook. Overall, there is a substantial resource of native broadleaved trees, woodland and scrub habitat, with mature and veteran standards occurring both within the small blocks of semi-natural woodland scattered throughout the site and within species-rich hedgerows and riparian margins of the site.

Wetland habitat included the heavily shaded and predominately unvegetated stretches of the River Mole and the Ifield Brook and there were several vegetated ponds within the Ifield golf course in particular.

Areas of particularly high potential value for invertebrates included the area to the east of the Ifield Brook comprising the Ifield Brook Wood and Meadows SNCI, which supported a network of small herb-rich, meadowland in mosaic with mature scrub and woodland, some of which was ancient. The fairway edge habitats within the Ifield golf course supported a significant resource of herb-rich grassland and scrub/woodland edge habitat and whilst the majority of grassland areas within the remainder of the site were herb-poor, both grassland and arable field were frequently bounded by tall grassland margins and headlands with uncut hedge margins and mature standards providing habitat with potential to support significant scrub edge, arboreal and wood-decay invertebrate assemblages. Other than the grasslands within the Ifield Brook Wood and Meadows SNCI and the uncut margins of the golf course, herb-rich small fields of higher invertebrate potential were found at several locations across the survey area and are discussed below.

For the purpose of this report the site has been divided into five broad areas (see map Appendix B, Figure 1). These include:

Area (A): Ifield golf course;

Area (B): Land east of Ifield Brook including Ifield Brook Wood and Meadows, Crawley SNCI;

Area (C): Land north of the River Mole including Ifield Court Farm;

Area (D): Land south of the River Mole and west of Ifield Brook;

Area (E): Mixed ownership properties adjacent to Rusper Road.

In addition to the broad zones, compartments within each broad zones such as distinct fields and woodlands etc. have been numbered for reference.

### **Area (A): Ifield golf course**

The majority of grassland managed as fairway and green within the Ifield golf course was of relatively low potential value for invertebrates being frequently mowed and generally herb-poor habitat typical of amenity value. Within the fairways there were often relatively recent plantings of native broad-leaved and ornamental trees and whilst the native examples of these in particular added continuity to the arboreal resource of the site and would support and provide additional habitat for more generalist arboreal invertebrates, these trees were often subject to management by mowing at ground level and lacked the structural and wood decay resources present in the more mature and less managed habitat at the margins and within woody headlands within the site.

In contrast, the habitat characterising both the perimeter of the golf course and the margins of woodland islands within the course, supported habitat of much higher potential value for invertebrates. Taller grassland margins ranged in width from between about two and 30m and often occurred in mosaic with scattered, native broadleaved scrub and culminated at the woodland/scrub edge with a gradual succession from tall grassland, through lower Bramble scrub, to mature woodland edge habitat with woody understorey species such as Hawthorn (*Crataegus monogyna*), Blackthorn, Hazel (*Corylus avellane*) and Field Maple (*Acer campestre*) often giving way to mature and occasionally veteran standards, predominately including Pedunculate Oak (*Quercus robur*) and Ash. An example of a veteran Pedunculate Oak was recorded at the northern boundary of the golf course (TQ23927 36929) (see Appendix C, Photograph 1).

Though herb-richness varied somewhat within the grassland margins, species composition frequently included grasses including Red Fescue (*Festuca rubra*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Yorkshire Fog (*Holcus lanatus*), Smooth-stalked Meadow Grass (*Poa pratensis*), Meadow Foxtail

(*Alopecurus pratensis*) and Meadow Barley (*Hordeum secalinum*) with herbs such as Meadow Vetchling (*Lathyrus pratensis*), Common Bird's-foot Trefoil (*Lotus corniculatus*), Lesser Stitchwort (*Stellaria graminea*), Creeping Cinquefoil (*Potentilla reptans*), Sorrel (*Rumex acetosa*), Meadow Buttercup (*Ranunculus acris*), Creeping Buttercup (*R. repens*), Hoary Ragwort (*Senecio erucifolius*), Common Knapweed (*Centaurea nigra*), Cut-leaved Cranesbill (*Geranium dissectum*), Agrimony (*Agrimonia eupatoria*), Germander Speedwell (*Veronica chamaedrys*) and Common Spotted Orchid (*Dactylorhiza fuchsii*) (see Appendix C, Photograph 2).

Taller sward graduating into scrub edge supported herbs including Wild Angelica (*Angelica sylvatica*), Hogweed (*Heracleum sphondylium*), Wood Dock (*Rumex sanguineus*), Common Nettle (*Urtica dioica*) and damper ruderal edge habitat included Hemlock Water-dropwort (*Oenanthe crocata*) and Meadowsweet (*Filipendula ulmaria*), with graminoids including variously Soft Rush (*Juncus effusus*), Compact Rush (*J. conglomeratus*) and Hard Rush (*J. inflexus*).

Edge habitat was frequently sinuous and uneven in profile and there were scalloped edges in some parts providing potentially excellent invertebrate potential, especially along the margins of southern aspect (such as along the northern site boundary).

The semi-natural broadleaved woodland site, Hyde Hill SNCI, is contiguous with the southern boundary of the golf course and there is a significant resource of potential invertebrate habitat within the mature native broadleaved canopy and understorey, both at the edge of the site and within the more extensive woodland/scrub patches forming islands and breaks within the managed green on site. The mature Pedunculate Oak and Ash frequently support wood decay habitat suitable for providing habitat for wood decay including both bark and sapwood decay and red rot assemblages. In addition, the understorey species such as Hawthorn, Blackthorn etc also were frequently mature and the blossom of these trees provides an important early season foraging resource for invertebrates. There were occasional log piles and more importantly, standing and fallen wood decay habitat at both the margins and within some of the wooded areas within the site. There are frequently elements of ground flora species associated with ancient woodland which would indicate a long history of woodland habitat within the landscape.

Several ponds were recorded within the golf course during the survey. The largest of these was located at TQ24025 36613 (see Appendix C, Photograph 3), towards the site's eastern border. Other, smaller ponds of potential invertebrate conservation value were located within the course at TQ23912 36927, TQ23691 36909, TQ23621 36893 and TQ23476 36841. These ponds generally supported a good range of macrophyte vegetation with marginal, emergent, floating leaved and some submerged aquatic macrophytes. The structural diversity provides habitat for aquatic and wetland associated invertebrate assemblages potentially of conservation value.

Another largish pond was located at the wooded edge of the site at TQ23926 36520. This pond was heavily shaded, silted and lacking aquatic macrophyte vegetation. This pond may support habitat of some value for species associated with silted woodland margins and saturated wood-decay habitats such as crane flies (Tipulidae) and associated groups, but was otherwise of limited potential, due to the lack of vegetation and heavily shaded nature.

Whilst the green and fairway habitats and associated bunkers were subject to frequent management, there was some evidence of the bare ground at the margins of the bunkers being used by ground nesting solitary aculeates, such as the furrow bees *Lasioglossum* spp., nesting at the edge of a bunker at TQ23692 36342 (see Appendix C, Photograph 4).

### **Area (B): Land east of Ifield Brook including Ifield Brook Wood and Meadows, Crawley SNCI**

The habitat lying immediately east of the Ifield Brook comprised the entirety of the Ifield Brook Wood and Meadows SNCI. The more open meadowland habitat comprised a succession of generally small fields (compartments 2 to 7), with well-developed and uncut wooded/hedgerow margins and frequently with infield

scrub patches forming a mosaic with the grassland (see Appendix C, Photograph 5). Increasingly to the west of the area approaching the Ifield Brook, the habitat gave way to mature semi-natural broadleaved woodland (compartment 8) (see Appendix C, Photograph 6).

The grassland within fields 2 to 7 was generally species-rich and for the most part the sward was tall, in keeping with habitat managed as hay meadow. Typical graminoids within the sward included Red Fescue, Meadow Foxtail, Yorkshire Fog, Rough-stalked Meadow Grass, Sweet Vernal Grass, Cock's-foot (*Dactylis glomerata*) and False Oat Grass (*Arrhenatherum elatius*) and herbs included Common Knapweed, Meadow Buttercup (*Ranunculus acris*), Red Clover (*Trifolium pratense*), White Clover, (*T. repens*), Common Bird's-foot Trefoil, Meadow Vetchling, Tufted Vetch (*Vicia cracca*), Lesser Stitchwort, Sorrel and Hogweed. The sward became shorter closer to the footpaths crossing the site and, in some areas, well developed Yellow Meadow Ant *Lasius flavus* anthills were present, indicating a long history of continuous grassland management (see Appendix C, Photograph 7).

The extensive, uncut scrub edge was structurally diverse, with tall herb vegetation at the field margins frequently giving rise to a transition from wide Bramble margins, through Blackthorn, Hawthorn and Elder (*Sambucus nigra*) and typically with mature Pedunculate Oak and Ash standards. The scrub species also frequently occurred as in-field scrub, the scrub increasing in proportion to the grassland further south within the field compartments 6 and 7.

The scrub and woodland edge habitat supported evident standing wood decay habitat, this being scattered throughout the resource, with many of the mature trees having features such as lost bark, bark beetle and other saproxylic galleries and rot-holes. The grassland provided habitat throughout this transition that was of higher potential for grassland invertebrates of conservation value (with one or two exceptions) than much of the site's grasslands and the diverse transition of the scrub edges and mature standards increased the overall habitat potential for scrub edge, arboreal and saproxylic assemblages. The abundance of Blackthorn and associated Bramble and mature Pedunculate Oak and Ash 'master trees', provided excellent potential for Brown Hairstreak, which has been historically recorded in this area, as well as elsewhere on site.

The grassland to the edge of the woodland habitat running parallel to the western edge of the meadow network supported species typical of damper habitat with herbs such as Greater Bird's-foot Trefoil (*Lotus pedunculatus*) alongside Sorrel. There were some fairly extensive patches of Bracken (*Pteridium aquilinum*) and Bramble scrub in this area and the habitat became increasingly wooded, with Hawthorn, Blackthorn and Hazel giving rise to mature woodland. The woodland interior was frequently rather heavily shaded and tended to be rather lacking in a diverse ground flora, but supported some mature trees including canopy Pedunculate Oak, Ash and understorey Hornbeam (often multi-stemmed), Hawthorn, Blackthorn and Holly (*Ilex aquilinum*).

The habitat occurred over a series of parallel banks including the banks of the Ifield Brook. The woodland continued to some extent on the western bank of the Brook where it was also generally shaded, with little light reaching the ground layer. The habitat here supported multi-stemmed Hornbeam, with Goat Willow (*Salix caprea*), Hawthorn, Blackthorn, Silver Birch (*Betula pendula*) and some younger Pedunculate Oak. The ground flora within this area was more typical of ancient woodland with Ramsoms (*Allium ursinum*), Cow Wheat (*Melampyrum pratense*), Bluebell (*Hyacinthoides non-scripta*), Primrose (*Primula vulgaris*), Wood Mellick (*Melica uniflora*), Wood False Brome (*Brachypodium sylvaticum*), Wood Sedge (*Carex sylvatica*) and Remote Sedge (*Carex remota*), as well as more generalist, shade tolerant herbs such as Ground Ivy (*Glechoma hederacea*), Wood Avens (*Geum urbanum*) and Ivy (*Hedera helix*). Honeysuckle, the larval foodplant of White Admiral, was also fairly abundant within the woodland on both sides of Ifield Brook and the habitat within this woodland area was potentially suitable for supporting this Section 41 butterfly as well as arboreal, scrub edge and wood decay invertebrates characteristic of mature semi-natural broadleaved woodlands.

The Ifield Brook itself within the woodland, was heavily shaded and supported little in-channel vegetation. The high banks suggested scouring and that the watercourse experienced considerable seasonal water level fluctuations and would not be expected to support invertebrate assemblages of higher conservation value. However, the silted margins and wetter patches within the woodland, as well as the in-channel, saturated dead-wood resource may have potential to support the larval stages of crane flies (Tipulidae), specialist hoverflies (Syrphidae) and allied families, taxa which include some particularly uncommon species.

### **Area (C): Land north of the River Mole including Ifield Court Farm**

The block of land at the northern extremity of the site, bounded by the River Mole to the south included predominately open grassland habitat (compartments 9, 10, 11, 12, 13, 15, 17 and 18). Field 12 in particular, was characterised by in-field mature and veteran Pedunculate Oak standards (see Appendix C, Photograph 8). However, the hedgerows and field boundaries with the River Mole corridor and semi-natural broadleaved woodland to the north were often characterised by mature Pedunculate Oak and Ash standards. Blocks of semi-natural broadleaved woodland were recorded within Area (C) in compartments 14, 16 and 19. Wetland habitats included the River Mole, which was invariably heavily shaded, silted and lacked in-channel macrophyte vegetation. The large field (12) to the north of the survey area was crossed by a sinuous paleochannel, which culminated in an area of vegetated wetland or elongate pond feature.

The in-field grassland composition in fields 9, 10, 11, 12, 13 and 15 was generally herb-poor and improved with Perennial Rye Grass (*Lolium perenne*), Yorkshire Fog, Smooth-stalked Meadow Grass, Crested Dog's-tail (*Cynosurus cristatus*), Meadow Foxtail and herbs including Red Clover, White Clover, Creeping Buttercup, Meadow Buttercup, Creeping Thistle (*Cirsium arvense*) and Common Mouse-ear (*Cerastium fontanum*). These swards were generally tall, though field 12 had been recently cut for hay and fields 11 and 17 were subject to low density grazing by Longhorn cattle at the time of survey.

Swards in fields 17 and 18 were of slightly higher diversity, but still generally herb-poor. These swards supported additional graminoids and herbs characteristic of less improved swards including Sweet Vernal Grass, Meadow Barley, Tufted Vetch and Lesser Stitchwort.

The paleochannel and pond within field 12 added diversity to the otherwise uniform, improved grassland within this compartment (see Appendix C, Photograph 9). The paleochannel formed a shallow, generally dried-out channel which meandered across the compartment. The channel was vegetated primarily with graminoids characteristic of wet grassland habitats including Marsh Foxtail (*Alopecurus geniculatus*), Floating Sweet Grass (*Glyceria fluitans*), Soft Rush and Compact Rush, with few herbs other than Redshank (*Persicaria maculosa*). There was some bare ground within the channel which also showed signs of livestock poaching.

At its western extremity, the paleochannel gave rise to a linear pond (see Appendix C, Photograph 10) with areas of open water and some fairly dense stands of Soft Rush with other hydrophilic graminoids including Reed Canary Grass (*Phalaris arundinacea*) and macrophytes including Reedmace, Gipsywort (*Lycopus europaeus*) and other plants typical of eutrophic wetlands including Creeping Buttercup, Curled Dock (*Rumex crispus*), Marsh Thistle (*Cirsium palustre*) and Hemlock Water-dropwort. The banks supported trees and scrub including Bramble, White Willow (*Salix alba*), Elder and Hawthorn.

Overall, with the possible exception of compartments 17 and 18, none of the swards supported habitat with sufficiently diverse herb or flowering resource to support grassland invertebrates of particularly high conservation value in themselves. However, the paleochannel and associated pond/swamp habitat added some potential for wetland associated invertebrate assemblages. Paleochannels can support specialist beetles (Coleoptera), flies (Diptera) and other invertebrates of conservation value.

However, like elsewhere on the site, the majority of field margins were uncut, more herb-rich and with a good scrub edge succession; from tall grassland, through Bramble to species-rich, mature hedgerow/scrub/

woodland edge habitat, with a resource of Hawthorn, Blackthorn, Hazel, Grey Willow (*Salix cinerea*), Goat Willow, Field Maple, Spindle (*Euonymus europaea*), Common Dog-rose (*Rosa canina*) and Field Rose (*R. arvensis*). The hedgerows throughout this field network supported mature and veteran Pedunculate Oak and Ash standards. These species, Pedunculate Oak in particular, also occurred as in-field standards, particularly in fields 12 and 17, which supported habitat approaching wood pasture.

This combined edge and in-field standard resource habitat was often of high potential value for scrub edge, and arboreal species and there was evident standing wood decay resource within the habitat and adjacent woodlands. As with Areas (A and B), the structure and composition of the field edge habitat throughout this network was potentially suitable for supporting the S41 priority species, Brown Hairstreak.

An example of a field margin within the unit of higher invertebrate potential was at the confluence of woodland and field margins at TQ 24013 37966 (see Appendix C, Photograph 11), however, the woodland, hedgerow and scrub margins of all the fields within the unit supported habitat with potential to support good scrub edge assemblages.

Blocks of native semi-natural broadleaved woodland occupied compartments 14, 16 and 19. Compartment 14 comprised a small copse, rather than a significant woodland. The woodland comprised a canopy of leggy Pedunculate Oak and Ash, with occasional Beech (*Fagus sylvatica*). The understorey included typical species such as Hawthorn, Blackthorn and Field Maple and a fairly species-poor heavily shaded scrub and ground layer with Bramble, Dog's Mercury (*Mercurialis perennis*), Creeping Soft Grass (*Holcus mollis*), Wood False-brome, Wood Dock and Common Nettle. The invertebrate habitat showed potential to support arboreal and epiphyte communities typical of native broadleaves, but was too shaded for more thermophilic ground and scrub layer assemblages. In addition, the trees were relatively young compared to other woodland and hedgerow habitat within the site, therefore reducing the potential value for wood-decay invertebrate assemblages.

The woodland block in compartment 16 (see Appendix C, Photograph 12) like compartment 14, was relatively shaded at the ground layer. However, the woodland comprised some mature trees in the canopy and understorey, together with a more diverse ground flora. Pedunculate Oak and Ash were the dominant canopy species with Silver Birch and an understorey of leggy Hawthorn, Elder, Hazel, Field Maple, Blackthorn and Spindle. A low scrub layer of Bramble was present with Red Currant (*Ribes rubrum*) and ground flora including Dog's Mercury, Wood False-brome, Enchanter's Nightshade (*Circaea lutetiana*), Herb Robert (*Geranium robertianum*), Common Dog Violet (*Viola riviniana*), Wild Strawberry (*Fragaria vesca*), Wood Avens, Bluebell, Red Campion (*Silene dioica*), Common Nettle, Ground Ivy, Cleavers (*Galium aparine*), Greater Stitchwort (*Stellaria holostea*), Primrose and Wood Dock. The habitat has potential to support arboreal, shaded ground layer and bark and saproxylic invertebrate assemblages.

The woodland block in compartment 19 (see Appendix C, Photograph 13), was of similar composition to 14 and 16 above, with a leggy canopy of Pedunculate Oak and Ash and a Hawthorn and Blackthorn understorey, but was somewhat less shaded, with dappled light locally reaching the scrub and ground layers. The scrub layer included Bramble, Common Dog Rose, Field Rose, Ivy and Black Bryony (*Tamus communis*) and a relatively diverse ground flora including Dog's Mercury, Common Nettle, Remote Sedge, Wood Sedge, Wood Melick, Wood False-brome, Rough-stalked Meadow Grass (*Poa trivialis*), Wood Avens, Wood Dock, Cow Parsley (*Anthriscus sylvestris*), Enchanter's Nightshade, Herb Robert, Nipplewort (*Lapsana communis*), Common Cow-wheat (*Melampyrum pratense*), Bluebell and Hemlock Water-dropwort. The ground layer supported a significant resource of fallen wood-decay habitat for bark and sapwood invertebrates. Fallen Ash branches with Cramp-ball fungus (*Daldinia concentrica*), were scattered throughout. Habitat has potential to support arboreal, shaded ground layer, scrub edge and saproxylic invertebrate assemblages.

### **Area (D): Land south of the River Mole and west of Ifield Brook**

In terms of area, much of the land to the south of the River Mole and west of the Ifield Brook comprised large arable fields planted with barley at the time of survey (compartments 26, 27, 28, 29 and 31). Whilst the in-field habitat within these compartments was of low potential value as invertebrate habitat, the network of edge habitat, including grassy margins and uncut hedgerows with standards as well as woodland edge, was of greater value. Of the three fields within the area supporting grassland habitat, one field (21), supported a generally improved sward of relatively low conservation value to invertebrates. The two remaining fields (22 and 30) supported herb-rich grassland habitat of much higher potential value for invertebrates.

Woodland habitat recorded within Area (D) included a block of semi-natural broadleaved woodland (compartment 20) and compartment 24, a shelter belt between arable fields 23 and 25. In general terms, the aquatic habitat of both the Ifield Brook to the east and River Mole to the north were of limited potential value for aquatic assemblages, being heavily shaded and lacking in-channel vegetation.

The meadow habitat within field 22 supported an herb-rich sward both in terms of composition and abundance of flowering resource of value to nectaring insects (see Appendix C, Photograph 14). The sward was generally around 20 to 30cm tall with graminoids including Sweet Vernal Grass, Yorkshire Fog, Smooth-stalked Meadow Grass, Meadow Foxtail, False Oat Grass with some Compact Rush, indicating dampness in the sward. Herb species included Creeping Buttercup, Meadow Buttercup, Fleabane (*Pulicaria dysenterica*), Curled Dock (*Rumex crispus*), Sorrel, Hairy Tare (*Vicia tetrasperma*), Grass Vetchling (*Vicia nissola*) (see Appendix C, Photograph 15), White Clover, Red Clover, Black Medick (*Medicago lupulina*), Lesser Stitchwort, Common Mouse-ear, Creeping Thistle, Hoary Ragwort and Common Spotted Orchid. The scrub edge succession at the margin of the field was uncut and there was scrub encroachment of Bramble, through to woody hedgerow species typical of the site as a whole. In addition, there was some in-field wood-decay habitat. The habitat within field 22 has potential to support grassland and scrub edge invertebrate assemblages of a higher conservation value.

Field 30, a small field on the site's southern boundary supported herb-rich wet grassland, approaching fen meadow in composition (see Appendix C, Photograph 16). The sward was generally tall with graminoids including Red Fescue, Tall Fescue (*F. arundinacea*), Sweet Vernal Grass, Yorkshire Fog, Tufted Hair Grass (*Deschampsia cespitosa*) and Compact Rush with flowering herbs plentiful in terms of abundance and composition including Common Knapweed, Creeping Cinquefoil, Greater Bird's-foot Trefoil, Meadowsweet, Sorrel, Ribwort Plantain (*Plantago lanceolata*), Marsh Bedstraw (*Galium palustre*), Lesser Stitchwort and Marsh Thistle.

Habitat at the margin of the field included extensive Bramble and Common Dog Rose patches graduating into an uneven Blackthorn dominated hedgerow with standards as elsewhere on site. Both the open grassland and scrub edge successional habitat provided potentially excellent habitat for invertebrate assemblages associated with wet meadows and scrub edge habitat.

Compartment 20 supported semi-natural broadleaved woodland, bordered on its northwest border by the River Mole (see Appendix C, Photograph 17). The woodland canopy comprised primarily of Pedunculate Oak and Ash standards with occasional Silver Birch. The understorey comprised Field Maple, Hawthorn and Hazel with Spindle and Yew (*Taxus baccata*). Ivy and Honeysuckle occurred as climbers and within the ground layer which included Bramble and woody seedlings and suckers.

The ground flora contained graminoids including Wood False-brome, Giant Fescue (*Festuca gigantea*) and Tufted Hair Grass, with herbs including Dog's Mercury, Wood Avens, Cleavers, Meadowsweet, Hogweed, Wood Dock, Ramsoms, Nipplewort, Hedge Woundwort (*Stachys sylvatica*) and Red Campion. The ground layer was generally shaded, but with areas of dappled light. The woodland was lacking management, but

with potential to support arboreal invertebrates of some conservation value as well as shaded ground layer species and wood-decay species.

Compartment 24 comprised a strip of semi-natural broadleaved woodland between two fields planted with arable barley. The field margin of the habitat included some scrub edge succession of value to scrub edge invertebrates, with Blackthorn, Hazel and Common Dog Rose with Bramble margins. The canopy comprised mature and veteran Pedunculate Oak and Ash standards. The habitat interior was rather heavily shaded, however, the scrub edge succession and mature and veteran standards contributed to the site's significant habitat resource for arboreal, wood-decay and scrub edge invertebrate assemblages. The habitat was potentially suitable for Brown Hairstreak, which has been historically recorded within Area (D).

In addition, the scrub edge habitat along the northern boundaries of the arable (barley) fields 23 and 25, which bordered the River Mole, included a wide grassy margin with a range of herbs including Common Knapweed, Common Cat's-ear (*Hypochaeris radicata*), Hedge Bedstraw (*Galium mollugo*) (see Appendix C, Photograph 18). The sinuous profile of the scrub edge provided some excellent, south-facing scalloped habitat, with field margin grassland giving way to extensive Bramble and Blackthorn, Hawthorn, Dogwood (*Cornus sanguinea*) and Common Dog Rose, through to mature Pedunculate Oak, Ash and Alder (*Alnus glutinosa*) standards. The habitat was valuable for scrub-edge and arboreal invertebrates and a number of bee species were recorded foraging on Bramble along this section, which also has habitat suitable for supporting Brown Hairstreak, historically recorded within close proximity of this boundary.

#### **Area (E): Mixed ownership properties adjacent to Rusper Road**

An area of small compartments of mixed ownership to the west to the north and south of the Rusper Road. Habitat within the northern section including compartments 32, 33 and 34 (centroid grid reference TQ 23620 37338) was entirely recorded from Rusper Road and tracks and footpaths to the east and west boundaries. The area south of Rusper Road including compartments 35 and 36 (TQ 23681 37216, TQ 23602 37124 respectively) as well as compartment 38, were also recorded from outside of the compartments. The remaining compartment in Area (E) was the Welbeck Land Holdings owned field compartment 37 (TQ 23743 37157). This field appeared to have been cleared of scrub and other vegetation and evidence of wood chippings, vehicle tracks and lack of other vegetation suggested that this had occurred recently. The habitat in its current condition was, other than the mature boundary trees and hedgerow, of low conservation value.

Compartments 36 and 35 immediately to the west of and north of compartment 37 were short-grazed pony paddocks with mature broadleaved wooded boundaries and a domestic pig was seen within the roadside paddocks (compartment 35). The area adjacent to a footpath immediately to the south of compartment 38 supported a narrow wooded strip (sharing a boundary with the northern edge of the Ifield golf course).

The habitat here supported semi-natural broadleaved woodland with mature broadleaved trees including Pedunculate Oak standards with an understorey of Hazel, Field Maple, Hawthorn, Blackthorn, Holly and a scrub layer of Bramble with Field Rose. The ground vegetation here included species characteristic of ancient woodlands including Wood Melick and Wood Millet (*Milium effusum*) as well as Wood False-brome and herbs including Bluebell, Common Cow-wheat, Common Dog Violet, Wood Avens and Nipplewort. There was dappled shade at the ground layer and good general woodland edge invertebrate potential. The habitat should be considered as part of the golf course, rather than Area (E). The wooded edge generally obscured views of the adjacent holdings around Furlong Farm to the north (compartment 38), which appeared to support meadowland of similar composition to many of the fields on site. The field also appeared to have a structurally varied mature hedgerow with standards, therefore may support habitat of value to scrub edge and arboreal invertebrates as recorded throughout the site.

The path continuing along the western boundary of compartments 36 and 38 was also wooded, with a hedge bank running the length of the boundaries with mature Pedunculate Oak standards with an understorey of

coppiced Hazel with Elder and Bramble and ground flora including Wood False-brome, Enchanter's Nightshade and Common Nettle. The mature standards again added to the overall resource of the site for arboreal invertebrate species.

Habitat immediately to the north of Rusper Road comprised a dense woodland strip (compartment 34). This mainly supported a uniform stand of Silver Birch. Little light reached the ground layer which supported Dog's Mercury and Ivy. The habitat was of some potential to support arboreal invertebrates associated with birch woodland, but the habitat structure lacked diversity and conservation value is unlikely to be high. All the compartments making up the northern section of Area (E) were somewhat obscured from view; however, the fields were bounded by mature hedgerows, often with standards as elsewhere on the site. The field compartment 33 appeared to be a former meadow being used as a breakers yard.

