

# A358 Taunton to Southfields Dualling Scheme

## Ecological Baseline Report - Terrestrial Invertebrates

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## Executive summary

The A358 Taunton to Southfields Dualling scheme would provide a dual carriageway along the length of the A358 between Taunton and Ilminster in Somerset, connecting the M5 motorway to the A303 at Ilminster to the south.

Terrestrial invertebrate surveys were part of the suite of habitat and protected species surveys commissioned in relation to the scheme. This report presents the results of the terrestrial invertebrate surveys undertaken in 2021 and aims to inform the ecology baseline for the scheme.

The desk study data search of information provided by the Somerset Environmental Records Centre (SERC) returned records of 52 notable terrestrial invertebrate species from within the 2 kilometre search area. A review of surveys carried out in 2017 and 2019 provided records of four notable species from site 9: the cinnabar moth (*Tyria jacobaeae*), which is a Species of Principal Importance (SPI), nationally scarce picture-winged fly (*Acanthiophilus helianthii*), nationally scarce mining bee *Lasioglossum pauxillum* and nationally scarce brown-banded carder bee (*Bombus humilis*), which is also a SPI; and two notable species from site 12: the cinnabar moth and the nationally scarce mining bee *Lasioglossum pauxillum*.

The scoping survey undertaken in 2021 recorded no significant change in the status of the habitats within previously surveyed sites (as identified within the desk study review). Subsequent access was granted to land within the Hatch Park Estate, Hatch Beauchamp, that had not previously been surveyed. Due to the presence of potentially suitable habitats, identified through aerial mapping, this land was also subject to a scoping exercise in June 2021. This survey identified that two areas within the previously inaccessible land (site 14 and site 15) also contained habitat suitable to support notable invertebrates and these areas were therefore scoped in to the 2021 suite of terrestrial invertebrate surveys.

The terrestrial invertebrate surveys were carried out in June and August 2021. No nationally scarce species of terrestrial invertebrate were recorded from sites 6, 7, 11 or 13. Two nationally scarce species were recorded in each of sites 8, 9, 12, 14 and 15. Species recorded include the cinnabar moth, a eumenid wasp *Gymnomerus laevipes*, mining bees *Andrena labialis* and *Lasioglossum pauxillum*, a nomad bee *Nomada flavopicta* and a soldier beetle *Cantharis fusca*.

The results show that none of the sites surveyed are of major entomological importance, with several sites supporting no notable species. The sites with most species interest were site 9 and site 14, but even these are only considered to be of limited value at a local level.

# 1 Introduction

## 1.1 Purpose and scope of this document

- 1.1.1 The A358 Taunton to Southfields Dualling scheme (hereafter referred to as ‘the scheme’) would provide a dual carriageway along the length of the A358 between Taunton and Ilminster in Somerset, connecting the M5 motorway at Junction 25 to the A303 at Ilminster to the south. Terrestrial invertebrate surveys were part of the suite of habitat and protected species surveys commissioned in relation to the scheme.
- 1.1.2 This report presents the results of the terrestrial invertebrate surveys undertaken and aims to inform the ecology baseline for the scheme.
- 1.1.3 The objectives of this report are to:
- present the findings of the terrestrial invertebrate surveys
  - provide a qualitative assessment of the value of habitats for notable invertebrate species
  - provide sufficient information to inform an assessment of the potential impacts to terrestrial invertebrates as a result of the scheme and design appropriate mitigation measures (where required)

## 1.2 Scheme overview

- 1.2.1 The scheme is part of a programme of improvements planned along the A303/A358 corridor aimed at improving connectivity between London, the south-east and the south-west. The A303, alongside the A30, forms part of the strategic road network (SRN) and together with the A358, provides the link between London, the south-east and the south-west.
- 1.2.2 The programme of improvements, as set out in the *Government’s Road Investment Strategy* [1] made a commitment to, “...upgrade all remaining sections of the A303 between the M3 and the A358 to dual carriageway standard, together with creating a dual carriageway link from M5 at Taunton to the A303”.
- 1.2.3 The scheme directly addresses this long-term commitment and would provide a new rural all-purpose dual carriageway link from the M5 at Taunton to the A303 at Southfields roundabout. The new dual carriageway would comprise new and upgraded stretches of the existing A358 road. Full details of the scheme will be provided in Chapter 2 *The Project* of the Environmental Statement (ES). Please refer to Figure 1-1 for scheme plan.