Tall ruderal habitat obscured a view of field 32, however this again had boundaries with native broadleaved woodland and hedgerow habitat. There was an extensive tall ruderal habitat along the eastern margin of compartments 32 and 33, forming an impenetrable raised bank with Bramble and tall herbs including Common Nettle and Hemlock (*Conium maculatum*). The ruderal habitat provides a nectar resource for insects, but such habitat is early successional and not of high conservation value. In summary, like the other survey areas, there appeared to be a considerable scrub/woodland edge resource within the compartment boundaries of Area (E) and also some meadowland of some potential value. However, much of the habitat was either of lower potential or could not be surveyed in detail due to access constraints.

### 3.5.2 Incidentally recorded invertebrate species

For a complete list of insect and other invertebrate species recorded incidentally during the survey see Appendix A, Table 2. Importantly, whilst these records may add a small amount to the resolution to data collected during a more comprehensive and targeted invertebrate survey, the species recorded are mainly easy to spot and identify on site and cannot be seen as a representative indication of the site's fauna.

During the walkover, one species, Small Heath, listed under section 41 of the NERC Act (2006) 'research only', was recorded at TQ25085 38488, close to the eastern hedge boundary of compartment 12 and Roesel's Bush-cricket nymphs were recorded within the tall grassland margins of the Ifield golf course. Banded Demoiselle (*Calopteryx splendens*) recorded throughout the riparian corridor, are typical species of slow flowing rivers and brooks with vegetated margins. The Scarce Chaser (*Libellula fulva*), is classed as 'Near Threatened' under post-2001 IUCN guidelines. This species has, however, undertaken a significant range expansion in recent years. The species is associated with slow-flowing rivers with lush marginal vegetation, particularly where there is associated water meadow and grazing marsh habitat. The majority of other species were typical of the more visible species of grassland and scrub edge habitat in southern England. Common Green Grasshopper (*Omocestus viridulus*), despite being the third commonest British grasshopper, has often been associated with permanent pasture. The species was heard stridulating in the grasslands of the Ifield Brook Wood and Meadows SSSI. The Common Blue (*Polyommatus icarus*) is another common species which is generally associated with reasonably herb-rich grasslands, where its larval foodplant Common Bird's-foot Trefoil grows.

## 4 Evaluation

### 4.1 Landscape context

The site supports habitat typical of the broader agricultural landscape characteristic of the West Sussex countryside in the Crawley area. The habitat is characterised by small fields bounded by mature hedgerows supporting abundant Pedunculate Oak and Ash standards. Small Ash/oak woodlands are also a feature of both the wider landscape and the survey area. Important sites designated for nature conservation purposes in the broader landscape include House Copse SSSI, an ancient woodland lying 650m south of the Ifield golf

course and Glover's Wood SSSI northwest of the site, which also comprises ancient woodland of conservation value and is noted for supporting a rare crane fly fauna.

Several Sites of Nature Conservation Interest/Local Wildlife Sites (SNCI/LWS) primarily comprising well established woodland habitat also occur within close proximity of the site, including Ewhurst Wood, Woldhurstlea Wood, Wood near Lower Prestwood Farm, Orltons Copse, Kilnwood Copse and Hyde Hill SNCIs/LWSs. Importantly the entire footprint of the Ifield Brook Wood and Meadows SNCI/LWS lies within the boundary of the survey area, a site which also supported characteristic semi-natural broadleaved woodland and more open scrub and grassland mosaic habitat. In addition to the designated woodland sites, blocks of habitat considered to fall within the definition of 'ancient and semi-natural woodland' occupy areas contiguous to the site boundary to the south, north and west. The presence of similar ancient and other established semi-natural broadleaved woodland to that occurring within the site increases landscape level connectivity and provides opportunities for specialist invertebrates associated with woodland to occur as metapopulations on a landscape level.

Besides the uncut hedgerows, scrub and semi-natural woodland habitats, wetland habitat is important on a site level as well as within the broader landscape with two main riparian corridors crossing the site as well as a number of small ponds and some wet meadows and damp woodland habitat. Important wetland habitats within 2km of the survey area include the Buchan Hill Ponds SSSI, which is an important example of 'Wealden hammer ponds on acidic Tunbridge Wells sands'. The ponds are important for dragonfly species, with species including the Brilliant Emerald, Downy Emerald and Hairy Dragonfly recorded on the site which also supports important wet woodland habitat. The Ifield Ponds Local Wildlife Site (LWS) also supports populations of dragonflies and contributes to the connectivity of wetland habitat on a landscape scale. In addition, wetland habitats variously including ponds and riparian habitat occur as subsidiary habitat within Woodhurstlea Wood, Willoughby Fields, Orltons Copse, Kilnwood Copse and Hyde Hill SNCI/LWSs and the Buchan Country Park LWS supports several lakes of local importance for dragonflies and other aquatic invertebrate fauna.

## 4.2 Importance of Site-Level Habitats

### 4.2.1 Woodland and scrub habitats

Although much of the open habitat including improved grassland and arable cropland was generally of low potential value for invertebrates, the site supported an extensive resource of mature hedgerow, scrub and semi-natural broadleaved woodland and associated grassland edge habitat with potential to support significant arboreal, scrub edge and wood-decay invertebrate assemblages. A feature of the site as a whole was the abundance of mature and veteran native broadleaves, primarily including Pedunculate Oak and Ash, occurring both within the hedgerows, as in-field standards and within the wooded edges of the site.

Whilst these trees were scattered throughout the site, collectively they formed a significant habitat resource with potential to support specialist invertebrate species including uncommon wood-decay, epiphyte and arboreal assemblages. Significant species records within the survey area included the Brown Hairstreak, listed as a 'Species of Principal Importance' under Section 41 of the NERC Act (2006) as well as being classed as 'Vulnerable' under IUCN post-2001 guidelines. This species is associated with uncut hedgerows, woodland edge and scrub habitats where there is an abundance of its larval foodplant, Blackthorn, as well as tall master trees, such as oaks and Ash. The habitat composition and structure throughout much of the site's hedgerow and woodland edges offered suitable habitat for this species, which being a sessile species is sensitive to habitat loss.

Arguably the areas with the greatest continuity of good scrub edge and grassland mosaic habitat occurred within the Ifield Brook Wood and Meadows, Crawley SNCI (Area B). However, the wooded margins of the Ifield golf course, which featured wide, herb-rich borders, the field edge scrub/hedgerow habitat south of the

River Mole (adjacent to compartments 23 and 25), the in-field and hedgerow habitat of the species-rich grassland compartments 22 and 30 and hedgerow and wood-edge habitat around compartments 17 and 18 were also of particularly high quality.

The semi-natural woodland resource within the site tended to be rather shaded, however, the woodland blocks surveyed typically supported habitat of varied structure and composition with canopy, understorey, scrub and ground flora layers, supporting typical species of broadleaved Pedunculate Oak/Ash woodlands often with multi-stemmed coppice species such as Hornbeam and Hazel alongside Hawthorn and Blackthorn in the understorey. Some of the woodland blocks supported mature canopy and understorey tree and scrub species with evident resources of standing and fallen wood-decay habitat, together and often with, some ground-flora species considered to be ancient woodland indicators in southeast England e.g. Wood Sedge, Remote Sedge, Giant Fescue, Bluebell, Cow-wheat, Primrose, Wild Redcurrant and Field Rose, amongst others (Rose updated by O'Reilly, 2006).

The examples of native semi-natural broadleaved woodland habitat with potential invertebrate value included compartments 16, 19 and 20 and some of the woodland within the Ifield Brook Wood and Meadows SNCI (compartment 8).

The long history of woodland units on site and within the wider landscape increases the potential value of the site to support specialist arboreal and wood-decay assemblages.

#### **4.2.2 Grassland habitats**

The most extensive continuous tract of herb-rich grassland of higher potential value to invertebrates within the survey area was the meadowland habitat within the small field network of the Ifield Brook Wood and Meadows SNCI and the invertebrate potential of this area was increased by the structural diversity of the scrub and woodland edge and importantly, in-field scrub components. The overall floristic diversity did vary to some extent both between and within fields, but the presence of grassland herbs such as Common Knapweed, Common Bird's-foot Trefoil and other herbs and grasses characteristic of less improved swards, indicated habitat of higher potential invertebrate value. Within this general area, well-developed anthills created by the Yellow Meadow Ant indicate a long continuity of unintensive management in this area and add to the overall potential of this habitat for grassland and scrub edge invertebrate assemblages.

In addition to the SNCI grassland habitat, two fields, arguably of higher floristic diversity were recorded in compartments 22 and 30. The rich flower resource and structural diversity within these fields provided a significant potential resource for grassland invertebrates. In addition to the open meadow habitats, relatively herb-rich swards were recorded in a number of the wider field margins and headlands of some of the otherwise improved or arable swards. Some of the wider grassland headlands within the Ifield golf course were particularly floristically diverse.

#### **4.2.3 Wetland habitats**

The River Mole and Ifield Brook provided riparian channels crossing the site. The habitat here was invariably wooded and the channels heavily over shaded and lacking in macrophyte vegetation. Such shaded and silted, slow-flowing waterbodies typically support rather poor invertebrate assemblages. However, such habitat is favoured for breeding and larval development for the dragonflies Brilliant Emerald (IUCN post-2001 'Vulnerable' and Sussex Rare) and Downy Emerald (Sussex Rare), both of which have been recorded within a few hundred metres of the survey area and riverine species such as the Banded Demoiselle, often associated with well-vegetated channels, was recorded on several occasions during the survey. However, other than these species, the habitat is unlikely to support aquatic assemblage of high conservation value although there may be some value for certain diptera species associated with in-channel saturated wood and silted channel edge habitat.

Created ponds within the Ifield golf course often supported a range of macrophyte species including marginal, emergent, floating-leaved and submerged aquatics and may support macroinvertebrate assemblages of some conservation value. In addition, the paleochannel and associated pond in field 12 had some potential to support invertebrate assemblages, including both aquatic macroinvertebrates and species characteristic of the margins of wetlands and seasonally inundated habitat.

## 4.3 Importance of Habitats for Historically Recorded Species

### 4.3.1 Woodland and scrub species

Several species of butterfly characteristic of ancient oak/Ash woodland such as the Section 41 'Species of principal importance' and IUCN post-2001 'Vulnerable' White Admiral and 'Near Threatened' and 'Sussex Rare' Purple Emperor have been recorded both within the site boundary and in woodlands in the wider landscape. The White-barred Knot-horn, a Nationally Scarce and Sussex Rare species of micromoth associated with ancient oak woodland was recorded in two locations on site in 2003.

Other uncommon insect species associated with broadleaved woodland include the Nationally Scarce Plain Golden Hoverfly (*Callicera aurata*), the larvae of which develop in rot holes in mature and veteran Beech, Horse Chestnut (*Aesculus hippocastanum*) and Ash. The larva of the Sussex Rare listed hoverfly *Xylota florum*, are associated with rotting wood and sap in wet woodland habitats. A Nationally Scarce and Sussex Rare solitary wasp *Ectemnius ruficornis* is another woodland/scrub edge species associated with wood-decay habitat and the Sussex Rare species, the local Orange Footman (*Eilema sororcula*) is an example of an epiphyte species associated with native semi-natural broadleaved woodlands. The species has a lichen feeding larval stage and the Nationally Scarce weevil *Dorytomus ictor*, recorded on site near Ifield Court in 2003, is associated with Lombardy Poplar and possibly other poplars.

West Sussex is an important stronghold for the S41 'Species of principal importance' and IUCN post-2001 'Vulnerable' Brown Hairstreak and there were a significant number of historic records of this species, both within the wider landscape and the survey area. Brown Hairstreak has specific habitat requirements, being associated with uncut hedges, with wide uncut edge habitat supporting significant Blackthorn and hedgerow/scrub edge standards such as Ash or Pedunculate Oak, which provide 'master trees' for adult insects. The resource of uncut hedgerow with wide, grassy margins and mature and veteran oak and Ash is a feature of the landscape both within the survey area and the wider landscape and provides an excellent resource for this species and other hedgerow/scrub edge invertebrate fauna.

Another uncommon species associated with uncut scrub habitat recorded within the 2km search area includes the S41 listed and IUCN post-2001 'Endangered' White-letter Hairstreak (*Satyrium w-album*), the larvae of which feed on English Elm (*Ulmus procera*) and Wych Elm. Due to the widespread practice of flailing hedgerows for tidiness, species such as Brown and White-letter Hairstreaks as well as other invertebrates characteristic of hedgerows and grassland margins with more structurally diverse margins have declined in the UK. One of the key strengths of the scrub edge habitat in the survey area was due to the lack of intense management.

### 4.3.2 Grassland species

Species of conservation importance recorded historically from grassland habitats include butterflies such as IUCN post-2001 'Vulnerable' and S41 priority species Dingy Skipper (*Erynnis tages*) and Grizzled Skipper (*Pyrgus malvae*). Both species are associated with warm, sheltered, herb-rich grassland habitats often in disturbed ground situations. The IUCN post-2001 'Near Threatened' and S41 (research only) Small Heath is more of a generalist, recorded on and around the site on numerous occasions including the current scoping study. There are records for S41 and 'Near Threatened' species Small Blue (*Cupido minimus*) and 'Near Threatened' Chalk-hill Blue (*Polyommatus coridon*), from close to the Ifield golf course, however, these may

be treated with caution as both species are chalk downland specialists. It is unlikely that the sole foodplants of neither of Small Blue (Kidney Vetch (*Anthyllis vulneraria*)) or Chalk-hill Blue (Horseshoe Vetch (*Hippocrepis comosa*)) have been recorded in the survey area.

Sussex Rare bush-crickets including Long-winged Conehead and Roesel's Bush-cricket are generally widespread and common in southern England and Roesel's Bush-cricket nymphs were recorded during the scoping study and Long-winged Conehead is also likely to occur within the site's grasslands. Other grassland associated species recorded within a 2km radius of the site include ground-nesting Trimmer's Mining Bee (*Andrena trimmerana*) and White-footed Furrow Bee (*Lasioglossum leucopus*) (both Nationally Scarce) and a solitary wasp *Tiphia minuta* associated with dung beetles (Scarabaeidae).

#### 4.3.3 Wetland species

Uncommon wetland species recorded within a two-kilometre radius of the site include the IUCN post-2001 'Vulnerable' and Sussex Rare listed Brilliant Emerald which together with the Sussex Rare Downy Emerald, is associated with tree shaded, standing and slow-flowing waterbodies, with silted bottoms and leaf-litter. Such habitat was well represented within both the River Mole and Ifield Brook crossing the site; however, the habitat is unlikely to support diverse invertebrate assemblages typical of more well-vegetated channels.

Bulrush veneer, a Nationally scarce micromoth recorded within the site in 2003, is associated with bulrush which occurred in the majority of the Ifield golf course ponds and in other wetland areas of the site including the linear pond in compartment 12. Nationally Scarce beetles associated with wetland habitat historically recorded within two kilometres of the site include a crawling water beetle *Peltodytes caesus*, a diving beetle *Rhantus frontalis*, the Water-lily Reed Beetle (*Donacia crassipes*) and a Nationally Scarce pond skater *Aquarius paludum*. Such species are unlikely to be recorded without dedicated aquatic invertebrate survey work being undertaken and it is probable that survey of the ponds within the Ifield golf course and compartment 12 would result in the recording of species and assemblages of conservation status.

## 5 Conclusions

Overall, the recorded invertebrate fauna of higher conservation value within the survey area appears rather biased towards popular species groups such as butterflies and moths, dragonflies and damselflies and hoverflies, with relatively few records of rare and uncommon representatives of the larger orders such as (other than hoverflies) two-winged flies (Diptera), beetles (Coleoptera), true bugs (Hemiptera) and bees, ants and wasps (Hymenoptera). Resolution of recording of species groups is dependent on recording effort and whilst there is evidence of species of higher conservation value occurring within and within close proximity to the site, there is a need for more comprehensive invertebrate recording to update, fill gaps and enable a more objective appraisal of the site supporting some habitat of potential to support invertebrate assemblages of higher conservation value.

### 5.1 Confirmation of Habitats/Species of Higher Conservation Potential

Invertebrate habitat and species of particular importance identified from the scoping study are as follows:

#### **Area (A) Ifield golf course**

- Grassland margins and scrub edge habitat with mature Pedunculate Oak and Ash standards throughout, but good representative habitat along northern border between TQ 24127 36861 and TQ 23671 36940;
- Ponds and wet ditches at TQ 23691 36909, TQ 23621 36893, TQ 23398 36896 (and associated channels), TQ 23926 36520 and TQ 24025 36613;

- Wood-decay habitat generally including standard broadleaves and fallen/standing wood decay habitat within the site's woodland edge habitat;
- S41 IUCN Post-2001 'Vulnerable' Brown Hairstreak historic records and suitable habitat including structurally diverse, uncut Blackthorn scrub with associated mature standards and grassland margins.

***Area (B): Land east of Ifield Brook including Ifield Brook Wood and Meadows SNCI***

- Open grassland meadows (compartments 3 to 7);
- Scrub edge habitat with mature Pedunculate Oak and Ash standards throughout compartments (2-8);
- Broadleaved woodland edge habitat (compartments 8 and 2);
- Wood-decay habitat generally including standard broadleaves and fallen/standing wood decay habitat within the site's woodland edge habitat;
- S41 IUCN Post-2001 'Vulnerable' and 'Sussex Rare' Brown Hairstreak historic records and suitable habitat including structurally diverse, uncut Blackthorn scrub with associated mature standards and grassland margins.
- Post-2001 'Vulnerable' and 'Sussex Rare' Brilliant Emerald. Not recorded on site but shaded and silted Ifield Brook channel with potential to support this species.

***Area (C): Land north of the River Mole including Ifield Court Farm***

- Scrub edge and tall grassland edge habitat with mature Pedunculate Oak and Ash standards throughout compartments 12, 15, 17 and 18;
- Broadleaved woodland edge and interior (compartments 16 and 19);
- Wood-decay habitat generally including standard broadleaves and fallen/standing wood decay habitat within the site's woodland edge habitat;
- S41 IUCN Post-2001 'Vulnerable' and 'Sussex Rare' Brown Hairstreak suitable habitat including structurally diverse, uncut Blackthorn scrub with associated mature standards and grassland margins;
- Post-2001 'Vulnerable' and 'Sussex Rare' Brilliant Emerald. Not recorded on site but shaded and silted River Mole channel with potential to support this species.

***Area (D): Land south of the River Mole and west of Ifield Brook***

- Herb-rich grassland and scrub edge (compartment 22);
- Herb-rich wet grassland and scrub edge (compartment 30);
- Grassland margins and scrub edge habitat with mature Pedunculate Oak and Ash standards throughout, but particularly good representative habitat along northern border (adjacent to River Mole) between TQ 23695 37547 and TQ 24561 37858 (compartments 22, 23 and 25);
- Broadleaved woodland edge and interior (compartments 20 and 24 also along Ifield Brook at eastern margins of compartments 21, 25, 29 and 31);
- Wood-decay habitat generally including standard broadleaves and fallen/standing wood decay habitat within the site's woodland edge habitat;
- S41 IUCN Post-2001 'Vulnerable' and 'Sussex Rare' Brown Hairstreak suitable habitat including structurally diverse, uncut Blackthorn scrub with associated mature standards and grassland margins;
- Post-2001 'Vulnerable' and 'Sussex Rare' Brilliant Emerald. Not recorded on site but shaded and silted River Mole channel with potential to support this species.

***Area (E): Mixed ownership properties adjacent to Rusper Road (note: habitats mainly surveyed remotely)***

- Woodland edge habitat at south of compartment 38 and west of compartments 36 and 38;

- Scrub edge and tall grassland edge habitat with mature Pedunculate Oak and Ash standards throughout compartments;
- Birch woodland in compartment 34 (surveyed from road);
- Wood-decay habitat generally including standard broadleaves and fallen/standing wood decay habitat within the site's woodland edge habitat;
- Meadowland habitat in compartments 32, 35, 36 and 38 (habitat quality unknown);
- S41 IUCN Post-2001 'Vulnerable' and 'Sussex Rare' Brown Hairstreak suitable habitat including structurally diverse, uncut Blackthorn scrub with associated mature standards and grassland margins (compartments 38, 32, 33 and 35);

## 6 Recommendations

From a combination of desk study and a field-based scoping exercise covering the survey area, habitat with potential to support significant invertebrate assemblages and species of conservation value (i.e. 'Species of principal importance' included within Section 41 of the NERC Act (2006)) have been identified. It is therefore recommended that detailed survey work leading to the adequate assessment of all habitats and species identified within the 'Confirmation of habitats/species of higher conservation potential' section (above) are conducted.

### 6.1 Survey Work Specification

Detailed sampling of scrub-edge, grassland, woodland (including wood decay habitat) and wetland habitats identified within the 'Confirmation of habitats/species of higher conservation potential' is recommended together with species-specific surveys of Brown Hairstreak throughout the site (focusing on habitat within Areas A, B and D in particular).

Whilst specific, assemblage-based surveys of the River Mole and Ifield Brook may not be warranted, species-specific surveys for the larvae of the IUCN post-2001 'Vulnerable' and 'Sussex Rare' Brilliant Emerald and closely related Sussex Rare Downy Emerald are also advised.

Habitat surveys should follow specifications outlined in NERR005 (Drake et al, 2007) including timed sampling methods enabling a robust analysis using an up-to-date version of Invertebrate Species-habitat Information System (ISIS) as included in Pantheon available online at: <http://www.brc.ac.uk/pantheon/>

It is recommended that the surveys of terrestrial habitat should be undertaken over three sampling events in June to early July and August (2018). In order to adequately cover species associated with woodland edge habitats, samples coinciding with the flowering of Hawthorn are also recommended during May (2019).

Surveys of aquatic habitats including the ponds detailed above, may be undertaken during two sampling events. One sampling event should be ideally undertaken during summer, the second may be undertaken in late autumn or during early spring, 2019 at a time when aquatic larvae of species of riverflies are typically mature.

Surveys of adult Brown Hairstreak may be undertaken during August, alongside detailed invertebrate surveys, however, the species is elusive as an adult and egg counts during winter may be of value. Advice on egg count methodologies may be derived from:

[http://www.ukbms.org/Downloads/NG3\\_Brown%20Hairstreak%20Egg%20Count%20Guidance.pdf](http://www.ukbms.org/Downloads/NG3_Brown%20Hairstreak%20Egg%20Count%20Guidance.pdf)

Although the purpose of the survey would be to determine presence of the species, rather than being a monitoring exercise.

## 7 References

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## Appendices

### Appendix A – Tables

Table 1 – SxBRC Post-1980 invertebrate records of conservation status within c2km of survey area

Higher taxon	Scientific name	Common Name	Distance of closest record to survey area	UK conservation status	Sussex conservation status	S41 status
Coleoptera	<i>Agabus bipustulatus</i>	A diving beetle	2km south of lfield golf course	Widespread	Sussex Rare	
Coleoptera	<i>Agabus sturmii</i>	A diving beetle	1.9km south of lfield golf course	Widespread	Sussex Rare	
Coleoptera	<i>Donacia crassipes</i>	Water-lily Reed Beetle	2km south of lfield golf course	Nationally Scarce (Notable b)	Sussex Rare	
Coleoptera	<i>Halplus heydeni</i>	A crawling water beetle	1.8km south of lfield golf course	Widespread	Sussex Rare	
Coleoptera	<i>Helochares lividus</i>	A water-scavenger beetle	2km south of lfield golf course	Widespread	Sussex Rare	
Coleoptera	<i>Ilybius fenestratus</i>	A diving beetle	2.3km south of lfield golf course	Widespread	Sussex Rare	
Coleoptera	<i>Pachytodes cerambyciformis</i>	Speckled Longhorn	1.7km south of lfield golf course	Locally common (west)	Sussex Rare	
Coleoptera	<i>Pelodytes caesus</i>	A crawling water beetle	2km north of site	Nationally Scarce		
Coleoptera	<i>Rhantus frontalis</i>	A diving beetle	2km north of site	Nationally Scarce (Notable b)	Sussex Rare	
Coleoptera	<i>Staphylinus dimidiaticornis</i>	A rove beetle	1.7km south of lfield golf course	Local	Sussex Rare	
Diptera	<i>Callicera aurata</i>	Golden Hoverfly	1.1km southeast of site in 2004	Red List Pre-1994 (Rare), Nationally Scarce	Sussex Rare	

Higher taxon	Scientific name	Common Name	Distance of closest record to survey area	UK conservation status	Sussex conservation status	S41 status
Diptera	<i>Heringia latitarsis</i>	A hoverfly	2km south of site in 1991	Nationally Scarce	Sussex Rare	
Diptera	<i>Volucella inanis</i>	A hoverfly	1km southeast of site in 2001	Local	Sussex Rare	
Diptera	<i>Volucella inflata</i>	A hoverfly	1km southeast of site in 2001	Local	Sussex Rare	
Diptera	<i>Volucella zonaria</i>	A hoverfly	1km southeast of site in 2001	Widespread (south)	Sussex Rare	
Diptera	<i>Xylota florum</i>	A hoverfly	2km south of site in 1992	Local	Sussex Rare	
Hemiptera	<i>Aquarius paludum</i>	A pond skater	2.2km south of site in 2016	Nationally Scarce (Notable b)	Sussex Rare	
Hymenoptera	<i>Andrena (Hoploundrena) trimmerana</i>	Trimmer's Mining Bee	c2.4km south of Ifield golf course	Nationally Scarce (Notable b)	Sussex Rare	
Hymenoptera	<i>Dolichovespula (Dolichovespula) media</i>	An Ant, Bee, Sawfly or Wasp	350m north of Old Pound Nursery	Nationally Scarce (Notable a)	Sussex Rare	
Hymenoptera	<i>Ectemnius (Clytochrysus) ruficornis</i>	An Ant, Bee, Sawfly or Wasp	1.9km south of site at Buchan Park	Nationally Scarce (Notable b)	Sussex Rare	
Hymenoptera	<i>Lasioglossum (Dialictus) leucopus</i>	White-footed Furrow Bee	1.9km south of site at Buchan Park	Red List Pre-1994 (Rare)		
Hymenoptera	<i>Tiphia minuta</i>	Small Tiphia	c2.4km south of Ifield golf course	Nationally Scarce (Notable b)	Sussex Rare	
Lepidoptera (butterfly)	<i>Apatura iris</i>	Purple Emperor	6 post 1990 records, nearest c300m west of Ifield golf course in 2013	Post-2001 IUCN 'Near Threatened'	Sussex Rare	

Higher taxon	Scientific name	Common Name	Distance of closest record to survey area	UK conservation status	Sussex conservation status	S41 status
Lepidoptera (butterfly)	<i>Coenonympha pamphilus</i>	Small Heath	44 post 1990 records including on site and within 2km records	Post-2001 IUCN 'Near Threatened'		NERC S41 'research only'
Lepidoptera (butterfly)	<i>Cupido minimus</i>	Small Blue	2 post 2000 records just outside lfield golf course (note: larval foodplant of species not seen during survey)	Post-2001 IUCN 'Near Threatened'		NERC S41
Lepidoptera (butterfly)	<i>Erynnis tages</i>	Dingy Skipper	9-post 1990 records within 2k of site, nearest 300m south of lfield golf course	Post-2001 IUCN 'Vulnerable'		NERC S41
Lepidoptera (butterfly)	<i>Lasiommata megera</i>	Wall	2 post 1980 records within 1km southeast of lfield golf course	Post-2001 IUCN 'Near Threatened'		NERC S41
Lepidoptera (butterfly)	<i>Limenitis camilla</i>	White Admiral	9 post-1990 records including 1 on site in 2010	Post-2001 IUCN 'Vulnerable'		NERC S41
Lepidoptera (butterfly)	<i>Polyommatus coridon</i>	Chalk-hill Blue	1 2012 record at western site boundary around Rusper Road (note: larval foodplant of species ( <i>Hippocrepis comosa</i> ) not recorded in Crawley	Post-2001 IUCN 'Near Threatened'		
Lepidoptera (butterfly)	<i>Pyrgus malvae</i>	Grizzled Skipper	1.7km west of site	Post-2001 IUCN 'Vulnerable'		NERC S41
Lepidoptera (butterfly)	<i>Satyrrium w-album</i>	White-letter Hairstreak	1km east of lfield Green site boundary	Post-2001 IUCN 'Endangered'		NERC S41