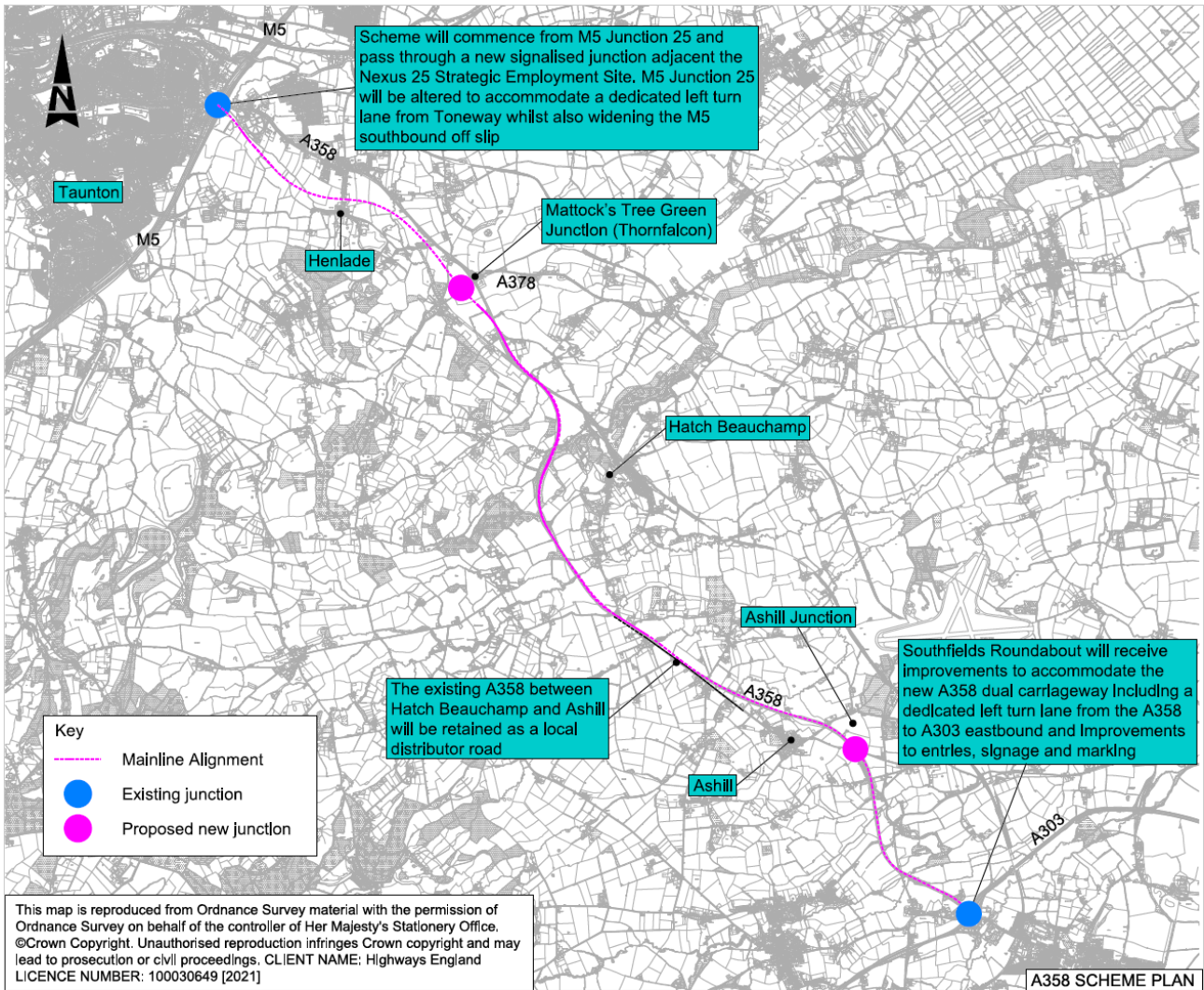


Figure 1-1 Scheme plan

### 1.3 Study area and zone of influence

1.3.1 The Chartered Institute for Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment* [2] recommend that all potentially important ecological features that occur within the Zone of Influence (Zol) for a scheme are investigated. The Zol includes:

- areas to be directly within the land take for the scheme
- areas that would be temporarily affected during construction
- areas likely to be impacted by hydrological disruption
- areas where there is a risk of pollution and noise disturbance during construction and/or operation

1.3.2 The Zol depends on the ecological features concerned. With regard to the terrestrial invertebrate habitats likely to be affected by the scheme, the Zol has been defined as land within 100 metres of the defined ecology survey zone, which comprises the footprint of the scheme and associated site clearance area. This Zol is hereafter referred to as the study area.

## 1.4 Legislation

1.4.1 A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This legislation will be listed in full within Chapter 8 *Biodiversity* of the ES. Legislation relevant to and discussed within this report is detailed below:

- Natural Environment and Rural Communities (NERC) Act 2006.

## 1.5 Status of terrestrial invertebrates at national level

1.5.1 Species of terrestrial invertebrate which would be considered important at the national level include those listed in the following:

- Species of Principal Importance (SPI) listed in accordance with Section 41 of the NERC Act 2006.
- The 2021 IUCN Red List of Threatened Species [3] classifies species at high risk of global extinction into nine categories ranging from Least Concern to Extinct. Species listed as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Near Threatened (NT) are considered to be notable species for the purpose of this assessment.
- Where the 2021 IUCN Red List of Threatened Species cannot be used, as the species has not been classified in recent years, the 1994 IUCN Red List of Threatened Animals [4] has been referred to. This classifies species as follows:
  - Extinct
  - Endangered (RDB 1)
  - Vulnerable (RDB 2)
  - Rare (RDB 3)
  - Insufficiently Known (RDB K)
  - Indeterminate (RDB I)
  - Notable A (Na)
  - Notable B (Nb)
  - Notable – Notable or Nationally Scarce
  - Unknown
  - None (Not rare or scarce)
  - Not reviewed (the taxon was not assessed for rarity in the review)
  - New to Britain (recently added to the British list and not yet reviewed)
  - Not native
- Nationally rare or scarce species which do not fall within the IUCN Red List categories, but are still uncommon in Great Britain. The following rare or scarce species are considered within the assessment:
  - Nationally rare (occurring in 15 or fewer 10-kilometre squares in Britain).
  - Nationally scarce (occurring in between 16 to 100 10-kilometre squares in Britain).
  - Nationally notable (N) (thought to occur within the range of between 16 to 100 10-kilometre squares or, for less-well recorded groups less than twenty vice-counties).
  - Nationally notable A (Na) (estimated to occur within 16-30 10-kilometre squares of the National Grid system).

- Nationally notable B (Nb) (estimated to occur within 31-100 10-kilometre squares of the National Grid system).

## 1.6 Status of terrestrial invertebrates at county level

1.6.1 The Taunton Deane Local Biodiversity Action Plan [5] lists pauper pug moth (*Eupithecia egenaria*), white letter hairstreak (*Satyrrium w-album*) as Local Biodiversity Action Plan (LBAP) species associated with woodland, and wood white (*Leptidea sinapis*) as a LBAP species, associated with woodland with ditches and/or streams with flowing water. Wood white now has a very restricted range within Somerset [5].

1.6.2 A species, population or assemblage of terrestrial invertebrate may be of importance at the county level if it meets the following criteria (as defined for Local Wildlife Site (LWS) status in accordance with Somerset Environmental Records Centre (SERC) [6]): the site contains  $\geq 2$  nationally scarce, or  $\geq 3$  Somerset Notable species or Somerset Priority species, or the site has veteran trees with a saproxylic invertebrate ecological index of continuity  $>15$ .

## 1.7 Species-specific ecology

1.7.1 There are an estimated 30,000 terrestrial invertebrate species in the UK alone [7]. These species are a major component of terrestrial ecology and are the foundation of most ecosystem services. Terrestrial invertebrates exist in all habitats, but certain habitat types are of very high value and should be considered in survey plans. These include semi-natural vegetation, wetland, coastal areas, open mosaics and previously developed brownfield land [8].



## 2 Methodology

### 2.1 Desk study

- 2.1.1 A detailed biological records search was requested from SERC in February 2021. This was used to identify records of notable terrestrial invertebrates (records from 2011 onwards) within a 2 kilometre radius of the scheme.
- 2.1.2 The A358 Taunton to Southfields Dualling Terrestrial Invertebrate Technical Report (March 2021) [9] was also reviewed for previously surveyed sites and records of terrestrial invertebrates.

### 2.2 Scoping survey

- 2.2.1 The scoping survey involved a walkover survey of the sites previously surveyed in 2017 and 2019 [9] that lie within 100 metres of the scheme (sites 6, 7, 8, 9, 11 and 12) to determine if there had been any significant change in the status of the habitats present. This scoping survey was undertaken on 26 May 2021.
- 2.2.2 Subsequently access was granted to the Hatch Park Estate in Hatch Beauchamp. Due to the presence of potentially suitable habitats, identified through aerial mapping, this land was also subject to a scoping exercise undertaken on 30 June 2021. The purpose of this scoping survey was to determine whether the habitats present were suitable to support notable terrestrial invertebrates based on habitat structure and diversity and whether these were likely to provide habitat for diverse communities of invertebrates or were likely to support scarce species.

### 2.3 Terrestrial invertebrate survey

- 2.3.1 Survey methods involved visual searching of nectaring sites and basking areas, the use of a sweep net and pooter to capture individual species, sweeping vegetation, beating foliage and grubbing. This range of techniques allowed the sampling of a range of species with different habits from the groups selected for survey. These groups were Lepidoptera (butterflies and moths), Diptera (true flies), Hymenoptera (bees, wasps, ants and relatives) and Coleoptera (beetles). Specimens of some of the more critical/difficult groups to identify were taken in a pooter and identified in the laboratory under the microscope with the aid of specialist keys. All survey work and reporting was undertaken in accordance with best practice guidance [8].
- 2.3.2 Details of each visit are provided in Table 2-1.

**Table 2-1 Terrestrial invertebrate survey details**

Survey date	Areas surveyed	Weather conditions
3 June 2021	Sites 6, 7 and 8	17°C, sunny spells with a light breeze
4 June 2021	Sites 9, 11, 12 and 13	18°C, sunny with a very light breeze
30 June 2021	Sites 13, 14 and 15	22°C, sunny with a moderate breeze
26 August 2021	Sites 13, 14 and 15	22°C, sunny with a moderate breeze

- 2.3.3 The terrestrial invertebrate surveys (2019 and 2021) were undertaken by experienced entomologists Adam Wright and Simon Colenutt.
- 2.3.4 Simon Colenutt BSc (Hons) MCIEEM CEnv is widely experienced in invertebrate ecology and evaluation of communities. Groups covered include butterflies and

moths, hoverflies, robberflies and allies and grasshoppers and crickets. Simon completed an assessment of extensive invertebrate surveys aimed at compiling inventories and guiding management of National Trust properties on the Isle of Wight, and an English Nature survey for reddish-buff moth on the Isle of Wight.