Higher taxon	Scientific name	Common Name	Distance of closest record to survey area	UK conservation status	Sussex conservation status	S41 status
Lepidoptera (butterfly)	<i>Thecla betulae</i>	Brown Hairstreak	70 post-1980 records within 2km including 10 post-1990 records inside survey boundary including 5 records in Ifield Brook Wood & Meadows SNCI, 2 records in compartment 24 and 3 records in compartment 17.	Post-2001 IUCN 'Vulnerable'	Sussex Rare	NERC S41
Lepidoptera (moth)	<i>Acrionicta rumicis</i>	Knot-grass	200km east of site in 2012	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Allophyes oxyacanthae</i>	Green-brindled Crescent	On site in 2013 (larvae)	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Calamotropha paludella</i>	Bulrush Veneer	On site in 2003	Nationally Scarce (Notable b)		
Lepidoptera (moth)	<i>Diarsia rubi</i>	Small Square Spot	1.3km north of site in 2015	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Eilema sorocula</i>	Orange Footman	2km south of Ifield golf course in 2016	Local	Sussex Rare	
Lepidoptera (moth)	<i>Elegia similella</i>	White-barred Knot-horn	On site in 2003	Nationally Scarce (Notable b)	Sussex Rare	
Lepidoptera (moth)	<i>Evergestis pallidata</i>	Chequered Pearl	On site in 2003	Local	Sussex Rare	
Lepidoptera (moth)	<i>Hoplodrina blanda</i>	Rustic	1.4km north of site in 2015	Widespread		NERC S41 'research only'

Higher taxon	Scientific name	Common Name	Distance of closest record to survey area	UK conservation status	Sussex conservation status	S41 status
Lepidoptera (moth)	<i>Hydria cervinalis</i>	Scarce Tissue	2km south of site in 1993	Local	Sussex Rare	
Lepidoptera (moth)	<i>Lycia hirtaria</i>	Brindled Beauty	2km south of site in 2018	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Malacosoma neustria</i>	Lackey	1.4km north of site in 2015	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Spilosoma lutea</i>	Buff Ermine	1.4km north of site in 2015	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Tyria jacobaeae</i>	Cinnabar	400m east of site in 2010	Widespread		NERC S41 'research only'
Lepidoptera (moth)	<i>Watsonalla binaria</i>	Oak Hook-tip	2km south of site in 1996	Widespread		NERC S41 'research only'
Odonata	<i>Cordulia aenea</i>	Downy Emerald	200m west of site in 1993	Post-2001 IUCN 'Least Concern'	Sussex Rare	
Odonata	<i>Somatochlora metallica</i>	Brilliant Emerald	21 post-1980 records within 2km of site. Nearest record 600m south of Ifield golf course (2004)	Post-2001 IUCN 'Vulnerable'	Sussex Rare	
Odonata	<i>Sympetrum fonscolombii</i>	Red-veined Darter	1 1987 record c2km south of Ifield golf course	Post-2001 IUCN 'Least Concern'	Sussex Rare	
Orthoptera	<i>Conocephalus fuscus</i>	Long-winged Cone-head	Post-1990 records in several locations including on site in SNCI in 2001	Widespread (south)	Sussex Rare	

Higher taxon	Scientific name	Common Name	Distance of closest record to survey area	UK conservation status	Sussex conservation status	S41 status
Orthoptera	<i>Metrioptera roeselii</i>	Roesel's Bush-cricket	Post-1990 records in several locations including on site in 2001	Widespread (south)	Sussex Rare	

Table 2 - 2018 Incidental species records

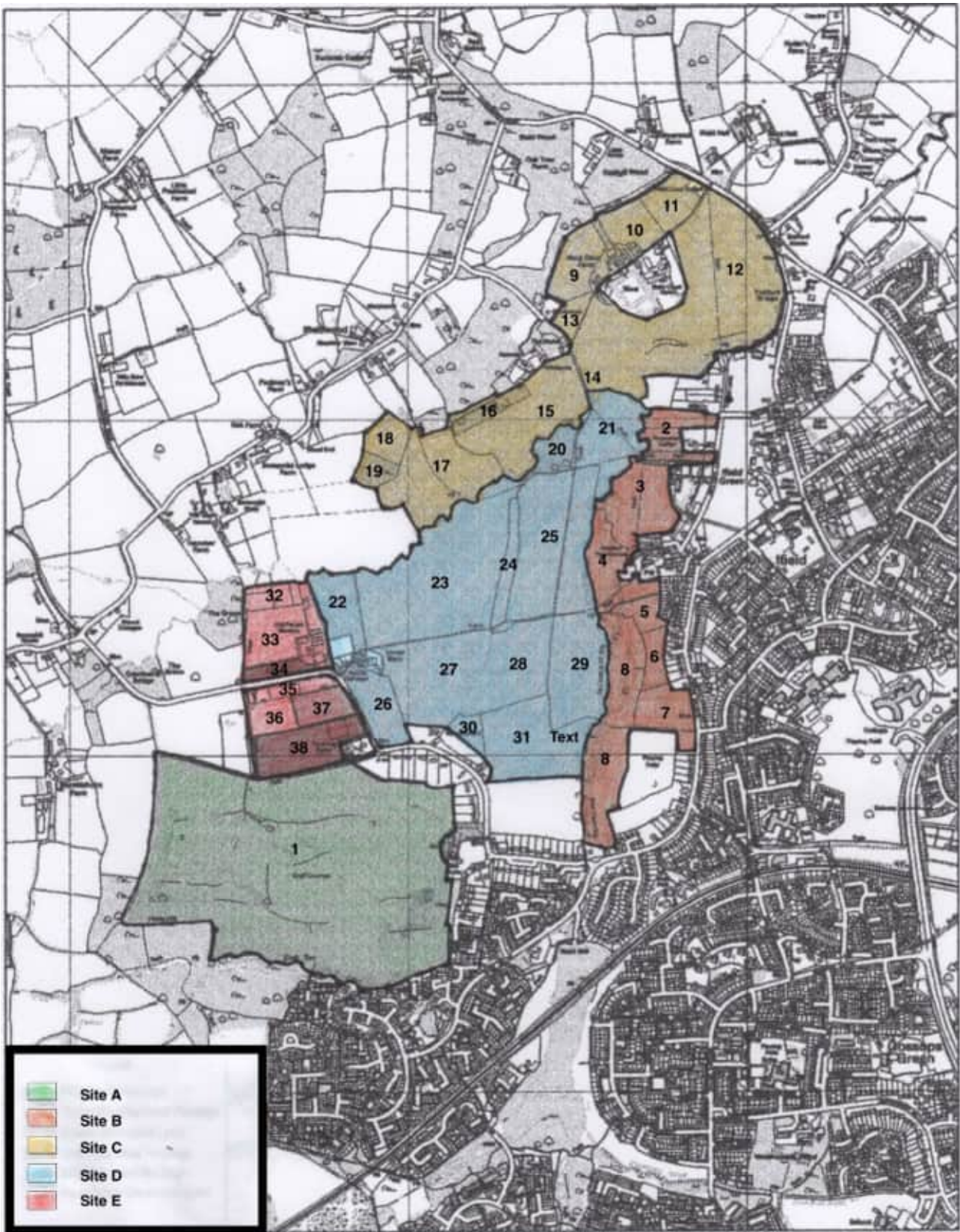
Common name	Scientific name	Family	Order	Stage	UK status	S41 / UK BAP	Ifield golf course	Site (other)
A tetragnathid spider	<i>Tetragnatha extensa</i>	Tetragnathidae	Araneae	Adults	Widespread		x	
Harlequin Ladybird	<i>Harmonia axyridis</i>	Coccinellidae	Coleoptera	Adults	Introduced			x
Thick-kneed Flower Beetle	<i>Oedemera nobilis</i>	Oedemeridae	Coleoptera	Adults	Widespread		x	x
Red-headed Cardinal Beetle	<i>Pyrochroa serraticornis</i>	Pyrochroidae	Coleoptera	Adults	Widespread			x
A dolichopodid fly	<i>Poecilobothrus nobilitatus</i>	Dolichopodidae	Diptera	Adults	Widespread		x	
Broad Centurion	<i>Chloromyia formosa</i>	Stratiomyidae	Diptera	Adults	Widespread		x	x
A hoverfly	<i>Episyrphus balteatus</i>	Syrphidae	Diptera	Adults	Widespread		x	
A hoverfly	<i>Helophilus pendulus</i>	Syrphidae	Diptera	Adults	Widespread		x	
Narcissus Fly	<i>Merodon equestris</i>	Syrphidae	Diptera	Adults	Widespread			x
A hoverfly	<i>Myathropa florea</i>	Syrphidae	Diptera	Adults	Widespread			x
A hoverfly	<i>Volucella bombylans</i>	Syrphidae	Diptera	Adults	Widespread			x
A hoverfly	<i>Volucella pellucens</i>	Syrphidae	Diptera	Adults	Widespread		x	
Dock Bug	<i>Coreus marginatus</i>	Coreidae	Hemiptera	Adults	Widespread		x	
A grass bug	<i>Leptopterna dolabrata</i>	Miridae	Hemiptera	Adults	Widespread			x
Honey Bee	<i>Apis mellifera</i>	Apidae	Hymenoptera	Adults	Widespread		x	
Tree Bumblebee	<i>Bombus hypnorum</i>	Apidae	Hymenoptera	Adults	Widespread (south)		x	x

Common name	Scientific name	Family	Order	Stage	UK status	S41 / UK BAP	Ifield golf course	Site (other)
Large Red-tailed Bumblebee	<i>Bombus lapidarius</i>	Apidae	Hymenoptera	Adults	Widespread			x
Common Carder Bee	<i>Bombus pascuorum</i>	Apidae	Hymenoptera	Adults	Widespread			x
Early Bumblebee	<i>Bombus pratorum</i>	Apidae	Hymenoptera	Adults	Widespread			x
Buff-tailed Bumblebee	<i>Bombus terrestris</i>	Apidae	Hymenoptera	Adults	Widespread		x	x
A crabronid wasp	<i>Ectemnius</i> sp.	Crabronidae	Hymenoptera	Adults	Unknown		x	
Hornet	<i>Vespa crabro</i>	Vespidae	Hymenoptera	Adults	Widespread		x	
Blood-vein	<i>Timandra comae</i>	Geometridae	Lepidoptera	Adults	Widespread	S41. (research only)	x	
Large Skipper	<i>Ochlodes sylvanus</i>	Hesperiidae	Lepidoptera	Adults	Widespread		x	x
Common Blue	<i>Polyommatus icarus</i>	Lycaenidae	Lepidoptera	Adults	Widespread		x	
Ringlet	<i>Aphantopus hyperantus</i>	Nymphalidae	Lepidoptera	Adults	Widespread		x	x
Small Heath	<i>Coenonympha pamphilus</i>	Nymphalidae	Lepidoptera	Adults	IUCN Post-2001 'Near Threatened'	S41. (research only)		x
Meadow Brown	<i>Maniola jurtina</i>	Nymphalidae	Lepidoptera	Adults	Widespread		x	x
Speckled Wood	<i>Pararge aegeria</i>	Nymphalidae	Lepidoptera	Adults	Widespread		x	x
Red Admiral	<i>Vanessa atalanta</i>	Nymphalidae	Lepidoptera	Adults	Widespread			x
Large White	<i>Pieris brassicae</i>	Pieridae	Lepidoptera	Adults	Widespread			x
Green-veined White	<i>Pieris napi</i>	Pieridae	Lepidoptera	Adults	Widespread			x
Banded Demoiselle	<i>Calopteryx splendens</i>	Calopterygidae	Odonata	Adults	Widespread		x	x
Azure Damselfly	<i>Coenagrion puella</i>	Coenagridae	Odonata	Adults	Widespread		x	x







Common name	Scientific name	Family	Order	Stage	UK status	S41 / UK BAP	Ifield golf course	Site (other)
Scarce Chaser	<i>Libellula fulva</i>	Libellulidae	Odonata	Adults	IUCN Post-2001 'Near Threatened'		x	
Four-spot Chaser	<i>Libellula quadrimaculata</i>	Libellulidae	Odonata	Adults	Widespread			x
Field Grasshopper	<i>Chorthippus brunneus</i>	Acrididae	Orthoptera	Nymphs	Widespread		x	
Meadow Grasshopper	<i>Chorthippus parallelus</i>	Acrididae	Orthoptera	Nymphs	Widespread		x	
Common Green Grasshopper	<i>Omocestus viridulus</i>	Acrididae	Orthoptera	Adults	Widespread			x
Roesel's Bush-cricket	<i>Metrioptera roeselii</i>	Tettigoniidae	Orthoptera	Nymphs	Widespread (south)	Sussex Rare	x	
Dark Bush-cricket	<i>Pholidoptera griseoaptera</i>	Tettigoniidae	Orthoptera	Nymphs	Widespread		x	x

## Appendix B – Figures

Figure 1– Land west of lfield survey area showing survey zones and compartment numbers



## Appendix C – Photographs

		
<p><b>Photograph 1 – Veteran Pedunculate Oak (Ifield golf course)</b></p>	<p><b>Photograph 2 – Field 2 - herb-rich grassland &amp; scrub (Ifield golf course)</b></p>	<p><b>Photograph 3– Pond (Ifield golf course)</b></p>
		
<p><b>Photograph 4 – Bunker with nesting furrow bees (Ifield golf course)</b></p>	<p><b>Photograph 5 – Scrub edge grassland mosaic (Ifield Brook Wood and Meadows SSSI)</b></p>	<p><b>Photograph 6 – Semi-natural broadleaved woodland (Ifield Brook Wood and Meadows SSSI)</b></p>



Photograph 7 – *Lasius flavus* anthills (Ifield Brook Wood and Meadows SNCI)



Photograph 8 - Veteran oak standard (compartment 12)



Photograph 9 – Paleochannel (compartment 12)



Photograph 10 – Vegetated pond (compartment 12)



Photograph 11 – Field edge scrub & woodland (compartment 17)



Photograph 12 – Semi-natural broadleaved woodland (compartment 16)



Photograph 13 – Semi-natural broadleaved woodland (compartment 19)



Photograph 14 – Herb-rich sward (compartment 22)



Photograph 15– Sward with Grass Vetchling (*Vicia nissola*) (compartment 22)



**Photograph 16 – Herb-rich wet grassland (compartment 30)**



**Photograph 17 – Semi-natural broadleaved woodland (compartment 20)**



**Photograph 18 – Grassland scrub edge habitat (compartment 23)**

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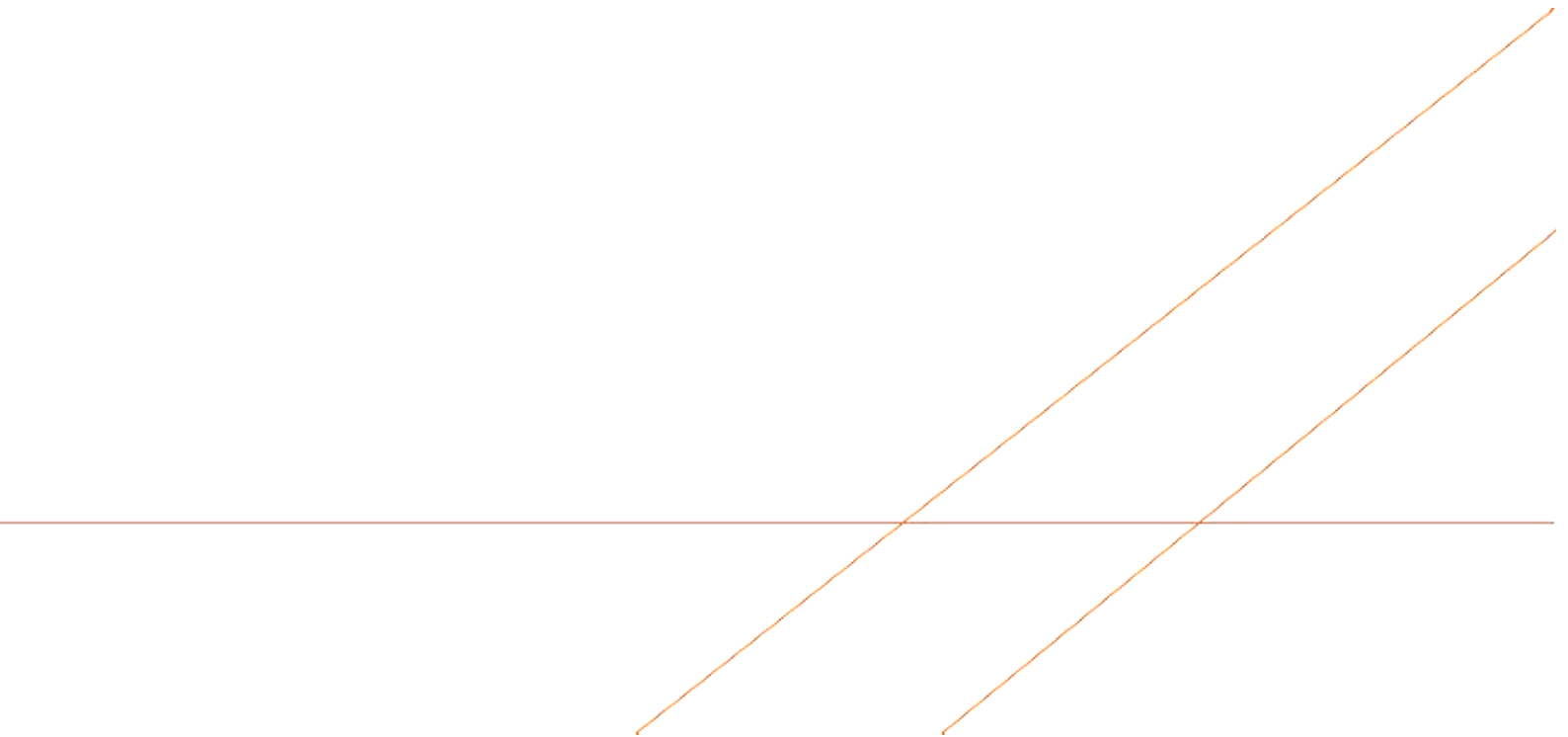
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# APPENDIX 8.9: LAND WEST OF IFIELD – GREAT CRESTED NEWT SURVEY REPORT 2024

Intended for  
**Homes England**


Date  
**December 2024**

Project Number  
**1620007949-003**

# **LAND WEST OF IFIELD GREAT CRESTED NEWT SURVEY REPORT 2024**

# LAND WEST OF IFIELD GREAT CRESTED NEWT SURVEY REPORT 2024

Project No. **1620007949-003**  
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## APPENDICES

### Appendix 1

Figure

# 1. INTRODUCTION

## 1.1 Background

Ramboll UK Limited ('Ramboll') was commissioned by Homes England (the 'Client'), to carry out a series of ecological surveys in relation to the proposed development at Land West of Ifield, Ifield, West Sussex (the 'site', as illustrated in Figure 1, Appendix 1). This report presents the findings of the Great Crested Newt (GCN) *Triturus cristatus* surveys carried out by Ramboll ecologists between March and June in 2024 of the ponds on site or nearby offsite.

A series of GCN surveys have been undertaken of the site between 2018 and 2023, to understand the use of the site by amphibians.

GCN surveys were previously undertaken by Arcadis Consulting Ltd (Arcadis) from March to June 2018 and 2019 at the site. Results from the 2018/2019 survey report<sup>1</sup> detailed four ponds (P2, P3, P3B and P6) and one ditch (D3) surveyed in 2018 which were identified as having presence of GCN. Due to the time elapsed since these surveys were completed, update surveys were required of the site. The 2018/2019 Arcadis surveys also included the Ifield Brook Wood and Meadows local wildlife site to the east of the site, which was previously proposed to comprise the proposed development area, however this area is no longer part of the proposed site boundary (other than a potential cycle / pedestrian route crossing this area in one location).

In March and June 2020, GCN surveys were undertaken by Ramboll of pond 11<sup>2</sup> which is situated in the eastern section of the site in the area known as Pastoral fields (Area 1). Pond 11 dried out after two surveys and therefore GCN were deemed to not be present.

In March and June 2021 and 2022, GCN surveys were undertaken by Ramboll across ten ponds (P2, P3, P3B, P5, P6, P15, P16, P16A, P18, P19) and one ditch (D3)<sup>3</sup>. The 2021 surveys found GCN present in Pond 3, Pond 3B, and Pond 6, the 2022 survey found presence of GCN in pond 16 and 16A. Surveys in 2023<sup>4</sup> were undertaken in Pond 12 and Ditch 4, and both locations found GCN present.

Further surveys were required in 2024 to confirm the continued presence of absence of GCN at the ponds on the site, with updates required for select ponds due to the time that has elapsed since previous surveys were undertaken. Given the scale of the site it has been proposed that surveys would be undertaken at least every 3 years. For the purposes of 2024 GCN surveying, the site has been split up into two geographical sections. These are:

1. Golf Course (approx. central grid reference: TQ 23679 36673); and
2. Pastoral (Area 1) and Arable fields (Area 2) (approx. central grid reference: TQ 24331 37818).

Figure 1 (Appendix 1) shows the location of these areas within the proposed boundary of the site, as part of the 2024 surveys the six ponds and three ditches detailed in this report required updated surveys as part of the proposed three-year survey cycle. As stated in the limitations (Section 2.2), a number of ponds were not accessible due to third party landowner restrictions.

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<sup>1</sup> Arcadis (October 2019). Land west of Ifield – Great Crested Newt Survey Report. Report reference: WOI-AUK-XX-WS-RP-EC-0005-01-Great Crested Newt Report.

<sup>2</sup> Ramboll (July 2020). Land West of Ifield- Great Crested Newt Survey Report. Report reference: R-1620007949\_1-GCN

<sup>3</sup> Ramboll (December 2022). Land West of Ifield – Great Crested Newt Survey Report 2022. Report reference: R-1620007949\_1-GCN 2022

<sup>4</sup> Ramboll (August 2023). Land West of Ifield – Great Crested Newt Survey Report 2023. Report reference: R-1620007949\_1-GCN 2023

## **1.2 Proposed Development**

At the time of writing it is understood that the proposed development will comprise: up to 3,000 new residential units with associated infrastructure; space for employment, retail, community uses and landscaping; and access arrangements. Further details regarding the proposed development will be determined in due course and may be subject to revision.

## **1.3 Objectives**

The content of this report is based on the findings of update presence/ likely absence surveys for GCN at the site.

The specific objectives of this report are to:

- determine the continued presence/ likely absence of GCN within select water bodies at the site; and
- where GCN are present, determine the size class of the population and their spatial use of the site.

This report presents factual baseline information on the findings of the survey. This report is intended to inform masterplanning and design and will form part of the baseline information used to support the Environmental Impact Assessment of the Land West of Ifield planning application.

The report is supported by Appendix 1: Figure. The structure and content of this report is based on current ecological report writing guidance (CIEEM, 2017<sup>5</sup>).

## **1.4 Legislation and Policy Framework**

Various legislation and planning policies refer to the protection of wildlife. When dealing with individual cases, the full texts of the relevant documents should be consulted, and legal advice obtained if necessary. GCN are fully protected under Schedule 5 of the Wildlife and Countryside Act, 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations, 2017 (as amended), making it a European protected species.

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<sup>5</sup> CIEEM (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.

## 2. SURVEY METHODOLOGY

### 2.1 Great Crested Newt Environmental DNA Survey

In April 2024 a site visit was undertaken of three ditches (D1, D2 and D3) and six ponds (P1, P3, P3B, P4, P5 and P6) to complete environmental DNA (eDNA) surveys, completed in accordance with current guidance<sup>6</sup>. The surveys were completed by James Hryniewicz of Ramboll, holding the appropriate Natural England survey licence (2016-25347-CLS-CLS), with assistance from Eleanor King.

The survey involved taking twenty water samples (total) per pond from the ditches and ponds on a single visit (as shown in Figure 1: Great Crested Newt Survey Results, Appendix 1). Water samples were collected using suitable sample containers provided by the analytical laboratory, ADAS.

The water samples were couriered to ADAS for analysis to determine if GCN eDNA was present in the waterbodies.

#### Great Crested Newts Survey

Population size class assessments (PSCA) were undertaken of the ponds identified as being positive for GCN eDNA, in accordance with Natural England guidance<sup>7</sup>. A minimum of four surveys are required to determine absence, with an additional two surveys required if GCN are found during the four initial surveys in order to determine PSCA. The surveys were completed by James Hryniewicz of Ramboll, holding the appropriate Natural England survey licence, with assistance from ecologists Eleanor King, Amina Reeb, Danielle Esterhuizen, and Rebecca Brightling. PSCA survey visits were undertaken between mid-March and mid-June with at least three of the visits undertaken between mid-April and mid-May (the 'core period').

All surveys were undertaken in suitable weather conditions in 2024 as shown in Table 2.1 below.

**Table 2-1: Survey Conditions of 2024 GCN Surveys**

Visit	Date	Temperature (°C)	Wind (1-5)	Precipitation	Humidity (%)
1	08/04/2024	8	3	0	85
2	23/04/2024	7	1	0	75
3	09/05/2024	12	1	88	0
4	15/05/2024	13	1	76	0
5	10/06/2024	9	1	79	0
6	11/06/2024	11	1	83	0
7	19/06/2024	11	1	85	0

In line with Natural England guidance<sup>6</sup>, surveys employed the following methods on each visit in order to detect the presence or likely absence of GCNs, with three of the four survey methods used for each method:

- Torch survey. The accessible margins of the waterbody were slowly walked once it was dark, and a search made by torchlight (using torches with >one million candlepower) for newts. All

<sup>6</sup> Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.  
<https://adas.co.uk/wp-content/uploads/2021/01/Natural-England-Technical-Advice-Note-2.pdf>

<sup>7</sup> English Nature (2001). Great Crested Newt Mitigation Guidelines V1. English Nature, Peterborough

newts observed were identified to species, counted and identified as males, females or juveniles, where possible;

- Bottle trapping. Funnel traps (made from 2 litre clear plastic bottles) were submerged (with an air bubble retained), approximately every 2 m around the pond margins where access was possible, in the evening before dark, and left set overnight to be checked the following morning;
- Netting. Long-handled dip nets were used to sample pond edges at night. 15 minutes of netting was undertaken per 50 m of shoreline; and
- Egg searches. All suitable submerged vegetation was searched for GCN eggs. Newt eggs are characteristically wrapped individually in the submerged leaves of aquatic vegetation.

PSCA was calculated using the peak count results of either the torching or bottle trapping survey and were categorised using the Natural England guidance, as highlighted below:

- 'small' for maximum counts up to 10.
- 'medium' for maximum counts up to 100.
- 'large' for maximum counts over 100.

## **2.2 Limitations**

Access was not permitted to 12 ponds which are off-site (See Appendix 1: Figure 1).

Torching survey technique did not take place at Pond 6 and Ditch 3, as the presence of cattle presented health and safety constraints.

This report has been prepared for the Client and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

Ramboll is satisfied that this report represents a robust appraisal of the site for the purpose of a GCN survey. If no action or development has taken place on this land within twenty-four months of the review date of this report, the findings of this survey should be reviewed by a suitably qualified ecologist and may need to be updated.

### 3. RESULTS

During these ecological assessments, continued presence of populations of GCN were confirmed at the site. Figure 1 (Appendix 1) shows the locations of all ponds with confirmed presence of GCN.

#### 3.1 eDNA Surveys

In 2024 eDNA surveys were undertaken on Ditches 1, 2, and 3, and Ponds 1, 4, 5 and 6. The results of the eDNA surveys returned two positive results for GCN (Ditch 3 and Pond 6) and five negative results (Ditch 1, Pond 1, Ditch 2, Pond 4, and Pond 5).

No eDNA surveys were undertaken on Pond 2, Pond 3 and Pond 3B as during the first round of presence/absence surveys which were undertaken in April prior to the start of the eDNA survey window (Mid-April to June) all three ponds were found to have GCN present. Therefore, it was deemed not necessary to undertake eDNA surveys on the three ponds as presence was confirmed.

Further surveys were conducted on the positive ponds and the results of those surveys are found in Section 3.2.1.

#### 3.2 Presence/Absence GCN Surveys (2024)

##### 3.2.1 Results

Tables 3.1 to 3.6 shows the results of the five surveys where GCN were found in 2024.

**Table 3-1: Results of GCN Surveys of Pond 2**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	08/04/2024	35	Y (1)	N	-
2	23/04/2024	5	Y (3)	N	-
3	09/05/2024	3	Y (2)	Smooth Newt	-
4	10/06/2024	3	Y (2)	Common Frog	-
5	12/06/2024	3	Y (1)	N	-
6	19/06/2024	6	Y (1)	N	-

**Table 3-2: Results of GCN Surveys of Pond 3**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	08/04/2024	7	Y (10)	Smooth Newt	-
2	23/04/2024	10	Y (7)	Smooth Newt	-

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
3	09/05/2024	6	N	Smooth Newt	-
4	10/06/2024	6	Y (3)	Smooth Newt	-
5	12/06/2024	6	Y (2)	Smooth Newt	-
6	19/06/2024	6	Y (8)	Smooth Newt	-

Table 3-3: Results of GCN Surveys of Ditch 3

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	08/04/2024	5	N	N	-
2	14/05/2024	7	N	N	-
3	28/05/2021	7	N	N	Drying
4	10/06/2024	-	-	-	Dry

Table 3-4: Results of GCN Surveys of Pond 3B

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	08/04/2024	10	Y (2)	Smooth Newt Common Frog	Two fish recorded
2	23/04/2024	10	N	Smooth Newt	-
3	09/05/2024	6	Y (1)	Smooth Newt	-
4	10/06/2024	6	Y (2)	N	-
5	12/06/2024	7	Y (1)	Smooth Newt	-
6	19/06/2024	6	N	N	-

**Table 3-5: Results of GCN Surveys of Pond 6**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	08/04/2024	10	N	N	-
2	14/05/2024	7	N	N	-
3	15/05/2024	7	Y (1)	N	-
4	10/06/2024	8	N	N	-
5	12/06/2024	6	N	N	-
6	19/06/2024	6	N	N	-

It was found that GCN are present in Pond 2, Pond 3, Pond 3B, and Pond 6. The peak count of GCN present in Pond 2 was **3**, Pond 3 was **10**, Pond 3B was **2**, and Pond 6 was **1**. The GCN were identified during the bottle trapping surveys and torching surveys. GCNs were not identified in Ditch 3 (despite being positive during the eDNA survey).

During the netting surveys undertaken on each of the ponds, no GCN were observed.

## 4. DISCUSSION AND CONCLUSION

### *Summary of Findings/ Population Size of Site, 2024*

GCN were recorded in Pond 2, Pond 3, Pond 3B, and Pond 6.

Pond 2 was recorded to have a small population of GCN with a peak count of 3 adult individuals being recorded, with both male and females being identified during the surveys. Therefore, it is deemed that Pond 2 is not a breeding pond for GCN.

Pond 3 was recorded to have a small population of GCN with a peak count of 10 adult individuals being recorded, with both male and females being identified during the surveys. Eggs were also identified during the surveys. Therefore, it is deemed that Pond 3 is a breeding pond for GCN.

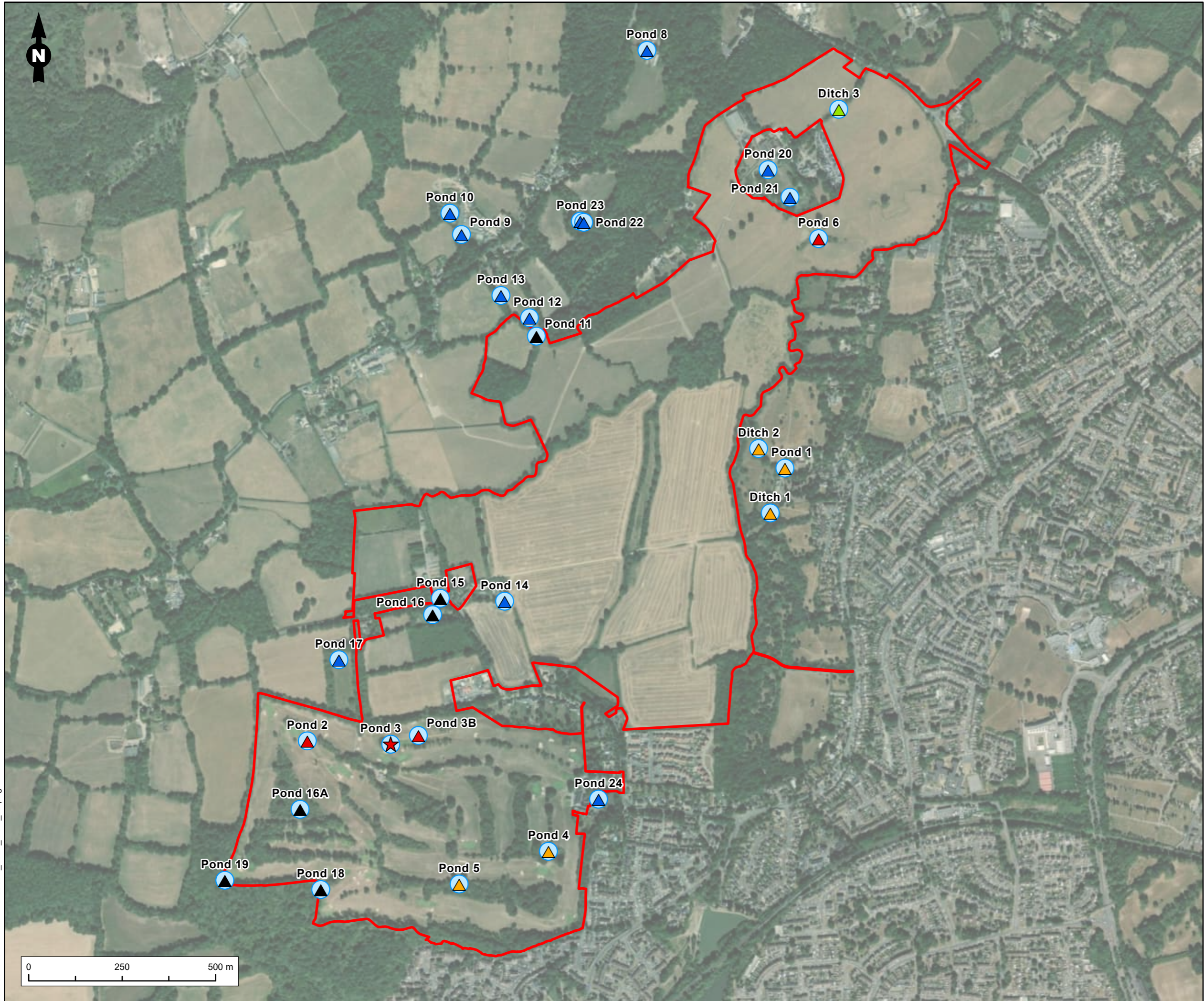
Pond 3B was recorded to have a small population of GCN with a peak count of 2 adult individuals being recorded, with both male and females being identified during the surveys. Therefore, it is deemed that Pond 3B is not a breeding pond for GCN.

Pond 6 was recorded to have a small population of GCN with a peak count of 1 adult individual being recorded, with all recordings being male and no eggs identified. Therefore, it is deemed that Pond 6 is not a breeding pond for GCN.

GCN were absent from Pond 5 and Ditch 3, and eDNA results were negative for Ditch 1, Pond 1, Ditch 2, Pond 4 and Pond 5. These sites are therefore not breeding locations for GCN.

Appropriate recommendations for mitigation and enhancement (where applicable) will be determined in due course once development proposals are finalised and included in separate documentation. The proposed planning application will be supported by an Environmental Statement which will include a chapter on biodiversity and outline appropriate recommendations for GCN.

**APPENDIX 1**  
**FIGURE**



**Legend**

- Site Boundary
- Pond Locations

**Survey Results**

- ★ GCN Breeding Pond
- ▲ GCN Present eDNA
- ▲ Negative GCN
- ▲ Absent
- ▲ No Access
- ▲ Not Surveyed -  
Survey not required  
in 2024, refer to prior  
years survey data

Figure Title  
**Great Crested Newt Survey Results**

Project Name  
**West of Ifield**

Project No./Filey ID  
**1620007949-003**

Date <b>December 2024</b>	Figure No. <b>1</b>	Revision <b>1.0</b>
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Prepared By <b>AR</b>	Scale <b>1:9,663 @A3</b>
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Client  
**Homes England**



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# APPENDIX 8.10: LAND WEST OF IFIELD – GREAT CRESTED NEWT SURVEY REPORT 2023

Intended for

**Turner and Townsend Project Management Ltd on behalf of Homes England**

Date

**August 2023**

Project Number

**1620007949**

# **LAND WEST OF IFIELD GREAT CRESTED NEWT SURVEY REPORT 2023**

# LAND WEST OF IFIELD GREAT CRESTED NEWT SURVEY REPORT 2023

Project No. **1620007949**  
Issue No. **1**  
Document Ref. **R-1620007949\_1-GCN Report 2023**  
Date **August 2023**  
Made by **James Hrynkiewicz**  
Checked by **Adam Fitchet**  
Approved by **Adam Fitchet**

Made by:	
Approved by:	

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## Version Control Log

Revision	Date	Made by	Checked by	Approved by	Description
1	11/08/2023	JH	AF	AF	First Client Issue

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## APPENDICES

### Appendix 1

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# 1. INTRODUCTION

## 1.1 Background

Ramboll UK Limited ('Ramboll') was commissioned by Turner and Townsend Project Management Ltd (the 'Client') on behalf of Homes England, to carry out a series of ecological surveys in relation to the proposed development plans for Land West of Ifield, Ifield, West Sussex (the 'site', as illustrated in Figure 1, Appendix 1). This report presents the findings of the Great Crested Newt (GCN) *Triturus cristatus* surveys carried out by Ramboll ecologists between March and June in 2023 of the ponds on site or nearby offsite.

GCN surveys of the offsite ponds were previously undertaken by Arcadis Consulting Ltd (Arcadis) in 2018 and 2019 at the site. Results from the 2018/2019 survey report<sup>1</sup> detailed that Pond (P)7, P8, P9, P12 and P14 returned negative eDNA results. P13 and P17 were identified as having GCN present through population surveys. Ponds 20, 21, 22 and 23 were not surveyed due to no access. Pond 10 was deemed unsuitable for GCN based on the Habitat Suitability Index (HSI) surveys.

Figure 1 (Appendix 1) shows the location of the offsite ponds.

Figure 2 (Appendix 1) shows the survey results of the offsite ponds.

## 1.2 Proposed Development

At the time of writing, the proposed development would comprise: 3,000 new residential units with associated infrastructure; space for employment, retail, community uses and landscaping; and access arrangements. Further details regarding the proposed development will be determined in due course and may be subject to revision.

## 1.3 Objectives

The content of this report is based on the findings of presence/ likely absence surveys for GCN at the site.

The specific objectives of this report are to:

- determine the presence/ likely absence of GCN on the site; and
- present factual baseline information on the findings of the survey.

This report is intended to inform masterplanning and design and will form part of the baseline information used to support the Environmental Impact Assessment of the Land West of Ifield planning application.

The report is supported by Appendix 1: Figures. The structure and content of this report is based on current ecological report writing guidance (CIEEM, 2017<sup>2</sup>).

## 1.4 Legislation and Policy Framework

Various legislation and planning policies refer to the protection of wildlife. When dealing with individual cases, the full texts of the relevant documents should be consulted, and legal advice obtained if necessary. GCN is fully protected under Schedule 5 of the Wildlife and Countryside Act, 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations, 2017 (as amended), making it a European protected species.

---

<sup>1</sup> Arcadis (October 2019). Land west of Ifield – Great Crested Newt Survey Report. Report reference: WOI-AUK-XX-WS-RP-EC-0005-01-Great Crested Newt Report.

<sup>2</sup> CIEEM (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.

## 2. SURVEY METHODOLOGY

### 2.1 Habitat Suitability Index Survey (HSI) (2023)

On the 5<sup>th</sup> April 2023 a site visit was undertaken to P12, P13 and Ditch (D)4 and assessment of suitability for GCN was completed in accordance with the current HSI tool<sup>3</sup>. This assessment uses a scoring system, derived from ten 'Suitability Indices' (SI1 – SI10) which are measured for each pond and used to ascertain an overall HSI score for each pond.

Pond 13 was dry at the time of the survey and therefore not surveyed.

To calculate an overall HSI value for Ponds 12 and D4, it was cross referenced with the guidelines to assign the ponds to one of five categories: 'Poor', 'Below average', 'Average', 'Good' or 'Excellent'. Index calculation is not a failsafe method of identifying whether a water body supports great crested newts or not and is based off professional judgement when on site.

An assessment of the results of the HSI was conducted using the standard methodology. This tool has been developed to provide a measure of the suitability of a pond to support GCN.

### 2.2 Great Crested Newt Environmental DNA Survey (2023)

On the 21<sup>st</sup> April 2023 a site visit was undertaken to one ditch (D4) and pond (P12) to complete environmental DNA (eDNA) surveys, completed in accordance with current guidance<sup>4</sup>. The surveys were completed by James Hryniewicz of Ramboll, holding the appropriate Natural England survey licence (2016-25347-CLS-CLS), with assistance from graduate ecologist Rebecca Brightling.

The survey involved taking twenty water samples (total) from each of D4 and P12 on a single visit (as shown in Appendix 2). Water samples were collected using suitable sample containers provided by the analytical laboratory, ADAS.

The water samples were couriered to ADAS for analysis to determine if GCN eDNA was present in either of the waterbodies.

### 2.3 Great Crested Newts Survey (2023)

Population size class assessments (PSCA) were undertaken of the pond 12 and ditch 4 in 2023. A minimum of four surveys are required to determine absence, with an additional two surveys required if GCN are found during the four initial surveys in order to determine PSCA. The surveys were completed by James Hryniewicz and Felicity Wright of Ramboll, holding the appropriate Natural England survey licence, with assistance from graduate ecologists Rebecca Brightling and Jake Knell of Ramboll for the 2023 surveys. PSCA survey visits were undertaken between mid-March and mid-June with at least three of the visits undertaken between mid-April and mid-May (the 'core period').

All surveys were undertaken in suitable weather conditions across 2023 as shown in Table 2.1.

**Table 2.1: Survey Conditions of 2023 GCN Surveys**

Visit	Date	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
1	04/05/2023	9	20	1	0	82
2	12/05/2023	10	65	1	0	94

<sup>3</sup> Great Crested Newt Habitat Suitability Index. May 2010. ([arguk.org](http://arguk.org)). Accessed 25<sup>th</sup> July 2023.

<sup>4</sup> Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford. <https://adas.co.uk/wp-content/uploads/2021/01/Natural-England-Technical-Advice-Note-2.pdf>

Visit	Date	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
3	18/05/2023	9	10	1	0	87
4	02/06/2023	10	45	2	0	71
5	09/06/2023	13	65	1	0	88
6	20/06/2023	16	100	1	Yes	94

In line with Natural England guidance<sup>5</sup>, surveys employed the following methods on each visit in order to detect the presence or likely absence of GCNs, with three of the four survey methods used for each method:

- Torch survey. The accessible margins of the waterbody were slowly walked once it was dark, and a search made by torchlight (using torches with >one million candlepower) for newts. All newts observed were identified to species, counted, and identified as males, females or juveniles, where possible;
- Bottle trapping. Funnel traps (made from 2 litre clear plastic bottles) were submerged (with an air bubble retained), approximately every 2 m around the pond margins where access was possible, in the evening before dark, and left set overnight to be checked the following morning;
- Netting. Long-handled dip nets were used to sample pond edges at night. 15 minutes of netting was undertaken per 50 m of shoreline; and
- Egg searches. All suitable submerged vegetation was searched for GCN eggs. Newt eggs are characteristically wrapped individually in the submerged leaves of aquatic vegetation.

PSCA was calculated using the peak count results of either the torching or bottle trapping survey and were categorised using the Natural England guidance, as highlighted below:

- 'small' for maximum counts up to 10.
- 'medium' for maximum counts up to 100
- 'large' for maximum counts over 100.

## 2.4 Limitations

Despite the Client undertaking reasonable attempts access was not permitted to 10 ponds which are offsite (See Appendix 1: Figure 2).

This report has been prepared for the Client and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

Ramboll is satisfied that this report represents a robust appraisal of the site for the purpose of a GCN survey. If no action or development has taken place on this land within twenty-four months of the review date of this report, the findings of this survey should be reviewed by a suitably qualified ecologist and may need to be updated.

<sup>5</sup> English Nature (2001). Great Crested Newt Mitigation Guidelines V1. English Nature, Peterborough

### 3. RESULTS

During these ecological assessments, HSI surveys, eDNA surveys and population surveys were undertaken. GCN were identified during the 2023 survey season. Figure 2 (Appendix 1) shows the locations of all ponds with confirmed presence of GCN.

#### 3.1 Habitat Suitability Index (HSI)

A summary of the HSI surveys is detailed below in Table 3.2. Table 3.1 shows the standard HSI score and pond suitability for great crested newts.

**Table 3.1 Categorisation of HSI Score**

HSI Score	Pond Suitability
Less than 0.50	Poor
0.50 – 0.59	Below Average
0.60 – 0.69	Average
0.70 – 0.79	Good
More than 0.80	Excellent

Ramboll undertook an HSI survey of a ditch and pond on site on the 5<sup>th</sup> July 2023 to determine their suitability to support GCN. The results from the HSI surveys found:

**Table 3.2 Results**

Pond Number (See Appendix 1)	Pond Suitability
Pond 12	0.55 (Below Average)
Pond 13	0 (Dry)
Ditch 4	0.50 (Below Average)

However, during the HSI surveys GCN eggs were identified in Pond 12.

#### 3.2 EDNA Surveys

The eDNA surveys undertaken in 2023 returned two positive results for GCN (Pond 12 and Ditch 4). Further surveys were conducted on the two positive ponds and the results of those surveys are found in Section 3.3.

### 3.3 Presence/Absence GCN Surveys (2023)

#### 3.3.1 Results

Tables 3.3 and 3.4 shows the results of the two GCN surveys in 2023.

**Table 3.3: Results of GCN Surveys of Pond 12**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	04/05/2023	12	Y (4)	Smooth Newt	-
2	12/05/2023	12	Y (6)	Smooth Newt	-
3	18/05/2023	12	Y (8)	Smooth Newt	-
4	02/06/2023	12	Y (1)	Smooth Newt	-
5	09/06/2023	14	Y (1)	N	Juvenile GCN
6	20/06/2023	14	N	Smooth Newt	Newt Fry recorded.

**Table 3.4: Results of GCN Surveys of Ditch 4**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	04/05/2023	4	0	N	-
2	12/05/2023	4	0	N	-
3	18/05/2023	4	0	N	-
4	02/06/2023	4	Y (3)	N	-
5	09/06/2023	2	0	N	Ditch is drying.
6	20/06/2023	2	0	N	Ditch is drying.

It was found that GCN are present in Pond 12 and Ditch 4, with the peak count of GCN present in Pond 12 being **8** and the peak count of GCN in Ditch 4 being **3**. The GCN were identified during the bottle trapping surveys and torching surveys. GCN eggs were identified in Pond 12 during the egg-search surveys.

During the netting surveys undertaken on each of the ponds, no GCN were observed.

## 4. CONCLUSION

### *Summary of Findings/ Population Size of Site, 2023*

The eDNA results returned one pond (Pond 12) and one ditch (Ditch 4) with positive results for GCN presence. Pond 13 was found to be dry during the HSI surveys and therefore unsuitable for use by GCN.

Of the surveyed pond and ditch, it was found that Pond 12 and Ditch 4 had small populations of GCN. The peak count for Pond 12 was **8** adult individuals, with both males and females being identified and the peak count for Ditch 4 was **3** adults consisting of both male and female being identified. Eggs were also identified during the surveys of Pond 12. Therefore, it is deemed that Pond 12 is a breeding pond for GCN. Ditch 4 did have records of female and male GCN but there was no suitable vegetation within the pond that offered suitable egg laying habitat and therefore is not deemed suitable for breeding GCN.

Appropriate recommendations for mitigation and enhancement (where applicable) will be included in Environmental Statement, which includes a chapter on biodiversity and outline appropriate recommendations for GCN. The Environmental Statement also provides information on the previous surveys undertaken by Ramboll and Arcadis. The report also supports the planning application.


## **APPENDIX 1 FIGURES**



**Legend**

- Red Line Boundary
- Pond Locations

*Note:*  
This figure presents the overall site map and extent of ponds and ditches in the vicinity of the West of Ifield site location.

Figure Title	
Great Crested Newt Ponds Overall Site Map	
Project Name	
West of Ifield 2023 Ecology Surveys	
Project Number	Figure No.
1620007949	1
Date	Prepared By
July 2023	HX
Scale	Issue
1:9,750 @A3	4
Client	
<b>Homes England</b>	
	

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.



**Legend**

- Red Line Boundary
- Pond Locations

**2023 Survey Results**

- (Surveyed) - GCN Found
- (Surveyed) - No GCN Found (Dried)


**2022 Survey Results**

- (Surveyed) - GCN Found
- (Surveyed) - No GCN Found
- (Surveyed) - No GCN Found (Dried)

**2020 and 2021 Survey Results**

- ▽ (Surveyed) - GCN Found
- ▽ (Surveyed) - No GCN Found
- ▽ (Surveyed) - No GCN Found (Dried)
- ▽ eDNA negative

*Note:*  
 This figure presents the ponds surveyed for GCN. The data presented in this figure is solely based on the results of the Ramboll GCN surveys conducted between 2020 and 2023 at the West of Ifield site location.

Figure Title	
<b>Great Crested Newt Survey Results</b>	
Project Name	
<b>West of Ifield 2023 Ecology Surveys</b>	
Project Number	Figure No.
1620007949	2
Date	Prepared By
July 2023	HX
Scale	Issue
1:9,750 @A3	4
Client	
<b>Homes England</b>	
	

# APPENDIX 8.11: LAND WEST OF IFIELD – GREAT CRESTED NEWT SURVEY REPORT 2022

Intended for

**Turner & Townsend plc. on behalf of Homes England**

Date

**December 2022**



Project Number

**1620007949**

# **LAND WEST OF IFIELD GREAT CRESTED NEWT SURVEY REPORT 2022**

# LAND WEST OF IFIELD GREAT CRESTED NEWT SURVEY REPORT 2022

Project No. **1620007949**  
Issue No. **1**  
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Date **December 2022**  
Made by **James Hryniewicz**  
Checked by **Laura Sanderson**  
Approved by **Matt Royall**

Made by:	
Approved by:	

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## Version Control Log

Revision	Date	Made by	Checked by	Approved by	Description
01	13/12/2022	JH	LS	MR	Issue to Client

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## APPENDICES

### Appendix 1

Figures

# 1. INTRODUCTION

## 1.1 Background

Ramboll UK Limited ('Ramboll') was commissioned by Turner & Townsend plc on behalf of Homes England (the 'Client'), to carry out a series of ecological surveys in relation to the proposed development plans for Land West of Ifield, Ifield, West Sussex (the 'site', as illustrated in Figure 1, Appendix 1). This report presents the findings of the Great Crested Newt (GCN) *Triturus cristatus* surveys carried out by Ramboll ecologists between March and June in 2021 and 2022 across the entirety of the site.

GCN surveys were previously undertaken by Arcadis Consulting Ltd (Arcadis) from March to June 2018 and 2019 at the site. Results from the 2018/2019 survey report<sup>1</sup> detailed that four ponds (P2, P3, P3B and P6) and one ditch (D3) surveyed in 2018 were identified as having presence of GCN. Due to the time elapsed since these surveys were completed, update surveys were required of the site. The 2018/2019 Arcadis surveys also included the Ifield Brook Wood and Meadows local wildlife site to the east of the site, which was previously proposed to comprise the proposed development area, however this area is no longer part of the proposed redline boundary (other than a potential cycle / pedestrian route crossing this area in one location).

In March and June 2020, GCN surveys were undertaken by Ramboll of pond 11<sup>2</sup> which is situated in the eastern section of the site in the area known as Pastoral fields (Area 1). Pond 11 dried out after two surveys and therefore GCN were deemed to not be present.

For the purposes of GCN surveying, the site has been split up into three geographical sections. These are:

1. Golf Course (approx. central grid reference: TQ 23679 36673);
2. Pastoral (Area 1) and Arable fields (Area 2) (approx. central grid reference: TQ 24331 37818); and
3. Thrifts Yard, Welbeck and Rydon (approx. central grid reference: TQ 23683 37199).

Figure 1 (Appendix 1) shows the location of these areas within the proposed redline boundary of the site.

## 1.2 Proposed Development

At the time of writing the proposed development would comprise: 3,000 new residential units with associated infrastructure; space for employment, retail, community uses and landscaping; and access arrangements. Further details regarding the proposed development will be determined in due course and may be subject to revision.

## 1.3 Objectives

The content of this report is based on the findings of presence/ likely absence surveys for GCN at the site.

The specific objectives of this report are to:

- determine the presence/ likely absence of GCN on the site; and

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<sup>1</sup> Arcadis (October 2019). Land west of Ifield – Great Crested Newt Survey Report. Report reference: WOI-AUK-XX-WS-RP-EC-0005-01-Great Crested Newt Report.

<sup>2</sup> Ramboll (July 2020). Land West of Ifield- Great Crested Newt Survey Report. Report reference: R-1620007949\_1-GCN

- where reptiles are present, determine the size class of the population and their spatial use of the site.

This report presents factual baseline information on the findings of the survey. This report is intended to inform masterplanning and design and will form part of the baseline information used to support the Environmental Impact Assessment of the Land West of Ifield planning application.

The report is supported by Appendix 1: Figures. The structure and content of this report is based on current ecological report writing guidance (CIEEM, 2017<sup>3</sup>).

#### **1.4 Legislation and Policy Framework**

Various legislation and planning policies refer to the protection of wildlife. When dealing with individual cases, the full texts of the relevant documents should be consulted and legal advice obtained if necessary. GCN are fully protected under Schedule 5 of the Wildlife and Countryside Act, 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations, 2017 (as amended), making it a European protected species.

---

<sup>3</sup> CIEEM (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.

## 2. SURVEY METHODOLOGY

### 2.1 Great Crested Newt Environmental DNA Survey (2021)

In April 2021 a site visit was undertaken of three ditches (D1, D2 and D3) and six ponds (P1, P2, P3B, P4, P5 and P6) to complete environmental DNA (eDNA) surveys, completed in accordance with current guidance<sup>4</sup>. The surveys were completed by James Hryniewicz of Ramboll, holding the appropriate Natural England survey licence (2016-25347-CLS-CLS), with assistance from ecologist Hannah Roberts.

The survey involved taking twenty water samples (total) per pond from the ditches and ponds on a single visit (as shown in Figure 2: Great Crested Newt Survey Results, Appendix 1). Water samples were collected using suitable sample containers provided by the analytical laboratory, ADAS.

The water samples were couriered to ADAS for analysis to determine if GCN eDNA was present in the waterbodies.

### 2.2 Great Crested Newts Survey (2021 and 2022)

Population size class assessments (PSCA) were undertaken of the ponds over two seasons in 2021 and 2022. A minimum of four surveys are required to determine absence, with an additional two surveys required if GCN are found during the four initial surveys in order to determine PSCA. The surveys were completed by James Hryniewicz of Ramboll, holding the appropriate Natural England survey licence, with assistance from ecologists Natasha Wilson and Hannah Roberts for the 2021 surveys, and ecologists Rebecca Brightling, James Cunningham and Bianca Burton of Ramboll for the 2022 surveys. PSCA survey visits were undertaken between mid-March and mid-June with at least three of the visits undertaken between mid-April and mid-May (the 'core period').

During the surveys, Ramboll identified one additional pond on the Golf Course, which was pond 16A and the results for this additional pond are found in Table 3.8 and is shown on Figure 2 in Appendix 1.

All surveys were undertaken in suitable weather conditions across 2021 and 2022 as shown in Table 2.1 and Table 2.2 below.