- 2.3.5 Adam Wright is widely experienced in invertebrate ecology, having undertaken entomological surveys and assessments over a wide variety of habitat types. He has been contracted by English Nature to monitor the progress of field crickets and mole cricket on the Isle of Wight and has a wide range of experience in invertebrate surveying and monitoring.

## **2.4 Assumptions and limitations**

- 2.4.1 Due to a lack of access permission, visits to site 14 and site 15 did not commence until 30 June 2021, which means that species active earlier in the season would have been missed. Sites 14 and 15 contain much broad-leaved woodland and many scarce species associated with such habitats are early season species associated with spring flowering woodland ground flora; as a result, there is a high probability that rare and scarce species present at this time will have not been recorded. Early season surveys are due to be undertaken at sites 14 and 15 in May 2022 to further inform the assessment of terrestrial invertebrate populations within the study area as a whole, which will be reported in Chapter 8 *Biodiversity* of the ES.



## 3 Results

### 3.1 Desk study

3.1.1 The SERC data search returned records of 52 notable terrestrial invertebrate species from within a 2 kilometre radius of the scheme detailed in Table 3-1.

**Table 3-1 List of notable terrestrial invertebrate species recorded within 2 kilometres of the scheme**

Common name	Scientific name	Conservation status
Banded demoiselle	<i>Calopteryx splendens</i>	County notable
Beaded chestnut	<i>Agrochola lychnidis</i>	SPI, LBAP
Blood-vein	<i>Timandra comae</i>	SPI, LBAP
Brindled beauty	<i>Lycia hirtaria</i>	SPI, LBAP, county notable
Brindled green	<i>Dryobotodes eremita</i>	County notable
Brown argus	<i>Aricia agestis</i>	County notable
Brown hairstreak	<i>Thecla betulae</i>	SPI, red list, LBAP, county notable
Buff ermine	<i>Spilosoma lutea</i>	SPI, LBAP
Centre-barred sallow	<i>Atethmia centrigo</i>	SPI, LBAP
Common darter	<i>Sympetrum striolatum</i>	Red list
Dark-barred twin-spot carpet	<i>Xanthorhoe ferrugata</i>	SPI, LBAP
Deep-brown dart	<i>Aporophyla lutulenta</i>	SPI, LBAP
Demoiselle agrion	<i>Calopteryx virgo</i>	County notable
Dingy skipper	<i>Erynnis tages</i>	SPI, red list, LBAP, county notable
Dotted chestnut	<i>Conistra rubiginea</i>	County notable
Duke of Burgundy	<i>Hamearis lucina</i>	SPI, red list, LBAP, county notable
Dusky thorn	<i>Ennomos fuscantaria</i>	SPI, LBAP
Garden tiger	<i>Arctia caja</i>	SPI, LBAP
Ghost moth	<i>Hepialus humuli</i>	SPI, LBAP
Green-brindled crescent	<i>Allophyes oxyacanthae</i>	SPI, LBAP
Green hairstreak	<i>Callophrys rubi</i>	County notable
Grey dagger	<i>Acronicta psi</i>	SPI, LBAP
Grizzled skipper	<i>Pyrgus malvae</i>	SPI, red list, LBAP, county notable
Jersey tiger	<i>Euplagia quadripunctaria</i>	County notable
Knot grass	<i>Acronicta rumicis</i>	SPI, LBAP
Lackey	<i>Malacosoma neustria</i>	SPI, LBAP
Large nutmeg	<i>Apamea anceps</i>	SPI, LBAP
Large wainscot	<i>Rhizedra lutosa</i>	SPI, LBAP
Minor shoulder-knot	<i>Brachylomia viminalis</i>	SPI, LBAP
Mocha	<i>Cyclophora annularia</i>	County notable
Mottled rustic	<i>Caradrina morpheus</i>	SPI, LBAP
Mullein wave	<i>Scopula marginepunctata</i>	SPI, LBAP
Oak hook-tip	<i>Watsonalla binaria</i>	SPI, LBAP
Oak-tree pug	<i>Eupithecia dodoneata</i>	County notable
Pale eggar	<i>Trichiura crataegi</i>	SPI, LBAP
Pied grey	<i>Eudonia delunella</i>	County notable