**Table 2.1: Survey Conditions of 2021 GCN Surveys**

Visit	Date	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
1	14/05/2021	12	20	1	0	67
2	21/05/2021	10	85	2	Light shower	82
3	28/05/2021	19	15	1	0	56
4	04/06/2021	13	25	1	Light Shower	94
5	11/06/2021	20	5	1	0	78
6	18/06/2021	14	40	1	0	98

<sup>4</sup> Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford. <https://adas.co.uk/wp-content/uploads/2021/01/Natural-England-Technical-Advice-Note-2.pdf>

**Table 2.2: Survey Conditions of 2022 GCN Surveys**

Visit	Date	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
1	28/04/2022	11	0	2	0	67
2	03/05/2022	14	20	1	0	72
3	10/05/2022	17	45	2	0	59
4	07/06/2022	16	65	1	0	88
5	20/06/2022	21	0	1	0	43
6	21/06/2022	23	15	1	0	36

In line with Natural England guidance<sup>5</sup>, surveys employed the following methods on each visit in order to detect the presence or likely absence of GCNs, with three of the four survey methods used for each method:

- Torch survey. The accessible margins of the waterbody were slowly walked once it was dark, and a search made by torchlight (using torches with >one million candlepower) for newts. All newts observed were identified to species, counted and identified as males, females or juveniles, where possible;
- Bottle trapping. Funnel traps (made from 2 litre clear plastic bottles) were submerged (with an air bubble retained), approximately every 2 m around the pond margins where access was possible, in the evening before dark, and left set overnight to be checked the following morning;
- Netting. Long-handled dip nets were used to sample pond edges at night. 15 minutes of netting was undertaken per 50 m of shoreline; and
- Egg searches. All suitable submerged vegetation was searched for GCN eggs. Newt eggs are characteristically wrapped individually in the submerged leaves of aquatic vegetation.

PSCA was calculated using the peak count results of either the torching or bottle trapping survey and were categorised using the Natural England guidance, as highlighted below:

- 'small' for maximum counts up to 10.
- 'medium' for maximum counts up to 100
- 'large' for maximum counts over 100.

### 2.3 Limitations

During the 2021 surveys, it was not possible to use bottle traps at Pond 5 due to health and safety concerns. The pond had some shallow edges with soft mud, through which surveyors could not safely wade. Remaining banks were deemed too steep to allow safe access to place bottle traps. Therefore, the survey techniques used on Pond 5 consisted of egg search of the marginal vegetation, torching and netting. As three of the four techniques were completed, this is not considered to be a significant constraint.

During the 2022 surveys Pond 15 and Pond 18 could not be bottle trapped. Pond 15 was a lined pond, which meant canes could not be securely placed within the pond without damaging the liner. Pond 18 had partially dried out and had very low water levels. These ponds were surveyed using the other methods available (egg searching, netting and torching), and therefore the lack of bottle-trapping is not considered to be a significant constraint.

Access was not permitted to 12 ponds which are offsite (See Appendix 1: Figure 2).

<sup>5</sup> English Nature (2001). Great Crested Newt Mitigation Guidelines V1. English Nature, Peterborough

Due to access limitations the first three surveys were not all undertaken by mid-May during the 2021 surveys. Pond 3 and Pond 3B recorded GCN as present and will not require new surveys to be undertaken again over the next two to three years. However, Pond 2, Ditch 3, Pond 5 and Pond 6 which came back as negative for GCN after the presence/absence surveys may need to be subject to resurveying at an earlier opportunity (access permitting).

This report has been prepared for the Client and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

Ramboll is satisfied that this report represents a robust appraisal of the site for the purpose of a GCN survey. If no action or development has taken place on this land within twenty-four months of the review date of this report, the findings of this survey should be reviewed by a suitably qualified ecologist and may need to be updated.

### 3. RESULTS

During these ecological assessments, populations of GCN were identified across 2021 and 2022 survey season. Figure 2 (Appendix 1) shows the locations of all ponds with confirmed presence of GCN.

#### 3.1 EDNA Surveys

The eDNA surveys undertaken in 2021 returned six positive results for GCN (Pond 2, Pond 3, Pond 3B, Ditch 3, Pond 5, and Pond 6) and four negative results (Ditch 1, Pond 1, Ditch 2 and Pond 4). Further surveys were conducted on the six positive ponds and the results of those surveys are found in Section 3.2.1.

#### 3.2 Presence/Absence GCN Surveys (2021)

##### 3.2.1 Results

Tables 3.1 to 3.6 shows the results of the six GCN surveys in 2021.

**Table 3.1: Results of GCN Surveys of Pond 2**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	14/05/2021	5	N	N	-
2	21/05/2021	5	N	N	-
3	28/05/2021	5	N	N	-
4	04/06/2021	5	N	N	-

**Table 3.2: Results of GCN Surveys of Pond 3**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	14/05/2021	10	Y (5)	Smooth Newt	-
2	21/05/2021	10	Y (6)	Smooth Newt	-
3	28/05/2021	10	Y (7)	Smooth Newt	-
4	04/06/2021	10	Y (5)	N	-

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
5	11/06/2021	10	Y (6)	Smooth Newt	-
6	18/06/2021	10	Y (3)	Smooth Newt	-

**Table 3.3: Results of GCN Surveys of Ditch 3**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	14/05/2021	7	N	N	-
2	21/05/2021	7	N	N	-
3	28/05/2021	0	N	N	Drying (water level was too low for bottle trapping)
4	04/06/2021	0	-	-	Drying (water level was too low for bottle trapping)
5	11/06/2021	-	-	-	Dry
6	18/06/2021	-	-	-	Dry

**Table 3.4: Results of GCN Surveys of Pond 3B**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	14/05/2021	10	Y (4)	Smooth Newt	-
2	21/05/2021	10	Y (2)	N	-
3	28/05/2021	10	Y (6)	Smooth Newt	-
4	04/06/2021	10	Y (5)	Smooth Newt	-
5	11/06/2021	10	Y (4)	Smooth Newt	-
6	18/06/2021	10	Y (4)	Smooth Newt	-

**Table 3.5: Results of GCN Surveys of Pond 5**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	14/05/2021	0	N	N	Unable to bottle trap due to safety concerns
2	21/05/2021	0	N	N	Unable to bottle trap due to safety concerns
3	28/05/2021	0	N	Smooth Newt	Unable to bottle trap due to safety concerns
4	04/06/2021	0	N	N	Unable to bottle trap due to safety concerns

**Table 3.6: Results of GCN Surveys of Pond 6**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	14/05/2021	10	N	N	-
2	21/05/2021	10	N	N	-
3	28/05/2021	10	N	Smooth Newt	
4	04/06/2021	10	N	Smooth Newt	-

It was found that GCN are present in Pond 3 and Pond 3B, with the peak count of GCN present in Pond 3 being **6** and the peak count of GCN in Pond 3B being **7**. The GCN were identified during the bottle trapping surveys and torching surveys. GCN eggs were identified in Ponds 3 and Pond 3B during the egg-search surveys.

During the netting surveys undertaken on each of the ponds, no GCN were observed.

### 3.3 Presence/Absence GCN Surveys (2022)

#### 3.3.1 Results

Table 3.7 to 3.11 shows the results of the surveys in 2022. All surveys were started in suitable weather conditions (>5°C).

**Table 3.7: Results of GCN Surveys of Pond 15**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	05/04/2022	0	N	-	-

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
2	28/04/2022	0	N	Smooth Newt	-
3	03/05/2022	0	N	-	-
4	10/05/2022	0	N	Smooth Newt	-

**Table 3.8: Results of GCN Surveys of Pond 16A**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	28/04/2022	6	N	-	-
2	03/05/2022	6	N	Smooth Newts	-
3	10/05/2022	6	Y (1)	Smooth Newt	-
4	07/06/2022	6	N	N	-
5	20/06/2022	6	N	N	-
6	21/06/2022	6	Y (2)	Smooth Newt	-

**Table 3.9: Results of GCN Surveys of Pond 16**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	05/04/2022	10	N	N	-
2	28/04/2022	10	N	N	-
3	03/05/2022	10	N	N	-
4	10/05/2022	10	Y (7)	Smooth Newt	-
5	07/06/2022	10	Y (4)	Smooth Newt	-
6	20/06/2022	10	Y (2)	Y	-

**Table 3.10: Results of GCN Surveys of Pond 18**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	05/04/2022	0	N	N	-

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
2	28/04/2022	0	N	N	Drying
3	03/05/2022	0	N	N	Drying
4	-	-	-	-	Dried

**Table 3.11: Results of GCN Surveys of Pond 19**

Visit	Date	Number of Bottle Traps	Great Crested Newt	Other Amphibians	Notes
1	05/04/2022	8	N	-	-
2	28/04/2022	8	N	-	-
3	03/05/2022	8	N	-	-
4	10/05/2022	8	N	-	-

It was found that GCN are present in Pond 16A and Pond 16, with the peak count of GCN present in Pond 16A being **2** and the peak count of GCN in Pond 16 being **7**. The GCN were identified during the bottle trapping surveys and torching surveys. No GCN eggs were identified during the egg search surveys.

During the netting surveys undertaken on each of the ponds, no GCN were observed.

## 4. CONCLUSION

### *Summary of Arcadis Results 2018-2019*

Arcadis GCN assessment identified 25 ponds and three ditches within the site and off site (see Appendix 1: Figure 2). Where feasible, the 25 ponds and three ditches were subject to eDNA survey to determine if GCN are present.

The 2018 eDNA results confirmed the three ponds and ditches surveyed were all negative for GCN (P1, P4 and P5) and two ditches (D1 and D2). One ditch (D3) tested positive for GCN eDNA although no evidence of GCN was found during subsequent population estimate surveys.

The 2019 eDNA surveys confirmed the use of two ponds (P11 and P17) by GCN. The eDNA surveys indicated that the remaining ponds (P7, P8, P9, P12, P13, P14, P15, P16, P18 and P19) did not support GCN, but GCN eggs were found in P13. As such GCN were considered to be present in ponds 11, 13 and 17.

The Arcadis presence / absence and population estimate surveys were only carried out in 2018, on ponds identified to contain GCN (P2, P3, P3b, P6 and D3). Egg searching of emergent vegetation during the surveys revealed the presence of GCN eggs in ponds P2, P3, P3b and P6, confirming breeding GCN.

### *Summary of Findings/ Population Size of Site, 2021*

The eDNA results returned six ponds (Pond 2, Pond 3, Pond 3B, Ditch 3, Pond 5 and Pond 6) with positive results for GCN and four ponds/ditches (Ponds 1, Pond 4, Ditch 1 and Ditch 2) with negative results of GCN. Of the six surveyed, it was found that Pond 3 and Pond 3B had small populations of GCN. The peak count for Pond 3 was 6 adult individuals, with both males and females being identified and the peak count for Pond 3B was 7 adults consisting of both male and female being identified during the surveys of Pond 3B. Eggs were also identified during the surveys of both ponds. Therefore, it is deemed that Pond 3 and 3B are breeding ponds for GCN.

GCN were absent from Pond 2, Ditch 3, Pond 5 and Pond 6.

### *Summary of Findings/ Population Size of Site, 2022*

Presence and absence surveys were undertaken on Ponds 15, 16, 18 and 19. During the surveys a new pond was identified (Pond 16A) which was situated on the golf course as shown in Appendix 1: Figure 2.

GCN were recorded in Pond 16A and Pond 16.

Pond 16A was recorded to have a small population of GCN with a peak count of 2 adult individuals being recorded, and all being male with no eggs identified. Therefore, it is deemed that Pond 16A is not a breeding pond for GCN.

Pond 16 was recorded to have a small population of GCN with a peak count of 7 adult individuals being recorded, with both male and females being identified during the surveys. Eggs were also identified during the surveys. Therefore, it is deemed that Pond 16 is a breeding pond for GCN. However, due to the heatwave the UK experienced over the summer of 2022 Pond 16 did dry up towards the end of the season and after the completion of the surveys.

GCN were absent from Ponds 15, 18 and 19.

Appropriate recommendations for mitigation and enhancement (where applicable) will be determined in due course once development proposals are finalised and included in separate documentation. The proposed planning application will be supported by an Environmental Statement which will include a chapter on biodiversity and outline appropriate recommendations for GCN.

## **APPENDIX 1 FIGURES**



**Legend**

- Red Line Boundary
- Pond Locations


*Note:*  
This figure presents the overall site map and extent of ponds and ditches in the vicinity of the West of Ifield site location.

Figure Title  
**Great Crested Newt Ponds Overall Site Map**

Project Name  
**West of Ifield 2022 Ecology Surveys**

Project Number 1620007949	Figure No. 1
Date October 2022	Prepared By HX
Scale 1:9,750 @A3	Issue 2

Client  
**Homes England**



Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.



**Legend**

- Red Line Boundary
- Pond Locations


**2022 Survey Results**

- (Surveyed) - GCN Found
- (Surveyed) - No GCN Found
- (Surveyed) - No GCN Found (Dried)

**2020 and 2021 Survey Results**

- ▼ (Surveyed) - GCN Found
- ▼ (Surveyed) - No GCN Found
- ▼ (Surveyed) - No GCN Found (Dried)
- ▼ eDNA negative

*Note:*  
 This figure presents the ponds surveyed for GCN. The data presented in this figure is solely based on the results of the Ramboll GCN surveys conducted between 2020 and 2022 at the West of Ifield site location.

Figure Title	
<b>Great Crested Newt Survey Results</b>	
Project Name	
<b>West of Ifield 2022 Ecology Surveys</b>	
Project Number	Figure No.
1620007949	2
Date	Prepared By
October 2022	HX
Scale	Issue
1:9,750 @A3	2
Client	
<b>Homes England</b>	
	




**Legend**

- Red Line Boundary
- Pond Locations

**Arcadis 2018 and 2019 Survey Results**

- ▲ GCN present - GCN eggs, but no population survey conducted
- ▲ eDNA negative
- ▲ Not surveyed (Habitat Suitability Index (HSI) unsuitable)
- ▲ Not surveyed (no access)

*Note:*  
 This figure presents a summary of the survey results from the Arcadis 2018 and 2019 GCN surveys at the West of Ifield sites, where updated survey data is not available between 2020-2022. The ponds labelled in this figure have not yet been surveyed by Ramboll for GCN in the surveys conducted between 2020-2022.

Figure Title	
<b>Great Crested Newt Arcadis Survey Results</b>	
Project Name	
<b>West of Ifield 2022 Ecology Surveys</b>	
Project Number	Figure No.
1620007949	3
Date	Prepared By
October 2022	HX
Scale	Issue
1:9,750 @A3	1
Client	
<b>Homes England</b>	
	

# APPENDIX 8.12: LAND WEST OF IFIELD – GREAT CRESTED NEWT SURVEY REPORT

# LAND WEST OF IFIELD

## Great Crested Newt Survey Report

OCTOBER 2019



# Land West of Ifield ES – Great Crested Newt Survey Report

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WOI-AUK-XX-WS-RP-EC-0005-01-Great Crested Newt Survey Report

Date OCTOBER 2019

## VERSION CONTROL

Version	Date	Author	Changes
001	October 2019	Kailey O'Brien / Liam Price	Issue of final document

This report dated 31 October 2019 has been prepared for Homes England (the "Client") in accordance with the terms and conditions of appointment dated 04 May 2018 (the "Appointment") between the Client and **Arcadis UK** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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**APPENDIX B : HABITAT SUITABILITY INDEX ASSESSMENT DATA (PONDS)**

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**APPENDIX D : SURVEY CONDITIONS AND RESULTS (PONDS)**

**APPENDIX E : SURVEY CONDITIONS AND RESULTS (DITCHES)**

**APPENDIX F : KEY SURVEYOR PEN PORTRAITS**

## Executive Summary

Arcadis Consulting (UK) Ltd was commissioned on behalf of Homes England to undertake a survey for great crested newts (GCN) of land associated with a proposed housing development. The area is referred to as Land West of Ifield, is located to the west of Crawley and herein is referred to as the 'site'. This report has been prepared to inform a proposal for residential development.

The proposed development comprises the construction of approximately 3000 residential dwellings, three schools (two primary and one secondary) and associated infrastructure.

The site covers approximately 200ha in total and supports a range of habitats including semi-improved grassland, arable fields, amenity grassland, woodland, grazing pasture, a network of hedgerows and several ponds. The River Mole flows west to east through the north of the site, and Ifield Brook, runs flows south to north through the west of the site. Rusper Road passes through the south of the site. The site is situated to the north-west of the A23 (Crawley Avenue) and is bordered by residential properties to the east, farmland to the west and woodland to the north and south.

Habitat Suitability Index (HSI) assessments, eDNA assessments and targeted GCN population surveys were undertaken between May 2018 and June 2019. A total of 22 waterbodies were assessed based on their location on the site, or location within 250m of the site boundary. Eight of these waterbodies were found to support GCN (P2, P3, P3b, P6, P11, P13, P17 and D6).

It was assessed that there was likely to be three populations of GCN associated with the site:

- One population in the north of the site centred around TQ 247 383. Associated with the ponds within this area to which access was permitted, a small population of GCN was identified (although nearby off-site ponds were not surveyed); a precautionary approach should be undertaken and there is potential that if surveys are conducted on ponds where access was denied, the overall population assessment may be higher (especially considering that the ponds not surveyed have historic records of GCN);
- One population associated with the golf course in the south of the site around TQ234 368; the peak count during population surveys of the on-site ponds suggested a 'medium' population (although nearby off-site ponds were not surveyed for a population estimate, but presence was confirmed);
- One population was identified associated with off-site ponds immediately to the north-west of the site; population assessments were not undertaken of these off-site ponds.

Other amphibian species were identified during the surveys, including smooth newt, palmate newt, smooth/palmate newt eggs, common frog adults and/or frog tadpoles and common toad.

It is considered that the surveys conducted are sufficient to characterise the distribution of GCN across the site. It is likely that further surveys, including population assessments of off-site ponds, will be required to inform later stages of the planning process and to inform mitigation.

# 1 Introduction

## 1.1 Overview

Arcadis Consulting (UK) Ltd, working on behalf of Homes England, was instructed to undertake ecological surveys to inform a proposed masterplan for residential development on an area referred to as Land West of Ifield, West Sussex. Herein this area is referred to as 'the site'.

The aims of the survey were to establish the presence/absence of great crested newts (GCN) (*Triturus cristatus*) within the site boundary and adjacent areas, and where present within the site, estimate the GCN population size. This report presents the findings of these GCN surveys.

## 1.2 Site Location and Setting

The proposed development site is located to the west of Ifield, Crawley (central grid reference - TQ 24133 37360) (see Image 1 for the site location and survey boundary).

The site which covers approximately 200 ha in total and supports a range of habitats including semi-improved grassland, arable fields, amenity grassland, woodland, grazing pasture, a network of hedgerows and several ponds. The River Mole flows west to east through the north of the site, and Ifield Brook, runs flows south to north through the west of the site. Rusper Road passes through the south of the site.

The site is situated to the north-west of the A23 (Crawley Avenue) and is bordered by residential properties to the east, farmland to the west and woodland to the north and south.

To inform this report, a larger 'study area' was surveyed, which extended 500m beyond the red line boundary, the area which is considered to be the extent of any potential impact of the development on GCN.

An aerial image illustrating the site surveyed is presented in Image 1.



Image 1: Aerial imagery of the site

### 1.3 Proposed Development

The proposed development comprises the construction of approximately 3000 residential dwellings, three schools (two primary and one secondary) and associated infrastructure.

### 1.4 Overview of UK GCN Biology

GCN are the largest member of the Pleurodeline family, with an adult length range of 90 – 170mm (Mckinnell *et al.*, 2012). They are found widely throughout Europe but numbers have significantly declined in the past century predominantly due to agricultural intensification. Although afforded protection in the UK as a European Protected Species, GCN are widespread throughout much of England and Wales. They occur only sparsely in south-west England, mid Wales and Scotland and are absent from Northern Ireland (JNCC, accessed 2019). A national report published in 2013 estimated the population to be approximately 75,000 (European Union, 2013).

GCN spend the majority of time in areas of rough grassland, scrub and woodland, but breeding takes place in small to medium sized ponds. They emerge from hibernation in March – April and commute to neighbouring ponds/waterbodies to breed from April – June, providing the night temperature is above 5°C. Females can lay between 200 and 400 eggs per breeding season, which are hidden in the folds of aquatic vegetation (Mckinnell *et al.*, 2012).

GCN are thought to have a metapopulation structure, whereby the overall population of newts within a given area of suitable habitat is made up of smaller populations (metapopulations). This allows for stability within the overall population despite stochasticity within metapopulations (i.e. fluctuations in population size due to random chance events). However, this method of sustaining the population is dependent on habitat connectivity between metapopulations allowing emigration/immigration to occur (Hanski, 1998).

Despite the population evolving methods to avoid extinction, there has still been a noticeable decline in numbers within the last century. The main reasons for this are thought to be as follows:

- Agricultural intensification: Ponds within agricultural land are often now deliberately destroyed to increase the amount of space available for crop growth. If ponds remain there is often a lack of available surrounding vegetation due to intensive ploughing and pesticide use (Langton *et al.*, 2001).
- Habitat fragmentation: As mentioned above, for metapopulation structures to succeed, habitat connectivity is vital. In the last century, agricultural intensification and urbanisation has led to increased loss of suitable newt habitat, preventing newt migration and therefore inhibiting population stability.
- Introduction of fish: there has been evidence to suggest that the introduction of fish for fishing or ornamental purposes has contributed to newt decline in some cases, as fish prey on newt eggs and larvae (Mckinnell *et al.*, 2012).

### 1.5 Applicable GCN Legislation

The GCN is protected under two key pieces of national legislation. It qualifies as a European Protected Species (EPS) and is listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA, 1981 as amended, (HMSO, 1981)).

Under the WCA it is an offence to:

- intentionally or \*recklessly disturb a great crested newt whilst it is occupying a structure or place which it uses for shelter or protection;
- intentionally or \*recklessly obstruct access to any structure or place used for shelter or protection by a great crested newt;
- sell, offer or expose for sale, or to possess or transport for sale alive or dead otter or any part of or anything derived from a great crested newt.

\*The term “recklessly” was added as an amendment to the WCA 1981 as a result of the Countryside and Rights of Way Act (HMSO, 2000).

GCN are also included on Schedule 2 of the Conservation of Habitats and Species Regulations (HMSO, 2017) which makes it an offence to:

- deliberately capture or kill a great crested newt
- deliberately disturb a great crested newt (where disturbance is likely to impair their ability to survive, breed or reproduce, rear or nurture their young; or to hibernate or migrate; or to affect significantly the local distribution or abundance of great crested newts).
- damage or destroy a breeding site or resting place of a great crested newt; and
- be in possession of, control, transport, sell or exchange, or offer for sale or exchange any live or dead wild great crested newt or any part of a wild great crested newt or anything derived from a great crested newt.

GCN are also a 'Species of Principal Importance for the conservation of biodiversity', listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006).

Derogation licences may be granted by Natural England under Regulation 53 of the Conservation of Habitats and Species Regulations (2017) for certain purposes GCN, including development works. Regulation 53 (2)(e) states that such licences can be granted for the purpose of "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment". Those activities listed under Schedule 2 (see above) would not constitute an offence if carried out in accordance with the terms of such a licence.

## 1.6 Conservation Status

In the UK, GCN are widespread and locally common, with a patchy distribution, especially in South West England, parts of Wales, and in Scotland. It is estimated that there are about 75,000 populations in the UK.

A requirement of the Habitats Directive of each EU member state is to ensure that European Protected Species are maintained at or restored to 'favourable conservation status' across their natural range. GCN declined throughout Europe in the latter part of the 20th century as a result of agricultural intensification and the consequent loss, degradation and fragmentation of aquatic and terrestrial habitats. Ponds that were once used for watering livestock have been replaced with piped water supply and livestock drinking troughs, resulting in pond management neglect and eventual pond loss through hydro-seral succession to dry land.

Aquatic GCN are particularly conspicuous to predators as a result of their habit of "hanging about" in open water, and newt larvae, particularly, are very vulnerable to predation by fish. Although GCN populations have been found coexisting with fish (typically when broad-leaved pond weeds of the family *Potamogeton* are abundant and may provide cover for newts) fish and GCN rarely coexist.

The latest regional information is contained within Natural England (2011). This analysis found the south east contained 0.57 occupied ponds per km<sup>2</sup>, the third highest of the UK regions. This species is widespread within the south east. Dungeness Special Area of Conservation in south-east England has the largest shingle expanse in Europe and contains a large number of waterbodies within its 2,000 ha. This extensive site hosts a large and viable GCN population in a range of natural and anthropogenic habitats. GCN is a local Biodiversity Action Plan (BAP) priority species and Section 41 NERC (HMSO, 2006) species.

## 2 Approach and Methodology

### 2.1 Desk study

A desk study was undertaken to review existing biological information from the following sources:

- Sussex Biological Records Centre (SBRC);
- Previous surveys of the site; and
- Magic <http://magic.defra.gov.uk>.

Information was provided by SBRC for GCN within a 2km radius of the site as recommended in the Institute of Environmental Assessment's 'Guidelines for Baseline Ecological Assessment' (1997) and CIEEM's (Chartered Institute of Ecology and Environmental Management) Guidelines for Preliminary Ecological Appraisal (2017). Further, only records from within the last 10 years were considered.

A previous study by Ecology Solutions Ltd (2014) and an updated desk study undertaken by Arcadis Consulting (UK) Ltd in 2018 (SBRC, 2018) identified two records of GCN in 1990 - one located within P6 within the development boundary and one within P20, which lies outside of the site. The 2018 desk study by Arcadis Consulting (UK) Ltd, identified a further record from 2007 of a female GCN and GCN eggs within P21 (SBRC, 2018). All waterbody identifiers are presented in Figure 1.

In addition, 'Magic' mapping was consulted for all statutory designated sites which are present within 10km of the site and are designated for their GCN value.

### 2.2 Habitat assessment

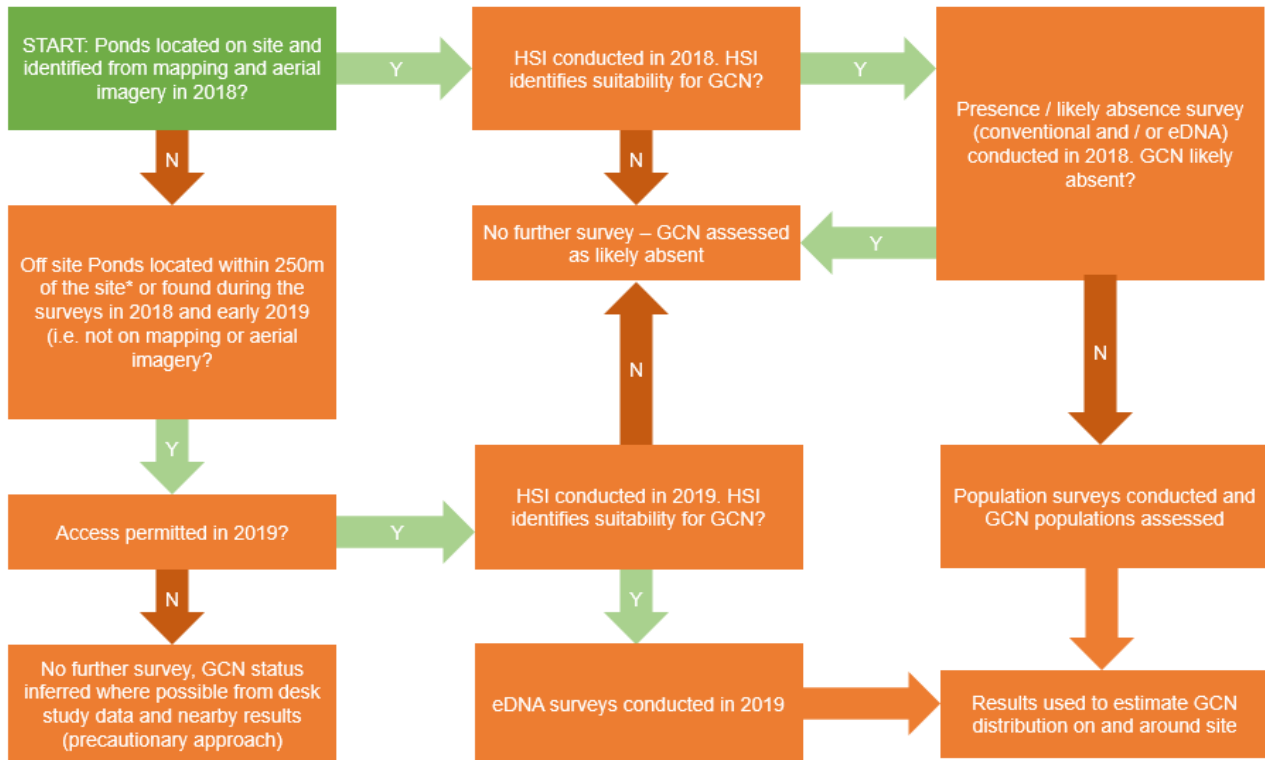
An initial habitat assessment was carried out as part of the extended Phase 1 habitat survey carried out by Arcadis in May, June and July 2018 by Porsha Thompson (ACIEEM), Julie Player (ACIEEM) and Sian Carr (MCIEEM). This identified waterbodies and terrestrial habitats suitable for GCN. Further assessment was carried out using aerial imagery and mapping to identify waterbodies within 500m of the site. Further waterbodies identified during other surveys were also assessed.

### 2.3 HSI, eDNA and Population Surveys

#### 2.3.1 Summary

This section summarises the surveys undertaken to assess the status of GCN on the site. The image below presents a decision tree which presents the reasoning / constraints behind the surveys conducted upon each water body.

Image 2: Decision tree explaining the reasoning behind the surveys conducted of each waterbody



\* a 250m area around the site for scoping in of pond assessments was agreed with the local planning authority

### 2.3.2 Great Crested Newt Habitat Suitability Index (HSI) Assessment

The waterbodies identified within the study area, those within 500m of the site boundary where there were no migration barriers (such as major road crossings and rivers) to the movement of newts between the waterbodies and the site, were assessed for their potential to support amphibians, including GCN. To do this, each waterbody was assessed using the Habitat Suitability Index (HSI) assessment tool for GCN developed by Oldham *et al.* (2000). However, an HSI assessment is not a substitute for undertaking targeted newt surveys; if a waterbody is awarded a high HSI score this does not guarantee that GCN will be present, only that they are more likely to be present in this waterbody than in a waterbody with a sub-optimal score. As such, HSI scores alone cannot be used to rule ponds in or out from further survey.

The value of terrestrial habitat within the site for use by foraging and hibernating amphibians was also assessed during the habitat assessment.

#### 2.3.2.1 2018 Assessments

Waterbodies that were located within the study area were initially surveyed on the 8, 15 and 23 May 2018 to determine their habitat suitability for GCN. The surveys were carried out by Sian Carr (licence number 2015-18807-CLS-CLS) and Porscha Thompson (licence number 2017-31863-CLS-CLS) assisted by Kailey O'Brien and Lee Gwyther. A total of ten waterbodies (seven ponds and three ditches) were assessed in this round of surveys (P1, P2, P3, P3b, P4, P5, P6, D1, D2 and D3), details of which can be seen in Appendix A and Figure 1. All other waterbodies within the site were dry at the time of survey.

#### 2.3.2.2 2019 Assessments

HSI assessments were also carried out on additional ponds within the study area, due to access becoming available, on 19 June 2019 by Brandon Murray (licence number 2015-17257-CLS-CLS) and Liam Price. A total of 13 waterbodies were assessed (P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18 and P19).

### 2.3.3 Presence/Absence Surveys (eDNA and ‘Conventional’ Surveys)

Waterbodies identified during the initial HSI assessments in 2018 (P1, P2, P3, P3b, P4, P5, P6, D1, D2 and D3) were subject to targeted surveys to confirm presence/likely absence of GCN in May and June 2018. Full details of the survey dates and conditions in Appendix D and Appendix E. These waterbodies were surveyed following best practice guidance (English Nature, 2001) using three of the following techniques, whichever were the most suitable at a particular waterbody. Details of the methods employed are presented in the sections below.

#### 2.3.3.1 Conventional Presence / Absence Surveys

- **Egg searching** involves checking marginal and aquatic vegetation around and within the ponds for GCN (and other newt species’) eggs. Newts often wrap their eggs in the leaves of vegetation around the margins of ponds. GCN eggs can be relatively easily distinguished from smooth or palmate newt (*Lissotriton vulgaris* or *L. helveticus*) eggs by their larger size and different colouration. Once GCN eggs are found in any pond, no further egg searches are required, as the survey technique can only be used for determining presence or absence, not for estimating population size class.
- **Torchlight surveys** comprises a single walk around each waterbody at night at a measured pace using a bright torch (Clulite model CB2) to locate and identify amphibians. During the survey all animals observed were counted, sexed and identified to species level where possible.
- **Bottle trapping** involves setting bottle traps (comprising 2-litre plastic drinks bottles with the top end cut off and inverted inside the main body of the bottle) along the waterbody/ditch margins. Canes are used to support the traps. Traps were set at two metre intervals wherever access allowed. Traps were set in the evening and checked early the following morning. All amphibians captured were identified to species level and sexed. The information collected was used to inform population size class estimates.
- **Sweep netting** involved using a standard pond net with 2mm x 4mm mesh to sweep the water column and aquatic vegetation at dusk before the bottle traps were deployed. At least 15 minutes of sweeping was undertaken for each 50 metres of shoreline. Once the presence of GCN was confirmed, netting ceased, as the survey technique can only be used for determining presence or absence, not for informing population size class estimates.

Appropriate bio-security measures were adopted whilst undertaking surveys within and close to water, in order to avoid the inadvertent spread of waterborne diseases such as chytridiomycosis. Although surveys were targeted to establish the presence/absence of GCN, the presence of other amphibians was also recorded incidentally during the surveys.

#### 2.3.3.2 Environmental DNA (eDNA) Survey

GCN release their DNA into ponds via their saliva, skin cells and urine where it will remain in the waterbody for several weeks. These eDNA surveys are undertaken by obtaining water samples from the waterbody (in accordance with guidance published by Biggs *et. al.* (2014) which are analysed in a laboratory to identify the presence/absence of GCN DNA which will determine if GCN have used the pond.

Three possible results will be presented by the testing:

- Positive – GCN eDNA has been detected in the pond;
- Negative – GCN eDNA has not been detected within the pond; or
- Inconclusive results – GCN eDNA has not been detected but the sample may have been degraded (e.g. not stored correctly and/or at the correct temperature before testing) or the test inhibited (e.g. by an unexpected chemical present within the sample).

#### 2018 Surveys

Four ponds (P2, P3, P3b and P6) had GCN presence confirmed during presence/absence surveys, therefore eDNA surveys were not required. Environmental DNA (eDNA) surveys were undertaken on the remaining waterbodies, where access was currently available (P1, P4, P5, D1, D2 and D3) on 15th May 2018 by Porscha Thompson, assisted by Lee Gwyther, to confirm the presence/absence of GCN. The samples were analysed by Fera Science Ltd.

## 2019 Surveys

Further eDNA surveys were carried out on 12 additional ponds (P7, P8, P9, P11, P12, P13, P14, P15, P16, P17, P18 and P19) on 19 June 2019 by Brandon Murray and Liam Price. These ponds were surveyed separately due to access becoming available later than for the ponds surveyed in 2018.

### 2.3.3.3 Population Estimates

For on-site ponds where presence of GCN was confirmed, population assessments were undertaken. Six survey visits were undertaken to each waterbody where GCN were confirmed as present, based either on the results of the 2018 presence/absence surveys (including eDNA surveys). Surveys were undertaken between 8 May 2018 and 13 June 2018, following best practice guidelines (Natural England, 2015) using two survey methods (bottle trapping and torch survey). Visit dates and survey conditions including surveyors and licence numbers are included in Appendix D and Appendix E.

## 2.4 Survey Limitations

Two water shrew (*Neomys fodiens*) were trapped inadvertently within bottle traps at D1 on 11<sup>th</sup> May 2018. This prevented any further bottle trapping from taking place and this method was therefore substituted with netting on the third visit. This had no impact on survey results as absence of GCN from D1 was subsequently confirmed by eDNA analysis.

Two ponds within the site; one at Lower Barn (Pound Cottages) in the west of the site (Pond 14) and one on the western boundary of Ifield Golf Course (Pond 19) were not identified on aerial imagery/Ordnance Survey maps, but were identified on site in July 2018 from publicly accessible land. It was not possible to undertake any surveys on the ponds during 2018 as they were not discovered until after the GCN survey season had finished (mid-June). These ponds were surveyed with eDNA surveys in 2019, this is not considered to have impacted upon the veracity of the results.

Best practice guidelines (Natural England, 2015) advise that three population estimate surveys should be completed before mid-May. This was not possible for waterbodies P6 and D3 due to health and safety reasons as cattle (including calves) were present within the field at the time of the survey. This is unlikely to have impacted the results of the population estimate surveys as peak counts of GCN were very small (maximum count 1); the threshold for the next population size class is 11 individuals which is a much higher than the peak count found on any of the surveys of P6 and D3. This is not considered to have impacted upon the validity of the results.

Best practice guidelines (Natural England, 2015) advise that torch surveys, bottle trapping and egg searches are completed for presence/absence surveys (i.e. netting should only be used where one of these methods is not suitable) and that bottle trapping and torch surveys are undertaken for population estimate surveys. However, not all waterbodies could be surveyed by torch due to factors such as turbidity (P6 and D3) and presence of dense vegetation such as Common Duckweed (*Lemna minor*) and Bulrush (*Typha latifolia*) (P1 and P2). Similarly, D2 could not be accessed in its entirety due to dense scrub which meant that bottle traps were confined to accessible areas of the ditch and the vegetation within the waterbody meant that netting was also constrained. Overall, this may have led to inaccuracies in the population estimates of GCN within these waterbodies, but this is not considered to have impacted upon the validity of the results.

Egg searches were also constrained due to lack of emergent/submerged vegetation and accessibility. However, this is not considered to be a constraint as evidence of GCN eggs was found in four of the ponds with confirmed GCN presence .

It was only possible to conduct three population estimate surveys on D3 due to the ditch drying out. In addition, these three surveys were severely restricted by dense Bramble (*Rubus fruticosus* agg.) cover and shallow, very turbid water which inhibited bottle trapping and torching. This sub-optimal survey effort is likely to have reduced the likelihood of GCN being recorded. However, GCN presence was confirmed by eDNA survey and based on the sub-optimal conditions, it is reasonable to assume that the ditch supports no more than a small population of GCN.

Pond P10 was not identified from aerial imagery, so an eDNA kit was not available. However, the HSI assessment rated this artificial pond, located within an aviary, as 'poor'. As such, it is considered that GCN are absent this pond.

## 3 Results

The status of the HSI and presence / likely absence surveys conducted on each of the ponds and the outcomes of these surveyed is presented in Figure 2.

### 3.1 HSI Surveys

#### 3.1.1 2018 Assessments

The 2018 HSI assessments determined that one waterbody (P6) had 'good' suitability for supporting GCN, three waterbodies (P1, P3 and P5) had 'average' suitability for supporting GCN, five waterbodies (P2, P3b, D1, D2 and D3) had 'below average' suitability for supporting GCN and one waterbody (P4) had 'poor' suitability for supporting GCN.

#### 3.1.2 2019 Assessments

The 2019 HSI assessments found that one waterbody (P17) had 'excellent' suitability, three waterbodies (P7, P11 and P18) had 'average' suitability, three waterbodies (P12, P13 and P19) had 'below average' suitability and six waterbodies (P8, P9, P10, P14, P15 and P16) had 'poor' suitability for supporting GCN.

A summary of the HSI assessments is included in Table 1, below, with full results included in Appendix B and Appendix C. Waterbody descriptions and photographs are included in Appendix A.

### 3.2 eDNA Surveys

#### 3.2.1 2018 Surveys

The 2018 eDNA surveys confirmed that three ponds (P1, P4 and P5) and two ditches (D1 and D2) were not utilised by GCN in the weeks prior to sampling. One ditch (D3) tested positive for GCN eDNA although no evidence of GCN was found during subsequent population estimate surveys (see Section 3.3).

#### 3.2.2 2019 Surveys

The 2019 eDNA surveys confirmed the use of two ponds (P11 and P17) by GCN. The eDNA surveys indicated that the remaining ponds (P7, P8, P9, P12, P13, P14, P15, P16, P18 and P19) did not support GCN, but GCN eggs were found in P13. As such GCN were considered to be present in ponds 11, 13 and 17.

Results of the eDNA surveys are included in Table 1, below.

### 3.3 Presence / Absence and Population Estimate Surveys

Presence / absence and population estimate surveys were only carried out in 2018, on ponds identified to contain GCN. Of the five waterbodies with confirmed GCN presence in 2018 (P2, P3, P3b, P6 and D3), pond P2 had the highest count of GCN over the course of the surveys with three male and five female GCN identified during the bottle trapping survey on 9 May 2018. Peak counts of GCN are included in Table 1, below, with full results included in Appendix D. Egg searching of emergent vegetation during the surveys revealed the presence of GCN eggs in ponds P2, P3, P3b and P6, confirming breeding GCN. Full results of population estimate surveys are included in Appendix D and Appendix E and are presented on Figure 3. Buffer areas (50m, 250m and 500m) around the ponds found to support GCN are presented in Figure 4 to aid in mitigation design.

Table 1: Summary of GCN survey results

Waterbody Number	HSI score	Pond suitability	eDNA result	Peak GCN count	Eggs found?	Year of assessment
P1	0.69	Average	Negative	N/A		2018

Waterbody Number	HSI score	Pond suitability	eDNA result	Peak GCN count	Eggs found?	Year of assessment
P2	0.57	Below average	N/A	8	Yes	2018
P3	0.63	Average	N/A	3	Yes	2018
P3b	0.55	Below average	N/A	4	Yes	2018
P4	0.49	Poor	Negative	N/A		2018
P5	0.63	Average	Negative	N/A		2018
P6	0.73	Good	N/A	1	Yes	2018
D1	0.54	Below average	Negative	N/A		2018
D2	0.58	Below average	Negative	N/A		2018
D3	0.55	Below average	Positive	0		2018
P7	0.61	Average	Negative	N/A		2019
P8	0.28	Poor	Negative	N/A		2019
P9	0.4	Poor	Negative	N/A		2019
P10	0.36	Poor	Not surveyed	N/A		2019
P11	0.63	Average	Positive	N/A		2019
P12	0.54	Below average	Negative	N/A		2019
P13	0.51	Below average	Negative (but GCN Present)	N/A	Yes	2019
P14	0.35	Poor	Negative	N/A		2019
P15	0.45	Poor	Negative	N/A		2019
P16	0.4	Poor	Negative	N/A		2019
P17	0.86	Excellent	Positive	N/A	Yes	2019
P18	0.65	Average	Negative	N/A		2019
P19	0.57	Below average	Negative	N/A		2019

Waterbody Number	HSI score	Pond suitability	eDNA result	Peak GCN count	Eggs found?	Year of assessment
P20	Not surveyed – no access					
P21	Not surveyed– no access					
P22	Not surveyed– no access					
P23	Not surveyed– no access					

### 3.4 Other Amphibian Species

Other amphibian species identified during the surveys included smooth newt (P2, P3, P3b, P4, D1 and D2), palmate newt (P4, D1), smooth/palmate newt eggs (P3, P4 and D1), common frog (*Rana temporaria*) adults and/or frog tadpoles (P1, P2, P3, P3b, P4, P6, D1, D2 and D3) and common toad (*Bufo bufo*) (P4, P5).

## 4 Discussion

The surveys confirmed the presence of GCN in seven ponds and one ditch within the study area. Three of these ponds (P2, P3 and P3b) are within Ifield Golf Course located in the south of the site, with P17 in an area of grassland 150m to the north of the golf course. The ditch (D3) and pond P6 are within cattle-grazed pasture in the north of the site. Ponds P11 and P13 are located in woodland edge and woodland habitats, respectively, outside of the western boundary of the site. The River Mole acts as a barrier to dispersal and as GCN have been identified on either side of the River Mole it can be assumed that these are separate populations.

From reviewing population results, desk study data and presence / absence survey information, likely distribution of GCN across and around the site was inferred. It was assessed that it is likely that there are three populations of GCN present within the site. These three populations are described below:

- One population in the north of the site, centred around TQ 247 383. Associated with the ponds within this area, to which access was permitted, a small population of GCN was identified (although nearby off-site ponds were not surveyed for population). A precautionary approach should be undertaken and there is potential that if surveys are conducted on ponds where access was denied, the overall population assessment may be higher (especially considered that the ponds not surveyed have historic records of GCN, ponds within Ifield Court Hotel approximately 160m north of P6);
- One population associated with the golf course in the south of the site around TQ234 368, the peak count during population surveys of the on-site ponds suggested a 'medium' population (Natural England, 2015) (although nearby off-site ponds were not surveyed for population, but presence was confirmed);
- One population was identified associated with off-site ponds immediately to the north-west of the site, population assessments were not undertaken of these off-site ponds.

Buffer areas around the ponds found to support GCN are presented in Figure 4 to aid in mitigation design.

Other amphibian species identified during the surveys included smooth newt, palmate newt, smooth/palmate newt eggs, common frog adults and/or frog tadpoles and common toad. Common toad are a 'Species of Principal Importance for the conservation of biodiversity', listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act (Anon, 2006).

No further surveys are required at this time; the requirement for further survey at later stages of the planning process will be determined by the details of the phasing of the development, and the mitigation approach determined for each phase.

## 5 Conclusions

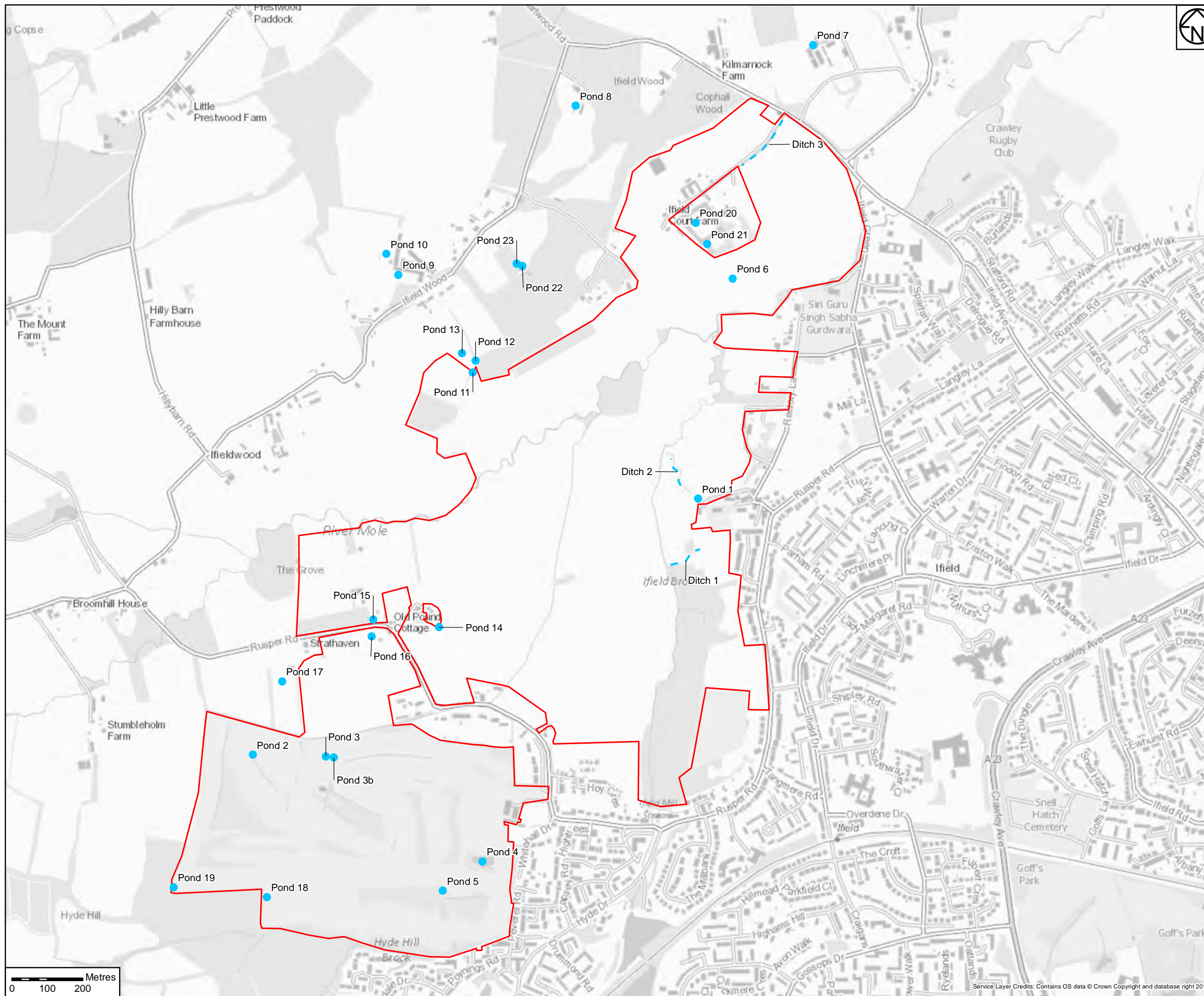
Habitat Suitability Index (HSI) assessments, eDNA assessments and targeted GCN presence / likely absence and population surveys were undertaken between May 2018 – June 2019. A total of 22 waterbodies were assessed based on their location on the site, or within 500m of the site. Eight of these were found to support GCN (P2, P3, P3b, P6, P11, P13, P17 and D3), in three separate populations, separated by the River Mole and roads / distance.

Other amphibian species were identified during the surveys including; smooth newt, palmate newt, smooth/palmate newt eggs, common frog adults and/or frog tadpoles and common toad.

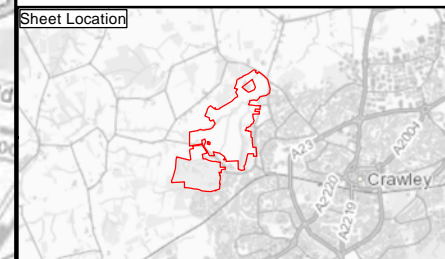
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## Figure 1: Waterbody locations



- Legend**
- Redline Boundary
  - Pond Locations
  - Ditch



01	S2	16/10/19	Initial Issue	PN	BM	MG
Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved

Client

Designer

Project  
**Land West of Ifield**

Drawing Title  
**Figure 1  
 Waterbody Locations**

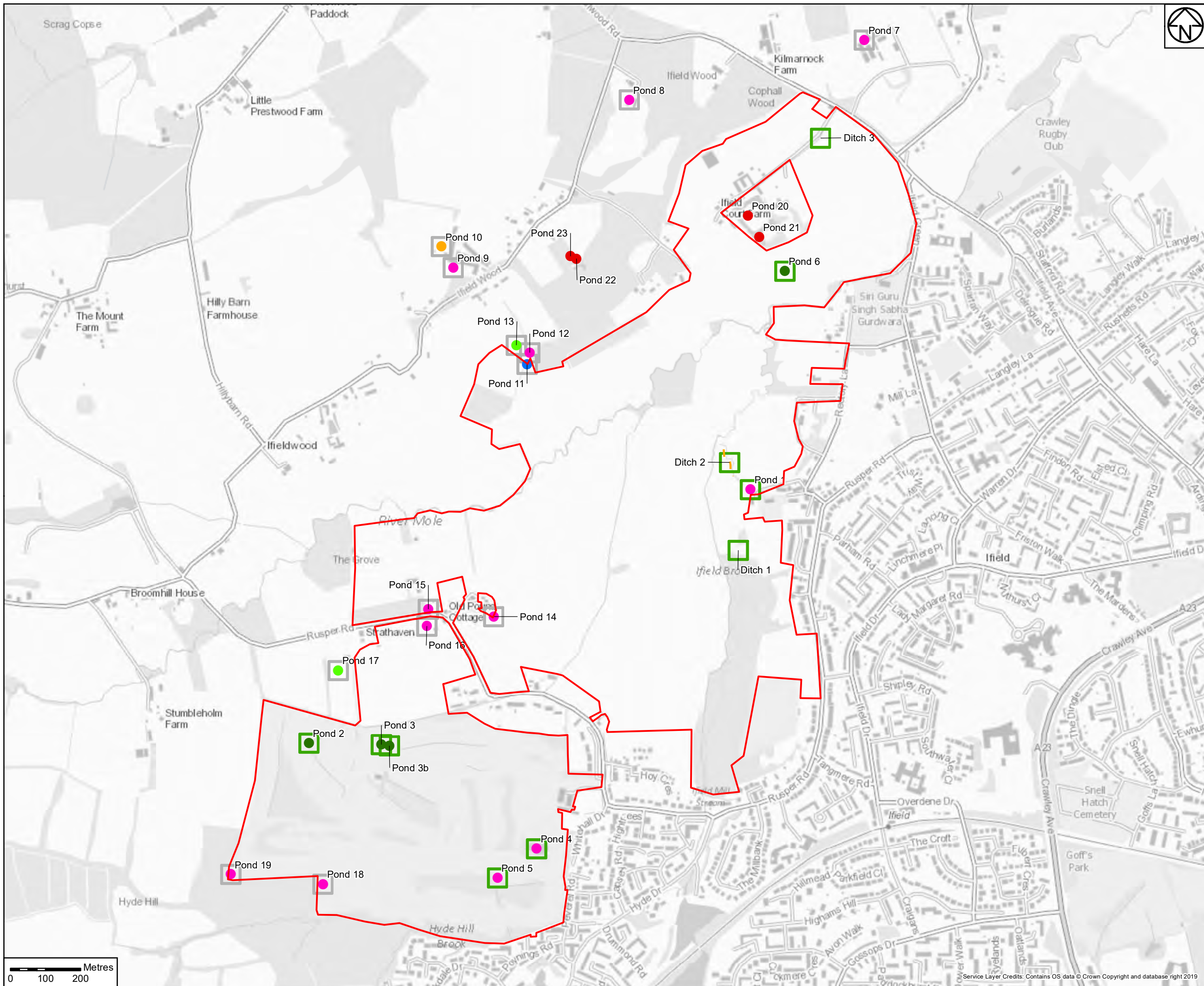
Status	S2	Revision	01
Scale	1:10,000	Date	16/10/19

Drawn By: P. Nehete  
 Checked By: B. Murray  
 Approved By: M. Girvan

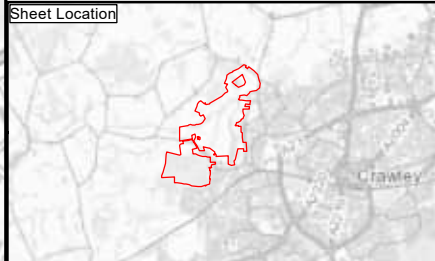
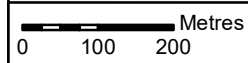
Drawing number: HE-PN-1-Original-Volume-1-Location-1-Type-Block-Number

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**Figure 2: Presence / absence surveys conducted in 2018 and 2019 and results.**



- Legend**
- Redline Boundary
  - Surveyed in 2018
  - Surveyed in 2019
- Survey Result**
- GCN present – GCN eggs, but no population survey
  - GCN present – population survey in 2018 (see Figure 3 for details)
  - eDNA positive – no population survey
  - eDNA negative – no further survey
  - HSI unsuitable – no survey
  - Not surveyed – no access
- Ditch**
- eDNA negative – no further survey
  - GCN present – population survey in 2018 (see Figure 3 for details)