Common name	Scientific name	Conservation status
Rosy rustic	<i>Hydraecia micacea</i>	SPI, LBAP
Ruddy streak	<i>Tachystola acroxantha</i>	County notable
Rustic	<i>Hoplodrina blanda</i>	SPI, LBAP
Scarce hawkler	<i>Aeshna mixta</i>	County notable
September thorn	<i>Ennomos erosaria</i>	SPI, LBAP
Shaded broad-bar	<i>Scotopteryx chenopodiata</i>	SPI, LBAP
Silver-washed fritillary	<i>Argynnis paphia</i>	County notable
Small eggar	<i>Eriogaster lanestris</i>	County notable
Small emerald	<i>Hemistola chrysoprasaria</i>	SPI, LBAP
Small heath	<i>Coenonympha pamphilus</i>	SPI, red list, LBAP
Small square-spot	<i>Diarsia rubi</i>	SPI, LBAP
Sprawler	<i>Asteroscopus sphinx</i>	SPI, LBAP
Square-spotted clay	<i>Xestia stigmatica</i>	County notable
Wall	<i>Lasiommata megera</i>	SPI, red list, LBAP
White ermine	<i>Spilosoma lubricipeda</i>	SPI, LBAP
White-letter hairstreak	<i>Satyrrium w-album</i>	SPI, red list, LBAP, county notable

3.1.2 No notable species of insect were recorded from sites 6,7,8,11 or 13 in 2017 or 2019 [9].

3.1.3 The following notable species were recorded on site 9 in 2017 and/or 2019:

- The cinnabar moth (*Tyria jacobaeae*) (SPI) recorded 2017 and 2019.
- Picture-winged fly (*Acanthiophilus helianthii*) (nationally scarce) recorded in 2017.
- Brown-banded carder bee (*Bombus humilis*) (SPI and nationally scarce) recorded in 2019.
- A mining bee *Lasioglossum pauxillum* (nationally scarce) recorded in 2017 and 2019.

3.1.4 The cinnabar moth and *Lasioglossum pauxillum* were recorded from site 12 in 2019 and 2017 respectively.

3.1.5 Full details of the 2017/2019 surveys are presented in the *A358 Taunton to Southfields Dualling Terrestrial Invertebrate Technical Report (March 2021)* [9].

## 3.2 Scoping survey

3.2.1 The scoping survey confirmed that the habitats at sites previously surveyed in 2019 had not changed significantly since the previous survey. In addition, the scoping survey identified that two areas within previously inaccessible land (site 14 and site 15) also support habitat suitable to support notable invertebrates. Both of these sites comprise broad-leaved woodland supporting a good diversity of mature tree and shrub species, much dead wood and a diverse ground flora containing many ancient woodland vascular plant species.

## 3.3 Terrestrial invertebrate survey

3.3.1 The locations of the survey sites are shown in Appendix A *Survey site locations*, and invertebrate species recorded at each site are provided in Appendix B *Terrestrial invertebrate survey results*.

3.3.2 A summary of the notable invertebrate species recorded within the study area is provided in Table 3-2. Further information regarding each notable species recorded is provided in the paragraphs below.

**Table 3-2 Summary of notable terrestrial invertebrates recorded within the study area in 2021**

Site	Summary of notable species recorded
Site 6	No notable species recorded
Site 7	No notable species recorded
Site 8	Two nationally scarce species recorded: <i>Lasioglossum pauxillum</i> , which no longer meets the criteria for its current nationally scarce status, and <i>Cantharis fusca</i> . A data deficient species, alder leaf beetle ( <i>Agelastica alni</i> ), was also recorded on this site
Site 9	Two nationally scarce species recorded: <i>Lasioglossum pauxillum</i> , which no longer meets the criteria for its current nationally scarce status, and <i>Gymnomerus laevipes</i> a data deficient species, alder leaf beetle, was also recorded on this site.
Site 11	No nationally scarce species recorded
Site 12	Two nationally scarce species recorded: <i>Lasioglossum pauxillum</i> , which no longer meets the criteria for its current nationally scarce status, and <i>Andrena labialis</i> .
Site 13	No nationally scarce species recorded
Site 14	Two nationally scarce species recorded: <i>Lasioglossum pauxillum</i> , which no longer meets the criteria for its current nationally scarce status, and <i>Nomada flavopicta</i> . The SPI cinnabar moth and a data deficient species, alder leaf beetle, were also recorded at this site.
Site 15	One nationally scarce species recorded: <i>Lasioglossum pauxillum</i> , which no longer meets the criteria for its current nationally scarce status.

### 3.4 Lepidoptera

#### The cinnabar moth (SPI and UK Biodiversity Action Plan (BAP) (Research only))

3.4.1 Caterpillars of the cinnabar moth were recorded from ragwort at Site 14 on 26 August 2021. The cinnabar is a common species whose larvae develop on ragwort. The moth remains widespread and frequent through much of the British Isles. However, it has declined considerably over the last 35 years and for this reason has been added to the UK BAP listings for monitoring purposes.

### 3.5 Hymenoptera

#### A eumenid wasp *Gymnomerus laevipes*, provisionally nationally scarce (N)

3.5.1 A single specimen of this distinctive wasp was recorded from site 9 on 4 June 2021. This species is most frequently found in open habitats or open woodland. *Gymnomerus laevipes* nests in hollow plant stems, such as bramble and thistles. It mainly provisions the nest with weevil larvae of the genus *Hypera*. The majority of recent records are from central southern England. Edwards & Telfer (2001) [10] note a considerable decline, particularly in the more northerly areas of its range, and suggest that the status of *Gymnomerus laevipes* should be upgraded to

nationally scarce. Based on available data, *Gymnomerus laevipes* would appear to be a scarce species in south-west England.

#### **A mining bee *Andrena labialis*, provisionally nationally scarce (N)**

- 3.5.2 A specimen of the mining bee *Andrena labialis* was noted at site 12 on 4 June 2021. *Andrena labialis* usually nests singly, although aggregations occasionally occur. This bee is found in a variety of flower-rich, open habitats. It appears that most pollen is collected from legumes such as common bird's-foot trefoil and meadow vetchling. Nationally, *Andrena labialis* is widespread in southern Britain and the Midlands.

#### **A mining bee *Lasioglossum pauxillum*, nationally scarce (Na)**

- 3.5.3 This species was found during general sweeping at sites 9 and 12 on 4 June 2021, and at site 14 and site 15 on 26 August 2021. *Lasioglossum pauxillum* nests in sparsely vegetated light soils in warm, sunny conditions. It may be found in a variety of habitats including calcareous grassland, soft rock coastal cliffs and heathland. Previously, *Lasioglossum pauxillum* was a scarce species restricted to south-east England, but in the last decade it has increased in frequency and expanded its range northwards and westwards [11]. Its current nationally scarce status is now considered to require downgrading.

#### **A nomad bee *Nomada flavopicta*, nationally scarce (Nb)**

- 3.5.4 A single specimen of this species was recorded from ragwort at Site 14 on 26 August 2021. The hosts of this cleptoparasitic bee are mining bees of the genus *Melitta*, with all four British *Melitta* species being used. No specimens of *Melitta* were recorded during the current survey; the most likely species present given the nature of the site would be *Melitta leporina*, which collects most of its pollen from leguminous plants. *Nomada flavopicta* has been recorded visiting a wide range of flowers including knapweeds, scabious and thistles, but ragwort is particularly favoured. The host bees are largely restricted to southern England, with a few records for south Wales; a distribution mirrored by *Nomada flavopicta*.

### **3.6 Coleoptera**

#### **A soldier beetle *Cantharis fusca*, nationally scarce (N)**

- 3.6.1 A specimen of this beetle was swept from rank vegetation at site 8 on 3 June 2021. *Cantharis fusca* is normally associated with tall grassy vegetation on permanently damp soils. Adults and larvae are believed to be predatory on small insects. This species has undergone considerable recent decline in England and has been lost from many inland localities and is now much less widespread than it was historically. It is now confined to a few southern coastal counties and some sites in Yorkshire. Strongholds for *Cantharis fusca* are north Somerset, south Hampshire, east Sussex, the Isle of Wight and Kent.

#### **Alder leaf beetle, data deficient (DD)**

- 3.6.2 Specimens were recorded from alder (*Alnus glutinosus*) at site 8 on 3 June 2021, site 9 on 4 June 2021 and Site 14 on 26 August 2021. Alder leaf beetle feeds primarily on alders, both as an adult and as larvae, although it has also been recorded from hazel (*Corylus avellana*), goat willow (*Salix caprea*), hybrid black poplar (*Populus x canadensis*) and downy birch (*Betula pubescens*) on occasion

[12]. It is not stated whether these alternative plant hosts are from British or continental observations. New generation adults appear in July or August, before aestivating, but become active for a short period in the autumn. They then hibernate for the winter and emerge the following spring. Originally alder leaf beetle was classified as extinct in Britain [13], but Hyman & Parsons (1992) [14] reclassified the beetle as RDB K (RDB K species refer to those whose status is insufficiently known). They considered the species to be only an immigrant to Britain. In 2004 larvae and adults were found in Manchester, and there have been subsequent records from Lancashire and Cheshire. Hubble (2015) [15] gives records for several sites in South Hampshire for 2014 where alder leaf beetle is now well established, and it appears that the species is spreading. It is likely that these colonies are the result of establishment by migrant specimens, since the beetle is distinctive and brightly metallic coloured and thus unlikely to be overlooked if it were a native species. It is therefore no longer considered to be a scarce species.