01	S2	29/10/19	Initial Issue	PN	BM	MG
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chkd	Apprvd

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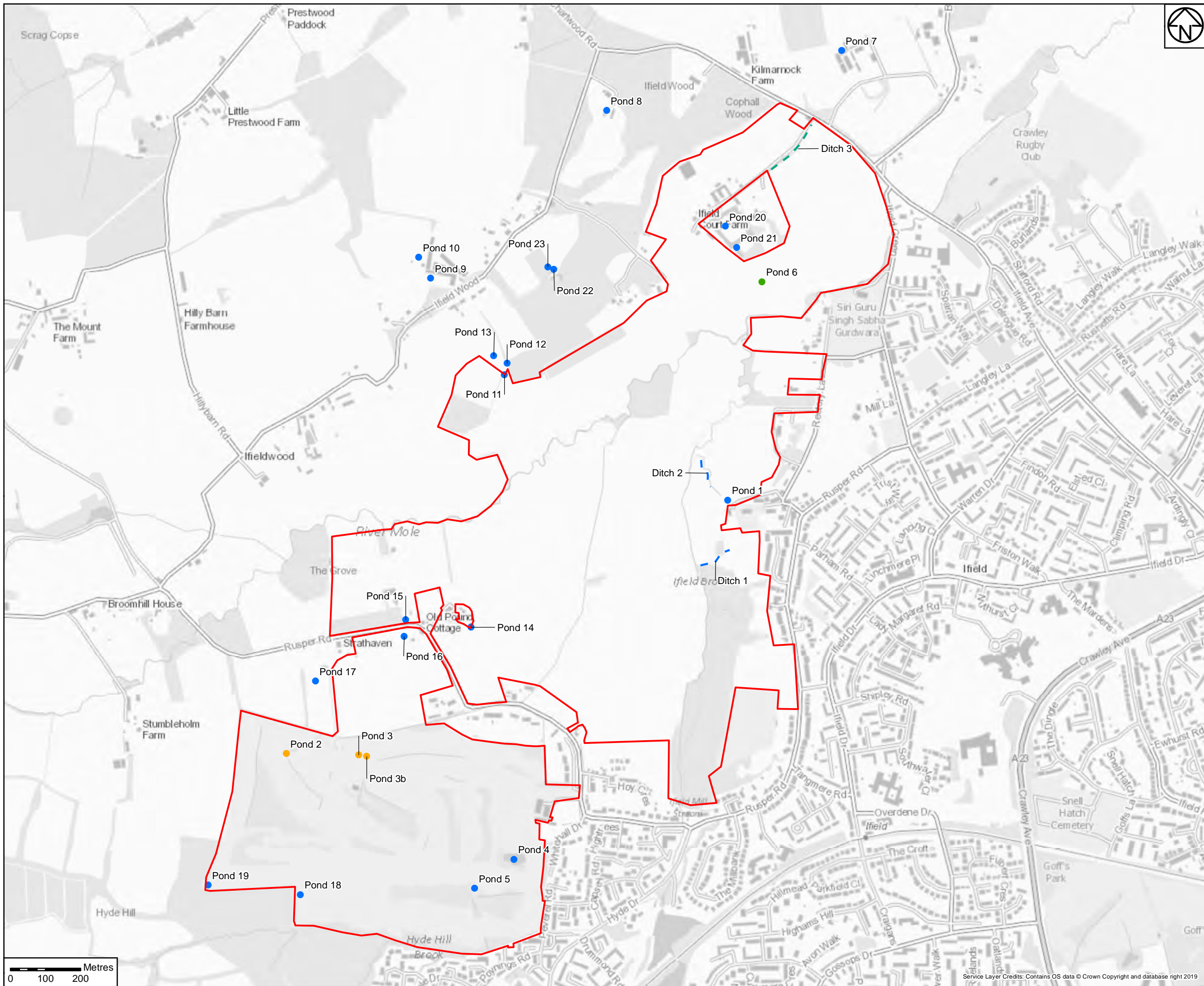
Project  
Land West of Ifield

Figure 2  
Figure 2: Presence / Absence Surveys  
Conducted in 2018 and 2019 and Results

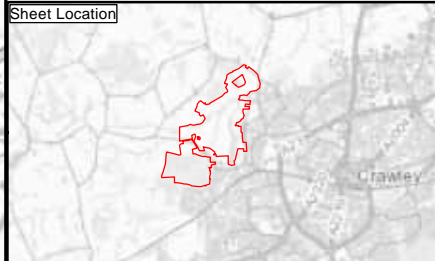
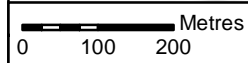
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Scale	1:10,000	Date	29/10/19
Drawn By	P. Nehete		
Checked By	B. Murray		
Approved By	M. Girvan		
PINS No.			
Drawing number	HE-PIN	Original	Volume
			Location
			Type
			Number

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**Figure 3: Great Crested Newt population assessment results - 2018 survey**



- Legend**
- Redline Boundary
  - Surveyed in 2018
  - Surveyed in 2019
  - Small Population
  - Medium Population
  - Pond not surveyed for population
- Ditch**
- Not Surveyed
  - Small Population



01	S2	28/10/19	Initial Issue	PN	BM	MG
Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved

Client

Designer

Registered office:  
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Birmingham  
B3 7GQ

Project  
**Land West of Ifield**

Drawing Title  
**Figure 3  
Great Crested Newt Population  
Assessment Results 2018 Survey**

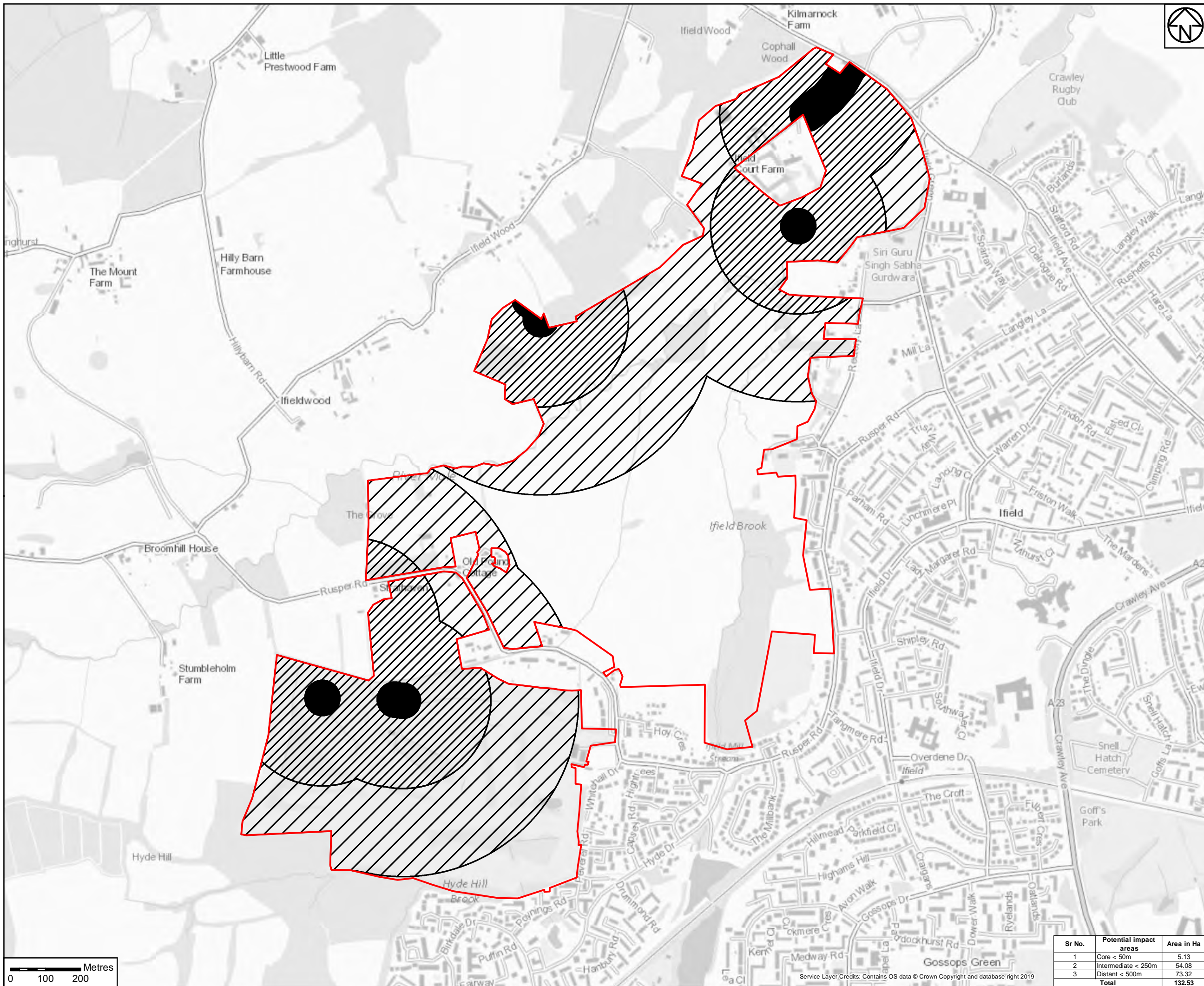
Status	S2	Revision	01
Scale	1:10,000	Date	28/10/19

Drawn By: P. Nehete  
Checked By: B. Murray  
Approved By: M. Girvan

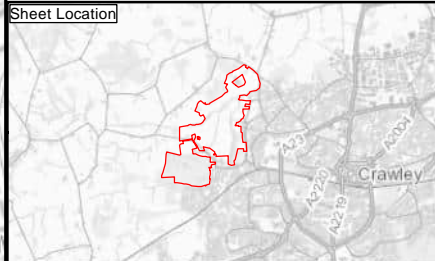
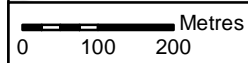
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Drawing number: HE-PIN | Original | Volume | Location | Type | Block | Number

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## Figure 4: Overview of Great Crested Newt impact radii



- Legend**
- Redline Boundary
  - Potential impact areas**
  - Core < 50m
  - Intermediate < 250m
  - Distant < 500m



01	S2	24/10/19	Initial Issue	PN	BM	MG
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chkd	Apprvd



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Project: Land West of Ifield

Drawing Title: Figure 4 Overview of Great Crested Newt Impact Radii




Status	S2	Revision	01
Scale	1:10,000	Date	24/10/19





Sr No.	Potential impact areas	Area in Ha
1	Core < 50m	5.13
2	Intermediate < 250m	54.08
3	Distant < 500m	73.32
<b>Total</b>		<b>132.53</b>

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## APPENDIX A: Waterbody Descriptions and Photographs

Table 2: Waterbody descriptions and photographs

Waterbody ID	Grid reference	Pond description	Photograph
P1	TQ 24680 37620	<p>Located on amenity grassland (village green) with a wooded bank on the northern edge, footpath to the east and minor road to the south. The pond has vegetation around the whole pond perimeter.</p>	
P2	TQ 23394 36886	<p>Located on amenity grassland (Ifield Golf Course). Two drains enter/exit the pond. The pond is covered with dense Bulrush throughout.</p>	
P3	TQ 23590 36879	<p>Located on amenity grassland (Ifield Golf Course).</p>	

Waterbody ID	Grid reference	Pond description	Photograph
P3b	TQ 23617 36877	Located on amenity grassland (Ifield Golf Course).	
P4	TQ 24044 36588	Located on amenity grassland (Ifield Golf Course). The pond has a small section of wooded bank to the south and west.	
P5	TQ 23928 36503	Located on amenity grassland (Ifield Golf Course). The pond has mostly wooded banks and is heavily shaded.	
P6	TQ 24753 38231	Located on cattle-grazed pasture. The pond has trees scattered around the circumference. The pond is fenced.	

Waterbody ID	Grid reference	Pond description	Photograph
P7	TQ 24964 38901	Very overgrown pond surrounded by short mown grass and trees.	
P8	TQ 24301 38731	Fish-pond within a short mown amenity grassland lawn.	
P9	TQ 23802 38239	Small garden pond managed ornamentally.	

Waterbody ID	Grid reference	Pond description	Photograph
P10	TQ 23775 38297	Wood lined ornamental pond in private aviary. Trees scattered around bank, with mud and coops beyond.	
P11	TQ 24006 37966	Densely vegetated pond, overgrown with rushes and grasses.	

Waterbody ID	Grid reference	Pond description	Photograph
--------------	----------------	------------------	------------

P12

TQ 24028 37993

Very shallow woodland pond with little aquatic vegetation. Highly shaded by surrounding trees.





P13




TQ 23981 38022

Large garden pond within wildflower meadow. Little aquatic vegetation due to grazing pressure from wildfowl.



Waterbody ID	Grid reference	Pond description	Photograph
P14	TQ 23903 37264	Garden pond surrounded by short mown lawn.	
P15	TQ 23746 37263	Ornamental garden pond with short mown lawn to the east and shrubs and trees on the remaining sides.	
P16	TQ 23725 37223	Pond managed to keep geese. No aquatic vegetation or emergent vegetation.	
P17	TQ 23470 37099	Pond within hay meadow. Rough grassland on the banks and hedges nearby.	

Waterbody ID	Grid reference	Pond description	Photograph
P18	TQ 23429 36496	Small pond within dense scrub within golf course. Pond is within a large depression and is densely vegetated.	
P19	TQ 23153 36525	Small woodland pond adjacent to golf course. Very shallow and with little aquatic vegetation. Highly shaded by canopy.	
P20	TQ 24611 38403	No access	
P21	TQ 24649 38335	No access	
P22	TQ 24135 38252	No access	
P23	TQ 24156 38246	No access	

Waterbody ID	Grid reference	Pond description	Photograph
D1	TQ 24600 37423	<p>Located within Ifield Brook Wood and Meadows LWS. The ditch is approximately 50m<sup>2</sup>. The ditch is surrounded by wooded/scrub-covered banks with semi-improved grassland in the wider landscape.</p>	
D2	TQ 24581 37695	<p>Located within Ifield Brook Wood and Meadows LWS. The ditch is approximately 350m<sup>2</sup>. The ditch is surrounded by wooded/scrub-covered banks with semi-improved grassland in the wider landscape.</p>	
D3	TQ 24870 38643	<p>The ditch is approximately 200m<sup>2</sup>. The ditch is surrounded by wooded and scrub-covered banks with grazing pasture to the south/east and an unnamed lane to the north/west.</p>	

## APPENDIX B: Habitat Suitability Index Assessment Data (ponds)

Table 3: Habitat Suitability Index Assessment Raw Data – ponds

Pond Number	Geographic Location	Area (m2)	Permanence	Water Quality	Shade	Waterfowl	Fish	Pond count	Terrestrial Habitat	Macrophytes	HSI score	Pond suitability	eDNA result
Surveyed in 2018													
P1	1	0.2	0.9	1	0.7	1	0.67	0.55	1	0.55	0.69	Average	Negative
P2	1	0.1	0.1	0.67	1	1	1	0.95	0.67	0.85	0.57	Below average	N/A
P3	1	0.2	0.9	0.67	1	1	0.33	0.95	0.67	0.4	0.63	Average	N/A
P3B	1	0.05	0.9	0.67	1	1	0.33	0.9	0.67	0.4	0.55	Below average	N/A
P4	1	0.86	0.9	0.67	1	0.67	0.01	0.75	0.67	0.45	0.49	Poor	Negative
P5	1	1	1	0.33	0.2	1	1	0.75	0.67	0.32	0.63	Average	Negative
P6	1	0.86	0.9	0.67	1	0.67	0.33	1	1	0.4	0.73	Good	N/A
Surveyed in 2019													
P7	1	0.2	0.1	0.67	0.8	1	1	0.95	1	0.65	0.61	Average	Negative
P8	1	0.2	0.9	0.33	1	0.01	0.01	1	0.67	0.7	0.28	Poor	Negative
P9	1	0.1	0.9	0.67	0.8	0.01	1	1	0.67	0.3	0.40	Poor	Negative
P10	1	0.7	0.9	0.33	0.2	0.01	1	1	0.33	0.3	0.36	Poor	Not carried out

Pond Number	Geographic Location	Area (m2)	Permanence	Water Quality	Shade	Waterfowl	Fish	Pond count	Terrestrial Habitat	Macrophytes	HSI score	Pond suitability	eDNA result
P11	1	0.1	0.9	0.67	0.2	1	1	1	1	0.85	0.63	Average	Positive
P12	1	0.1	0.5	0.67	0.2	1	1	1	1	0.3	0.54	Below average	Negative
P13	1	0.75	0.9	0.67	1	0.01	0.67	1	1	0.4	0.51	Below average	Negative (but eggs found)
P14	1	0.2	0.9	0.67	0.4	0.01	0.33	0.9	0.67	0.3	0.35	Poor	Negative
P15	1	0.1	0.9	0.67	1	1	0.01	0.9	0.67	0.9	0.45	Poor	Negative
P16	1	0.3	0.9	0.33	1	0.01	0.67	0.9	0.67	0.3	0.40	Poor	Negative
P17	1	0.45	0.9	1	1	1	0.67	0.9	1	0.9	0.86	Excellent	Positive
P18	1	0.15	0.5	0.67	0.4	1	0.67	1	1	1	0.65	Average	Negative
P19	1	0.1	0.9	0.67	0.2	1	1	1	1	0.3	0.57	Below average	Negative

## APPENDIX C: Habitat Suitability Index Assessment Data (ditches)

Table 4: Habitat Suitability Index Assessment Raw Data – ditches

	Geographic Location	Area (m2)	Permanence	Water Quality	Shade	Waterfowl	Fish	Pond count	Terrestrial Habitat	Macrophytes	HSI score	Pond suitability	eDNA result
D1	1	0.1	0.5	1	0.2	1	1	0.55	1	0.4	0.54	Below average	Negative
D2	1	0.7	0.1	0.67	0.4	1	1	0.55	1	0.4	0.58	Below average	Negative
D3	1	0.4	0.5	0.33	0.2	0.67	1	1	1	0.3	0.55	Below average	Positive

## APPENDIX D: Survey conditions and results (ponds)

Table 5: Full details of population surveys – ponds (shaded rows indicate peak counts of GCN)

Pond number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
P1	1	08/05/2018	19°C, no rain, no wind	0	N/A	0	N/A	-	<b>Sian Carr (Natural England licence number 2015-18807-CLS-CLS)</b> and Kailey O'Brien
	2	10/05/2018	11°C, no wind, no rain	0	N/A	0	N/A	1 frog; 1 large dragonfly larvae	<b>Sian Carr</b> and Kailey O'Brien
	3	15/05/2018	16°C, no wind, no rain	0	N/A	0	0	-	<b>Porscha Thompson (Natural England licence number 2017-31863-CLS-CLS)</b> and Lee Gwyther
Negative eDNA result confirmed 24/05/2018 – no further surveys required.									
P2	1	09/05/2018	12°C, light wind, no rain	3 male and 5 female GCN; 9 male and 3 female smooth newts	N/A	2 female GCN; 2 male smooth newts; 2 female smooth/palmate newts	N/A	Tadpoles	<b>Sian Carr</b> and Kailey O'Brien
	2	14/05/2018	16°C, light wind, no rain	2 male and 3 female GCN; 4 female smooth newts	0	3 female GCN; 4 male and 2 female smooth newts; 2 smooth/palmate newts	N/A	1 frog	<b>Julie Player (Natural England licence number 2015-16066-CLS-CLS), Ellen Quinton (Natural England licence number 2016-20756-CLS-CLS)</b> and Sam Saunders-Davies
	3	15/05/2018	18°C, no wind, no rain	7 females and 1 juvenile GCN; 1 female smooth newt	GCN eggs observed on Broadleaved Pondweed	6 female smooth newts	N/A	1 frog	<b>Julie Player, Ellen Quinton</b> and Sam Saunders-Davies

Pond number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search ( <i>Potamogeton natans</i> )	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
	4	31/05/2018	18°C, no wind, no rain	1 male and 6 female GCN	N/A	2 female GCN	N/A	-	<b>Porscha Thompson</b> and Lee Gwyther
	5	04/06/2018	13°C, light wind, no rain	1 male and 2 female GCN	N/A	1 female GCN	N/A	Tadpoles	<b>Julie Player</b> and <b>Porscha Thompson</b>
	6	12/06/2018	16°C, no wind, no rain	0	N/A	0	N/A	Tadpoles; 3 dragonfly larvae	<b>Sian Carr</b> and Kailey O'Brien
	1	09/05/2018	12°C, light wind, no rain	2 male and 1 female GCN; 1 male and 5 female smooth newts	N/A	1 female smooth/palmate newt	N/A	Tadpoles; sticklebacks	<b>Sian Carr</b> and Kailey O'Brien
	2	14/05/2018	16°C, light wind, no rain	3 male and 3 female smooth newts	0	1 smooth/palmate newt	N/A	Frog tadpoles; 1 frog	<b>Julie Player, Ellen Quinton</b> and Sam Saunders-Davies
P3	3	15/05/2018	18°C, no wind, no rain	1 female GCN; 1 male smooth newt	GCN eggs observed on Water Mint ( <i>Mentha aquatica</i> ); smooth/palmate eggs also observed	1 male smooth newt	N/A	Tadpoles; fish; 1 frog	<b>Julie Player, Ellen Quinton</b> and Sam Saunders-Davies
	4	31/05/2018	18°C, no wind, no rain	2 male GCN	N/A	2 female GCN	N/A	Tadpoles	<b>Porscha Thompson</b> and Lee Gwyther

Pond number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
P3b	5	04/06/2018	13°C, light wind, no rain	0	N/A	0	N/A	Fish; tadpoles	<b>Julie Player</b> and <b>Porscha Thompson</b>
	6	12/06/2018	16°C, no wind, no rain	0	N/A	0	N/A	Tadpoles; small fish	<b>Sian Carr</b> and Kailey O'Brien
	1	09/05/2018	12°C, light wind, no rain	1 male and 2 female GCN	N/A	1 male GCN	N/A	Small fish	<b>Sian Carr</b> and Kailey O'Brien
	2	14/05/2018	16°C, light wind, no rain	1 male GCN	GCN eggs observed	1 female smooth newt	N/A	1 frog	<b>Julie Player</b> , <b>Ellen Quinton</b> and Sam Saunders-Davies
	3	15/05/2018	19°C, no wind, no rain	2 male and 2 female GCN	N/A	1 male and 1 sex unknown GCN; 1 male and 1 female smooth newt	N/A	1 frog; 1 toad	<b>Julie Player</b> and <b>Ellen Quinton</b>
	4	31/05/2018	18°C, no wind, no rain	1 male GCN; 2 male and 1 female smooth newt	N/A	1 male smooth and 2 female smooth/palmate newts	N/A	Tadpoles	<b>Porscha Thompson</b> and Lee Gwyther
P3b	5	04/06/2018	13°C, light wind, no rain	1 male and 2 female GCN	N/A	1 sex unknown smooth newt	N/A		<b>Julie Player</b> and <b>Porscha Thompson</b>
	6	12/06/2018	16°C, no wind, no rain	1 female GCN	N/A	1 female GCN	N/A	Small fish; dragonfly larvae	<b>Sian Carr</b> and Kailey O'Brien
P4	1	09/05/2018	15°C, no wind, no rain	12 male and 1 female smooth newt	Smooth/palmate egg on submerged Willowherb ( <i>Epilobium</i> sp.)	1 male palmate newt; 1 male and 4 female smooth/palmate newts	N/A	Tadpoles; diving beetle; fish	<b>Lucy Fay (Natural England licence number 2015-16403-CLS-CLS)</b> and Lee Gwyther

Pond number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
	2	14/05/2018	16°C, no wind, no rain	1 male and 2 female smooth newts	0	1 male smooth newt; 1 sex unknown smooth/palmate newt	N/A	6 Canada geese (2 adults and 4 goslings); large fish	<b>Julie Player, Ellen Quinton</b> and Sam Saunders-Davies
	3	15/05/2018	19°C, light wind, no rain	0	0	2 female smooth newts	N/A	-	<b>Julie Player, Ellen Quinton</b> and <b>Porscha Thompson</b>
	Negative eDNA result confirmed 24/05/2018 – no further surveys required.								
P5	1	09/05/2018	15°C, no wind, no rain	0	N/A	0	N/A	-	<b>Lucy Fay</b> and Lee Gwyther
	2	14/05/2018	16°C, no wind, no rain	0	0	0	N/A	1 toad	<b>Julie Player, Ellen Quinton</b> and Sam Saunders-Davies
	3	15/05/2018	19°C, light wind, no rain	0	0	0	N/A	-	<b>Julie Player, Ellen Quinton</b> and <b>Porscha Thompson</b>
Negative eDNA result confirmed 24/05/2018 – no further surveys required.									
P6	1	10/05/2018	11°C, no wind, no rain	1 female GCN	N/A	1 sex unknown smooth/palmate newt	N/A	1 frog; tadpoles; diving beetles	<b>Sian Carr</b> and Kailey O'Brien
	2	22/05/2018	17°C, no wind, no rain	0	GCN eggs observed	3 sex unknown smooth/palmate newts	N/A	Tadpoles; fish	<b>Sian Carr</b> and Daniel Jones
	3	23/05/2018	17°C, no wind, no rain	1 male GCN	N/A	0	N/A	Tadpoles	<b>Sian Carr</b> and Daniel Jones
	4	04/06/2018	13°C, light wind, no rain	0	N/A	0	N/A		<b>Julie Player</b> and <b>Porscha Thompson</b>

Pond number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
	5	07/06/2018	18°C, light wind, no rain	0	N/A	0	N/A	Frogs	<b>Porscha Thompson</b> and Daniel Jones
	6	12/06/2018	16°C, no wind, no rain	0	N/A	0	N/A	4 froglets; fish; heron; dragonfly larvae	<b>Sian Carr</b> and Kailey O'Brien

## APPENDIX E: Survey conditions and results (ditches)

Table 6: Full details of population surveys – ditches

Ditch number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
D1	1	08/05/2018	19°C, light rain, no wind	6 male and 1 female smooth newt; 1 female palmate newt	Smooth/palmate eggs observed	1 male smooth newt; 6 female smooth/palmate newts	N/A	Tadpoles; 3 frogs	<b>Sian Carr</b> and Kailey O'Brien
	2	10/05/2018	11°C, no wind, no rain	2 female smooth newts	Smooth/palmate eggs observed	1 male and 1 female smooth newt; 2 female smooth/palmate newts	N/A	3 frogs; tadpoles; 2 water shrews caught in bottle traps	<b>Sian Carr</b> and Kailey O'Brien
	3	15/05/2018	16°C, no wind, no rain	N/A	Smooth/palmate eggs observed	0	0	Tadpoles	<b>Porscha Thompson</b> and Lee Gwyther
Negative eDNA result confirmed 24/05/2018 – no further surveys required.									
D2	1	08/05/2018	19°C, light wind, no rain	0	N/A	0	N/A	-	<b>Sian Carr</b> and Kailey O'Brien
	2	10/05/2018	11°C, no wind, no rain	2 male and 1 female smooth newt	N/A	N/A	N/A	Tadpoles	<b>Sian Carr</b> and Kailey O'Brien
	3	15/05/2018	16°C, no wind, no rain	4 male smooth newts	0	3 female smooth/palmate newt; 1 sex unknown newt of unidentified species	N/A	Tadpoles	<b>Porscha Thompson</b> and Lee Gwyther

Ditch number	Visit number	Survey date	Weather conditions	Bottle trapping	Egg search	Torch survey	Netting	Other species	Surveyors (licensed surveyors shown in bold)
Negative eDNA result confirmed 24/05/2018 – no further surveys required.									
D3	1	08/05/2018	19°C, no wind, no rain	N/A	N/A	0	N/A	Tadpoles	<b>Lucy Fay</b> and Lee Gwyther
	2	15/05/2018	16°C, no wind, no rain	N/A	N/A	0	N/A	Tadpoles	<b>Porscha Thompson</b> and Lee Gwyther
	3	22/05/2018	17°C, no wind, no rain	N/A	N/A	0	N/A	Tadpoles	<b>Sian Carr</b> and Daniel Jones
	4	04/06/2018	N/A	Ditch dry – no further surveys undertaken				-	<b>Porscha Thompson</b> and Daniel Jones