## 4 Conclusions

- 4.1.1 The notable species cinnabar moth, brown-banded carder bee, picture-winged fly and *Lasioglossum pauxillum* were all recorded within the study area during the 2017/2019 surveys [9], but only *Lasioglossum pauxillum* and the cinnabar moth were recorded in the most recent, 2021, surveys.
- 4.1.2 Amongst the nationally scarce species recorded within the study area, the mining bee *Lasioglossum pauxillum* has expanded considerably in range and frequency in recent decades and is now a relatively common species. Similarly, the alder leaf beetle has undergone a large expansion in both range and frequency in recent years. Neither of these species now qualify for their current threat status and would be downgraded in any future review.
- 4.1.3 Of the remaining nationally scarce species, the wasp *Gymnomerus laevipes* is perhaps the most significant find within the study area, as there appear to be relatively few records from south-west England. This species was recorded from site 9 in 2021.
- 4.1.4 Although sites 14 and 15 were not subject to early season surveys (due to access restrictions), the results show that none of the sites are of major entomological importance, with several sites supporting no notable species. The sites with most species interest were site 9 and site 14, but even these are only of limited significance at a local level. Although sites 8, 9, 12 and 14 supported two species categorised as nationally scarce, one of the species recorded on all of these sites, *Lasioglossum pauxillum*, no longer meets the criteria for its current nationally scarce status. Therefore, these sites are not considered to meet criteria for importance at the county level.
- 4.1.5 Since surveys of sites 6,7,11 and 13 produced no such species there are no management suggestions required to protect notable species.
- 4.1.6 Site 8 produced a record of the soldier beetle *Cantharis fusca*, which is associated with damp rank grassland. Provided this habitat remains on the site, the beetle should continue to be present.
- 4.1.7 Site 9 was the most productive site, yielding a specimen of the wasp *Gymnomerus laevipes* in 2021, and records of the picture-winged fly *Acanthiophilus helianthii* in 2019. Both these species appear to be uncommon in the south-west of England. The carder bee *Bombus humilis* was also recorded here in 2019.
- 4.1.8 *Gymnomerus laevipes* nests in dead stems, particularly bramble, whilst *Acanthiophilus helianthii* develops in the seed heads of knapweeds. *Bombus humilis* requires flower rich areas from which to collect pollen. Retention of bramble and black knapweed at site 9 may encourage the continued presence of *Gymnomerus laevipes* and *Acanthiophilus helianthii* respectively.
- 4.1.9 Site 12 produced a record of the mining bee *Andrena labialis*, which collects pollen from legumes such as vetches and clovers. The continued presence of these plants should assist the continued presence of this bee.
- 4.1.10 Site 14 produced records of the cleptoparasitic nomad bee *Nomada flavopicta*, which has a particular fondness for ragworts from which to forage.

- 4.1.11 Early season surveys are due to be undertaken at sites 14 and 15 in May 2022 and will feed into the impact assessment for the scheme, which will be fully detailed within Chapter 8 *Biodiversity* of the ES.

## Abbreviations List

*Please refer to ES Report Chapter 17 Abbreviations*

## Glossary

*Please refer to ES Report Chapter 18 Glossary*



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# Appendices

# Appendix A Survey site locations

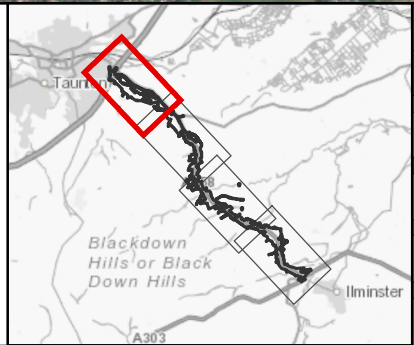




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- ECOLOGY SURVEY ZONE BUFFER - 100M
- TERRESTRIAL INVERTEBRATES SURVEY SITES



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
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CONSTRUCTION	NONE
MAINTENANCE / CLEANING	NONE
USE	NONE
DECOMMISSIONING / DEMOLITION	NONE

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P02	13/05/22	ISSUE FOR INFORMATION	AC	MA	JS	SV

Suitability: S2  
Drawing Status: SUITABLE FOR INFORMATION

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Client: **national highways**

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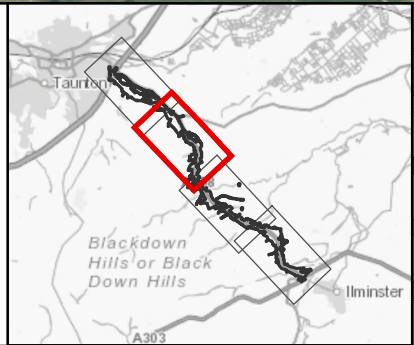




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MAINTENANCE / CLEANING	NONE
USE	NONE
DECOMMISSIONING / DEMOLITION	NONE

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Drawing Status: SUITABLE FOR INFORMATION

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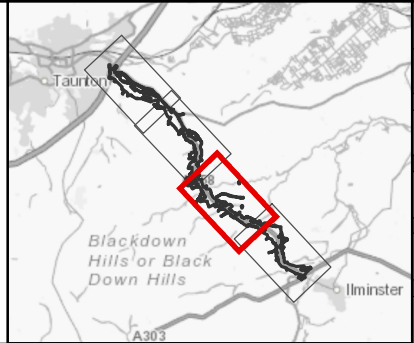




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USE	NONE
DECOMMISSIONING / DEMOLITION	NONE

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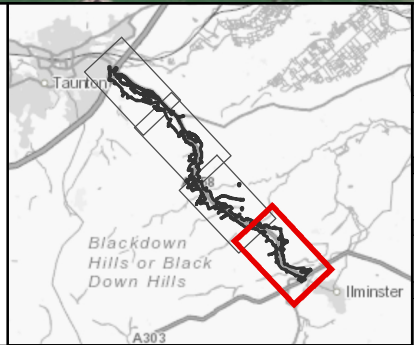




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MAINTENANCE / CLEANING	NONE
USE	NONE
DECOMMISSIONING / DEMOLITION	NONE

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# Appendix B Terrestrial invertebrate survey results



Invertebrate species recorded at each site are provided in Table B-1 to Table B-9 below. Notable species are highlighted in bold.