## APPENDIX F: Key Surveyor Pen Portraits

Table 7: Key surveyor pen portraits

Surveyor	CV details
Brandon Murray MCIEEM (Principal Ecological Consultant) BSc(hons)	Brandon has been a professional ecologist for over nine years and has undertaken multiple Phase 1 habitat surveys and Hedgerow Assessments. Brandon has planned and led surveys for many species including badgers, bats, GCN (Great Crested Newts Licence number 2015-17257-CLS-CLS) water voles and reptiles and is very confident in assessing habitats for their protected species suitability.
Porscha Thompson ACIEEM (Graduate Ecologist) MSc BSc (Hons)	Porscha has experience in assessing sites for potential ecological impacts and is able to provide appropriate recommendations and mitigation in order to reduce potential impacts. Porscha has experience in undertaking a range of protected species surveys including bats, great crested newts (GCN, licence number 2017-31863-CLS-CLS), dormice, reptiles and badger surveys, phase 1 habitat surveys and ecological clerk of works and has a keen interest in botany. She also has strong report writing, desk study and coordination skills. She currently holds a Class 1 Natural England GCN licence, is an accredited agent of a Natural Resources Wales GCN licence and bat licence.
Siân Carr MCIEEM (Senior Ecologist) PhD BSc (Hons)	Siân has over 10 years' experience as an ecological consultant working on both public and private sector projects of various scales. These roles have provided her with a wide range of technical experience, and a thorough understanding of environmental legislation and excellent organisational skills. She has expertise in a range of species surveys, including great crested newts (Class Licence Number 2015-18807-CLS-CLS and produced numerous technical reports, including habitat assessments, species specific reports including mitigation strategies and method statements
Kailey O'Brien (Graduate Ecologist) BSc, MSc GradCIEEM	Kailey has been a professional ecologist for 2 years and has assisted on surveys within consultancy and through volunteering.
Liam Price (GradCIEEM) MBiol	Liam has worked on the ecological inputs of large infrastructure projects for the transport, commercial, utilities and residential sectors. These works largely involved species and habitat surveys and protected species mitigation, including translocations. Liam has experience both supporting others in technical ecological surveying and carrying them out independently. Liam has undertaken surveys for: great crested newt, reptiles, water voles, otters, bats and badgers Liam has worked as an accredited agent on a great crested newt EPS development licence.
Julie Player ACIEEM (Ecologist) BSc (Hons)	Julie has 6 years' experience as an ecological consultant working on both public and private sector projects. Julie

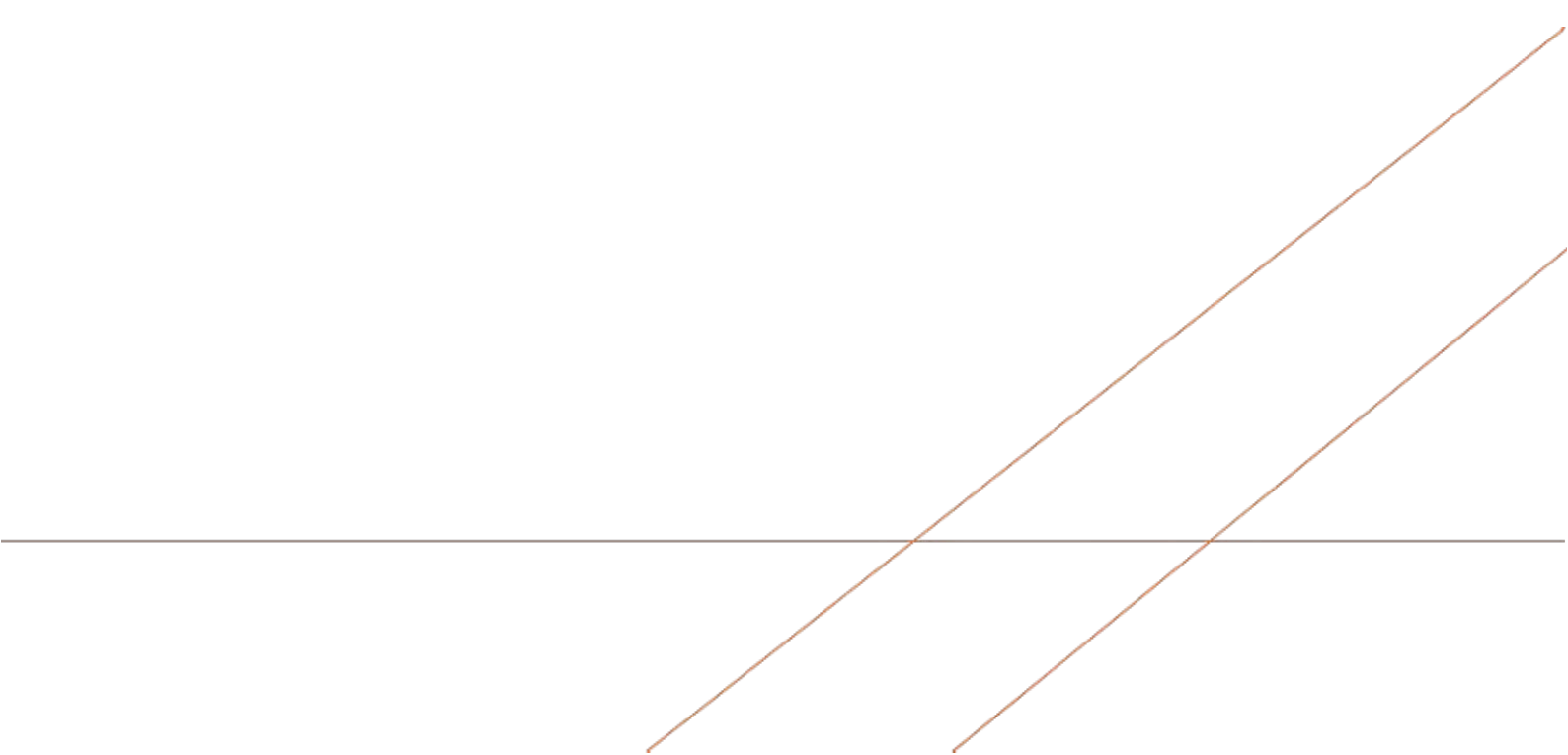
Surveyor	CV details
	<p>has significant experience of undertaking surveys for protected species. These roles have provided her with a wide range of technical experience, has significant experience in undertaking surveys for protected species, a thorough understanding of environmental legislation, Ecological and Environmental Clerk of Works and excellent organisation skills. Julie is experienced in producing technical reports, including habitat assessments, species specific reports including mitigation strategies, method statements and species licenses.</p>

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# APPENDIX 8.13: LAND WEST OF IFIELD – REPTILE SURVEY REPORT

Intended for  
**Turner & Townsend plc. on behalf of Homes England**

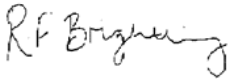

Date  
**November 2022**

Project Number  
**1620007949**

# **LAND WEST OF IFIELD** **REPTILE SURVEY REPORT**

# LAND WEST OF IFIELD REPTILE SURVEY REPORT

Project No. **1620007949**  
Issue No. **1**  
Date **November 2022**  
Made by **Rebecca Brightling**  
Checked by **Laura Sanderson**  
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## APPENDICES

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# 1. INTRODUCTION

## 1.1 Background

Ramboll UK Limited ('Ramboll') was commissioned by Turner & Townsend plc on behalf of Homes England (the 'Client'), to carry out a series of reptile surveys in relation to the proposed development plans for the Land West of Ifield, Ifield, West Sussex (the 'site', as illustrated in Figure 1, Appendix 1). This report presents the findings of the reptile surveys carried out by Ramboll ecologists between April and August 2022 across the entirety of the site (not including the off-site Ifield Brook Wood and Meadows local wildlife site that has been previously surveyed).

Reptile surveys were previously undertaken by Arcadis Consulting Ltd (Arcadis) from April to June 2019 at the site. Results from the 2019 survey report<sup>1</sup> detailed that three reptile species were recorded: slow worms *Anguis fragilis*, grass snakes *Natrix natrix*, and common lizards *Lacerta vivipara*. Due to the time elapsed since these surveys were completed, update surveys were required of the site. The 2019 surveys also included the Ifield Brook Wood and Meadows local wildlife site to the east of the site, which was previously proposed to comprise the proposed development area, however this area is no longer part of the proposed redline boundary (other than a potential cycle / pedestrian route crossing this area in one location).

In May and June 2020, reptile surveys were undertaken in the northern section of the site in the area now known as Pastoral fields (Area 1) (previously known as 'Area D' by Arcadis) by Ramboll. This area was not surveyed previously by Arcadis due to access constraints.

For the purposes of reptile surveying, the site has been split up into three geographical sections. These are:

1. Golf Course (approx. central grid reference: TQ 23679 36673);
2. Pastoral (Area 1) and Arable fields (Area 2) (approx. central grid reference: TQ 24331 37818); and
3. Thrifts Yard, Welbeck and Rydon (approx. central grid reference: TQ 23683 37199).

Figure 1 (found in Appendix 1) shows the location of these areas within the proposed redline boundary of the site at the time of writing.

## 1.2 Proposed Development

At the time of writing the proposed development would comprise: 3,000 new residential units with associated infrastructure; space for employment, retail, community uses and landscaping; and access arrangements. Further details regarding the proposed development will be determined in due course and may be subject to revision.

## 1.3 Objectives

The content of this report is based on the findings of presence/ likely absence surveys for reptiles at the site.

The specific objectives of this report are to:

- determine the presence/ likely absence of reptiles on the site; and
- where reptiles are present, determine the size class of the population and their spatial use of the site.

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<sup>1</sup> Arcadis (October 2019). Land west of Ifield – Reptile Survey Report. Report reference: WOI-AUK-XX-WS-RP-EC-0006-01-Reptile Survey Report.

This report presents factual baseline information on the findings of the survey. This report is intended to inform masterplanning and design and will form part of the baseline information used to support the Environmental Impact Assessment of the Land West of Ifield planning application.

The report is supported by the following appendices:

- Appendix 1: Figures; and
- Appendix 2: Legislation and Policy Context.

The structure and content of this report is based on current ecological report writing guidance (CIEEM, 2017<sup>2</sup>).

#### **1.4 Legislation and Policy Framework**

Various legislation and planning policies refer to the protection of wildlife. Reptiles (including slow worms, grass snakes and common lizards) are afforded legal protection under section 9 of the Wildlife and Countryside Act 1981 (as amended). These are summarised in Appendix 2 but should not be regarded as a definitive legal opinion. When dealing with individual cases, the full texts of the relevant documents should be consulted, and legal advice obtained if necessary.

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<sup>2</sup> CIEEM (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.

## 2. SURVEY METHODOLOGY

### 2.1 Reptile Survey

A series of surveys were undertaken to determine the presence/ likely absence of reptiles on the site.

Approximately 350 artificial refugia (felt and corrugated metal sheets) were placed between March and April 2022, around the site in habitats offering the best suitability for reptiles. Largely habitat margins and boundaries, and along the fairways on the Golf Course where there are pockets of vegetation.

The approximate sizes of both felt sheet and corrugated metal sheet refugia were 0.5m x 0.5m. Typically, the corrugated metal sheets were deployed in areas where livestock were commonly present in the Pastoral fields (Area 1), as felt mats were more likely to be damaged or eaten by livestock.

After a period of two weeks, during which time the refugia were left to settle into the short grass, they were checked for reptile presence on seven separate occasions between 12<sup>th</sup> April 2022 and 14<sup>th</sup> September 2022 (detailed in Tables 3.1, 3.2 and 3.3), during optimal weather conditions and in accordance with best practice guidance<sup>3 4</sup>. The refuges were approached slowly and carefully by experienced ecologists in order to minimise disturbance to any reptiles on top or beneath the refugia and to maximise potential observations.

Any reptiles, if found, were identified to species level and, where possible, an approximate age category and sex was determined. The locations where reptiles were found was recorded to determine the general usage of the site by reptiles.

The population of individual species was assessed against the Froglife<sup>5,6</sup> guidance as: **low** (<5), **good** (5-10 for slow worms and grass snakes; 5-20 for common lizards) and **exceptional** (>10 for slow worms and grass snakes; >20 for common lizards).

The reptile surveys were undertaken by the following Ramboll ecologists: James Cunningham, James Hrynkiwicz, Rebecca Brightling and Bianca Burton.

### 2.2 Limitations

The reptile surveys took place between April and August 2022. In summer 2022, the UK experienced a heatwave, with record-breaking high temperatures; therefore, some of the reptile surveys were undertaken at the appropriate time of year but during sub-optimal weather conditions. According to the Froglife Survey Guide<sup>7</sup> the optimal air temperature conditions for reptile surveys are between 9°C and 20°C. On some of the visits to the site, between May and August, the air temperature was at the upper end of this range, and on some occasions exceeding the optimal range during part of the survey by 1-3°C. Where possible, surveys were commenced early in the morning to avoid high temperatures. However, this was not considered to be a major limitation as reptiles were recorded in relatively consistent numbers throughout the surveys. Due to the size of the site, some survey visits were undertaken over several days and therefore weather conditions were not always consistent throughout the survey.

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<sup>3</sup> Froglife (1999). Reptile Survey an Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

<sup>4</sup> Sewell, D., Griffiths, R.A., Beebee, T.J.C., Foster, J. and Wilkinson, J.W. (2013). Survey protocols for the British herpetofauna. Version 1. ARG Trust, University of Kent, University of Sussex.

<sup>5</sup> Froglife. (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

<sup>6</sup> Froglife (1999). Froglife Advice Sheet 10: Reptile Survey (1999), [online]. [Accessed 15 May 2018]. Available from: [http://www.froglife.org/wp-content/uploads/2014/01/FAS\\_10.pdf](http://www.froglife.org/wp-content/uploads/2014/01/FAS_10.pdf)

<sup>7</sup> Draper, A. (2015). Surveying for reptiles: tips, techniques and skills to help you survey for reptiles. Froglife.

The Pastoral fields (Area 1) in the northern section of the site had livestock present during some of the surveys, including cattle with young calves. For safety reasons, some parts of these fields could not be accessed whilst livestock were present. Where possible surveys were undertaken when cattle were not in certain fields. The full seven surveys were undertaken and often the livestock were moved between different fields over the series of surveys to allow the completion of the full surveys.

Over the course of the surveys, approximately 50 reptile refugia sheets were lost or damaged due to a combination of site management activities (grass cutting of Thrift's Yard and Welbeck areas between surveys 4 and 5), excessive vegetation growth, and public interference (particularly along the north and east sides of the arable fields along the public footpath that is popular with dog walkers). To compensate for this, additional refugia mats were deployed in these areas and left for two weeks to settle before surveying.

Reptile activity levels are liable to fluctuate seasonally and/or in response to other environmental factors, such as heat waves and periods of drought. As with any ecological study, the reptile surveys provide only a 'snapshot' of the conditions on the site prevailing at the time of survey.

This report has been prepared for the Client and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

Ramboll is satisfied that this report represents a robust appraisal of the site for the purpose of a reptile survey. If no action or development has taken place on this land within twenty-four months of the review date of this report, the findings of this survey should be reviewed by a suitably qualified ecologist and may need to be updated.

## 3. RESULTS

### 3.1 Introduction

During these ecological assessments, populations of slow worms, grass snakes and common lizards were identified. Figure 2 (found in Appendix 1) shows the locations of all recorded reptiles.

### 3.2 Presence/Absence Reptile Surveys of the Golf Course

#### 3.2.1 Survey Conditions

The weather conditions during the surveys at the Golf Course are shown in Table 3.1. Temperatures varied between 12°C and 21°C, and cloud cover ranged from 20% to 100%. All surveys were started in suitable weather conditions (temperatures 9°C to 20°C).

**Table 3.1: Survey Conditions of Reptile Surveys at the Golf Course**

Visit	Date	Time (24hr)	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
1	13/04/2022	9:22 to 13:05	12 to 16	100 to 90	0 to 1	0	90 to 70
2	10/05/2022	9:03 to 11:47	13 to 16	75 to 100	3 to 1	0	79 to 66
3	18/05/2022	13:00 to 15:32	21 to 20	20 to 30	1	0	49 to 45
4	26/05/2022	9:02 to 14:48	15 to 18	100	1	0	77 to 67
5	29/06/2022	9:26 to 16:08	16 to 19	75 to 50	2 to 1	0	68 to 51
6	06/07/2022	9:40 to 12:50	18 to 21	100 to 90	1 to 2	0	68 to 59
7	14/09/2022	14:06 to 16:15	18 to 19	50 to 30	0	0	75 to 62

#### 3.2.2 Findings

Table 3.2 shows the results of the surveys at the Golf Course. The peak count of individuals found was on 26<sup>th</sup> May 2022, where a total of 16 adult reptiles were found. This indicates that overall the Golf Course has a **good** population of reptiles.

A peak count of 12 adult slow worms was recorded, on 26<sup>th</sup> May 2022. This indicates that the Golf Course has a **good** population of slow worms. A high concentration of slow worms was found along the northern and southern boundaries of the Golf Course. The slow worms at the Golf Course were found along the site boundaries and between the cut fairways in the longer grassy vegetation.

A peak count of two adult grass snakes was recorded on 28<sup>th</sup> June 2022. This indicates that the Golf Course has a **low** population of grass snakes. Recordings of grass snakes were sporadic across the Golf Course, with a small cluster of individuals in the north-west of the site. All grass snake records are within 50 m of a pond or stream.

A peak number of eight adult common lizards was recorded on 10<sup>th</sup> May 2022. This indicates that the Golf Course has a **good** population of common lizards. Recordings of common lizards were concentrated in the south of the Golf Course along the perimeter of an island of vegetation between fairways and along the southern boundary.

**Table 3.2: Findings from the Reptile Surveys at the Golf Course**

Visit	Date	Reptile Species Recorded (x/√)		
		Slow Worm	Grass Snake	Common Lizard
1	13/04/2022	<b>6 Adult</b> 2 Juvenile	x	<b>2 Adult</b>
2	10/05/2022	<b>6 Adult</b> 7 Juvenile	<b>1 Adult</b>	<b>8 Adult</b> 2 Juvenile
3	18/05/2022	<b>1 Adult</b> 1 Juvenile	<b>1 Adult</b> 2 Juvenile	<b>1 Adult</b>
4	26/05/2022	<b>12 Adult</b> 8 Juvenile	<b>1 Adult</b> 1 Juvenile	<b>3 Adult</b>
5	28/06/2022	<b>2 Adults</b> 2 Juveniles	<b>2 Adults</b>	x
6	06/07/2022	<b>6 Adults</b> 7 Juvenile	2 Juvenile	<b>1 Adult</b>
7	14/09/2022	<b>4 Adults</b> 3 Juvenile	<b>1 Adult</b>	<b>2 Adults</b>

### 3.3 Presence/Absence Reptile Surveys of Pastoral (Area 1) and Arable Fields (Area 2)

#### 3.3.1 Survey Conditions

The weather conditions during the surveys at the Pastoral (Area 1) and Arable fields (Area 2) are shown in Table 3.3. Temperatures varied between 10°C and 23°C, and the range of cloud cover ranged from 0% to 100%. All surveys were started in suitable weather conditions (temperatures 9°C to 20°C). As explained in Section 2.2, due to consistently high temperatures in July and August survey visits 6 and 7 were still deemed acceptable.

**Table 3.3: Survey Conditions of Reptile Surveys at the Pastoral (Area 1) and Arable Fields (Area 2)**

Visit	Date	Time (24hr)	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
<b>1</b>	12/04/2022	7:54 to 13:05	11 to 17	85 to 70	1	0	81
<b>2</b>	27/04/2022	11:37 to 15:00	10 to 11	90 to 100	3 to 2	0	63 to 59
<b>3</b>	09/05/2022	11:50 to 14:51	19 to 11	57 to 59	2	0	60 to 100
	10/05/2022	9:11 to 14:51	14 to 11	100	2	0 to light rain	70 to 80
<b>4</b>	24/05/2022	12:43 to 14:06	14 to 20	40 to 50	2 to 1	V. light drizzle	66 to 67
	25/05/2022	9:12 to 16:14	13 to 15	100	3 to 1	0	64 to 67
	26/05/2022	9:02 to 14:48	15 to 18	100	1	0	77 to 67
<b>5</b>	28/06/2022	9:26 to 16:08	16 to 19	75 to 50	1	0	68 to 51
	29/06/2022	12:21 to 16:12	16 to 18	100	1	0	90 to 64
<b>6</b>	05/07/2022	10:35 to 12:45	20 to 21	20 to 100	2	0	49 to 50

Visit	Date	Time (24hr)	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
7	10/08/2022	7:22 to 9:11	15 to 21	5 to 0	1	0	15 to 76
	11/08/2022	7:20 to 9:00	14 to 23	0	2 to 1	0	99 to 62
	31/08/2022	8:00 to 12:30	16 to 22	15 to 10	3 to 1	0	81 to 58

### 3.3.2 Findings

Table 3.4 shows the results of the surveys at the Pastoral (Area 1) and Arable fields (Area 2). The peak count of individuals was on survey 5, on the 28<sup>th</sup> to 29<sup>th</sup> June 2022, where a total of five adult reptiles were found. This indicates that overall, the pastoral and arable fields have a **good** population of reptiles.

The peak count of adult slow worms recorded in any one survey was four, recorded on visit 5 on 28<sup>th</sup> and 29<sup>th</sup> May 2022. This indicates that the pastoral and arable fields have a **low** population of slow worms. The distribution of recordings of slow worms showed more were recorded along the boundaries in the arable fields (area 2), particularly in the southern half. Along these boundaries vegetation was made up of long grass and tall ruderals.

A peak count of one individual adult grass snake was recorded during the surveys at the Pastoral fields (Area 1) and Arable fields (Area 2), on visits 3 (9<sup>th</sup> May), 4 (24<sup>th</sup> May), 5 (28<sup>th</sup> June), 6 (5<sup>th</sup> July) and 7 (10<sup>th</sup> August). This indicates that the Pastoral (Area 1) and Arable fields (Area 2) has a **low** population of grass snakes. Recordings of grass snakes showed that more were recorded in the Pastoral fields (Area 1), in particular in the small north-western field near a pond. All grass snakes found on the Pastoral (Area 1) and Arable fields (Area 2) were found within 50 m of the River Mole that runs along the boundary between the Pastoral field (Area 1) and Arable field (Area 2), and Ifield Brook and Ifield Mill Stream running along the eastern boundary in the Ifield Conservation Area.

No common lizards were recorded in the pastoral and arable fields.

**Table 3.4: Findings from the reptile surveys at the Pastoral (Area 1) and Arable Fields (Area 2)**

Visit	Date	Reptile Species Recorded (x/√)		
		Slow worm	Grass Snake	Common Lizard
1	12/04/2022	1 Juvenile	x	x
2	27/04/2022	3 Adults 1 Juvenile	1 Juvenile	x
3	09/05/2022	2 Juvenile	1 Adult 1 Juvenile	x
	10/05/2022	3 Adult 2 Juvenile	√	x
4	24/05/2022	x	1 Adult 1 Juvenile	x
	25/05/2022	1 Adult 1 Juvenile	1 Juvenile	x
	26/05/2022	2 Adults 2 Juvenile	x	x

Visit	Date	Reptile Species Recorded (x/√)		
		Slow worm	Grass Snake	Common Lizard
5	28/06/2022	2 Adults	1 Adult 1 Juvenile	x
	29/06/2022	2 Adults	1 Juvenile	x
6	05/07/2022	2 Adults 1 Juvenile	1 Adult	x
7	10/08/2022	x	1 Adult	x
	11/08/2022	x	x	x
	31/08/2022	x	x	x

### 3.4 Presence/Absence Reptile Surveys of Thrift's Yard, Welbeck and Rydon

#### 3.4.1 Survey Conditions

The weather conditions during the surveys at Thrift's Yard, Welbeck and Rydon are shown in Table 3.5. Temperatures varied between 13°C and 23°C; the range of cloud cover from 0% to 100%. All surveys were started in suitable conditions (9°C to 20°C). As explained in Section 2.2, due to consistently high temperatures in July and August survey visit 7 at Thrift's Yard, Welbeck and Rydon was still deemed acceptable.

**Table 3.5: Survey conditions of reptile surveys at Thrift's Yard, Welbeck and Rydon**

Visit	Date	Time (24hr)	Temperature (°C)	% Cloud Cover	Wind Speed	Precipitation	Humidity (%)
1	11/05/2022	9:03 to 11:47	13 to 16	75 to 100	3 to 1	0	79 to 66
2	18/05/2022	10:49 to 12:10	18 to 19	20 to 30	1	0	69 to 57
3	25/05/2022	9:12 to 16:14	13 to 15	100	3 to 1	Very light rain to 0	64 to 67
4	29/06/2022	12:21 to 16:12	16 to 18	100	1	0	90 to 64
5	07/07/2022	9:15 to 11:40	18 to 19	100	2 to 1	0	67 to 60
6	09/08/2022	6:45 to 7:18	13 to 15	-	0	0	94
7	11/08/2022	7:20 to 9:00	14 to 23	0	2 to 1	0	99 to 62

#### 3.4.2 Findings

Table 3.6 shows the results the series of surveys at Thrift's Yard, Welbeck and Rydon. The peak survey was on 11<sup>th</sup> May 2022 where a total of two adult reptiles were found; this indicates that overall the Thrift's Yard, Welbeck and Rydon have a **low** population of reptiles.

Over the course of the surveys, a peak count of two adult slow worms was recorded on visit 1 on 11<sup>th</sup> May 2022. This indicates that the Thrift's Yard, Welbeck and Rydon has a **low** population of slow worms. Slow worms were only recorded on the first survey along the field boundary hedge in grassy vegetation.

A peak number of one adult grass snake was recorded at Thrift's Yard, Welbeck and Rydon on visits 2 (18<sup>th</sup> May), 3 (25<sup>th</sup> May), 4 (29<sup>th</sup> June) and 5 (7<sup>th</sup> July). This indicates that the Thrift's Yard, Welbeck and Rydon have a **low** population of grass snakes. Repeated recordings of grass snakes were most often recorded along the northern boundaries of the fields at Thrift's Yard, within 50 m of the River Mole.

No common lizards were recorded at Thrift's Yard, Welbeck and Rydon; therefore deemed **negligible** in these areas.

**Table 3.6: Findings from the reptile surveys at Thrift's Yard, Welbeck and Rydon**

Visit	Date	Reptile Species Recorded (x/√)			Peak Result
		Slow worm	Grass Snake	Common Lizard	
1	11/05/2022	<b>2 Adult</b>	x	x	Total of <b>2</b> reptile adults
2	18/05/2022	x	<b>1 Adult</b>	x	
3	25/05/2022	x	<b>1 Adult</b> <i>2 Juvenile</i>	x	
4	29/06/2022	x	<b>1 Adult</b>	x	
5	07/07/2022	x	<b>1 Adult</b> <i>1 Juvenile</i>	x	
6	09/08/2022	x	x	x	
7	11/08/2022	x	x	x	

### 3.5 Summary

Two reptile species (slow worms and grass snakes) were recorded across all survey areas of the West of Ifield site, whilst common lizards were only recorded within the southern section of the Golf Course.

Slow worms were frequently recorded along the northern and southern boundaries of the Golf Course and in the southern half of the Arable fields (Area 2). Few slow worms were recorded in Thrift's Yard, Welbeck and Rydon and in the Pastoral fields (Area 1). Typically, slow worms were recorded along field margins and boundaries in long grass and ruderal vegetation.

Grass snakes were sporadically recorded across the site, however recurring sightings were recorded along the northern boundaries of the fields at Thrift's Yard and in the north-west of the Golf Course and in a small field west of the Pastoral fields (Area 1). Sightings of grass snakes were associated with areas in close proximity to watercourses (streams and rivers) and ponds.

The numbers recorded are representative of a larger population in the area.

**Table 3.7: Summary of Reptile Populations of the West of Ifield Site**

Site	Overall Reptile Population Size	Reptile Species population size		
		Slow Worm	Grass Snake	Common Lizard
Golf Course	<b>Good</b>	<b>Good</b>	<b>Low</b>	<b>Good</b>
Pastoral and Arable Fields (Areas 1 and 2)	<b>Good</b>	<b>Low</b>	<b>Low</b>	<b>Negligible</b>
Thrift's Yard, Welbeck and Rydon	<b>Low</b>	<b>Low</b>	<b>Low</b>	<b>Negligible</b>

## 4. CONCLUSIONS

### 4.1 Conclusions

#### *Summary of Findings/ Population Size of Site*

Ramboll undertook seven reptile survey visits of the site between April and September 2022. Three reptile species were recorded during these visits: slow worms, grass snakes and common lizards. Slow worms and grass snakes were found in all three sections of the West of Ifield site, whilst common lizards were only recorded in the southern section of the Golf Course.

Appropriate recommendations for mitigation and enhancement (where applicable) will be determined in due course once development proposals are finalised and included in separate documentation. The proposed planning application will be supported by an Environmental Statement which will include a chapter on biodiversity and outline appropriate recommendations for reptiles.

## **APPENDIX 1 FIGURES**