**Table B-1 Invertebrate species recorded at site 6**

Order	Family	Scientific name	English name	Status	Date
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	03/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris napi</i>	Green-veined white	Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Cheilosia albitarsis s.l.</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Chrysotoxum bicinctum</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma mellinum</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma scalare</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Pipiza austriaca</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Pipizella viduata</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus albimanus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syrphus ribesii</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Scathophagidae (Dung flies)	<i>Scathophaga stercoraria</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Sciomyzidae (Snail – killing flies)	<i>Limnia unguicornis</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Tachinidae (Tachinid flies)	<i>Tachina fera</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum</i>	White-tailed bumblebee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	03/06/2021

Order	Family	Scientific name	English name	Status	Date
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum/terrestris worker</i>	A bumblebee	Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis pellucida</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis rufa</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Anaglyptus mystaceus</i>		Local Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Grammoptera ruficornis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Pyrochroidae (Cardinal Beetles)	<i>Pyrochroa serraticornis</i>	Red-headed cardinal	Common Widespread	03/06/2021

**Table B-2 Invertebrate species recorded at site 7**

Order	Family	Scientific name	English name	Status	Date
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Leptophyes punctatissima</i>	Speckled bush cricket	Common Widespread	03/06/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Metrioptera roeselii</i>	Roesel's bush cricket	Common Widespread	03/06/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Pholidoptera griseoptera</i>	Dark bush cricket	Common Widespread	03/06/2021
Hemiptera (True Bugs)	Coreidae (Squash Bugs)	<i>Coreus marginatus</i>	Squash bug	Common Widespread	03/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris napi</i>	Green-veined white	Common Widespread	03/06/2021
Diptera (True Flies)	Tipulidae (Craneflies)	<i>Tipula maxima</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Stratiomyiidae (Soldier flies)	<i>Beris chalybata</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Cheilosia albitarsis s.l.</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Chrysotoxum bicinctum</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Epistrophe eligans</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eupeodes corollae</i>		Common Widespread	03/06/2021

Order	Family	Scientific name	English name	Status	Date
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma mellinum</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Merodon equestris</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus albimanus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Rhingia campestris</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Sphaerophoria scripta</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syritta pipiens</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Xylota segnis</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Tephritidae (Picture-winged flies)	<i>Eulia heraclei</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Scathophagidae (Dung flies)	<i>Scathophaga stercoraria</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava/panzeri male</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flavoguttata</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum/terrestris worker</i>	A bumblebee	Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis nigra</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis pellucida</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis rustica</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Malthodes marginatus</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Grammoptera ruficornis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Phytoecia cylindrica</i>		Local Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Tetrops praeustus</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Chrysomelidae (Leaf Beetles)	<i>Gastrophysa viridula</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Coccinelidae (Ladybirds)	<i>Psyllobora 22 - punctata</i>	22 spot ladybird	Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Elateridae (Click Beetles)	<i>Athous haemorrhoidalis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Malachiidae (Pollen Beetles)	<i>Malachius bipustulatus</i>		Common Widespread	03/06/2021

Order	Family	Scientific name	English name	Status	Date
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Pyrochroidae (Cardinal Beetles)	<i>Pyrochroa serraticornis</i>	Red-headed cardinal	Common Widespread	03/06/2021

**Table B-3 Invertebrate species recorded at site 8**

Order	Family	Scientific name	English name	Status	Date
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Pholidoptera griseoptera</i>	Dark bush cricket	Common Widespread	03/06/2021
Dermaptera (Earwig)		<i>Forficula auricularia</i>	Common earwig	Common Widespread	03/06/2021
Hemiptera (True Bugs)	Coreidae (Squash Bugs)	<i>Coreus marginatus</i>	Squash bug	Common Widespread	03/06/2021
Odonata (Dragonflies & Damselflies)	Agriidae (Demoiselles)	<i>Agrion virgo</i>	Beautiful demoiselle	Common Widespread	03/06/2021
Diptera (True Flies)	Tipulidae (Craneflies)	<i>Limonia phragmatidis</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Epistrophe eligans</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis horticola</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis pertinax</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Meliscaeva auricollis</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma scalare</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Myathropa florea</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus albimanus</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Portevinia maculata</i>		Local	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Rhingia campestris</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syrirta pipiens</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Platystomatidae (Platystomatid flies)	<i>Platystomata seminationis</i>		Common Widespread	03/06/2021

Order	Family	Scientific name	English name	Status	Date
Diptera (True Flies)	Sciomyzidae (Snail – killing flies)	<i>Tetanocera ferruginea</i>		Common Widespread	03/06/2021
Diptera (True Flies)	Scathophagidae (Dung flies)	<i>Scathophaga stercoraria</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining bees)	<i>Andrena chrysoseles</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining bees)	<i>Andrena haemorrhoa</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining bees)	<i>Andrena nitida</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava / panzeri male</i>		Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus hypnorum</i>	Tree bumblebee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum</i>	White-tailed bumblebee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	03/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum/terrestris worker</i>	A bumblebee	Common Widespread	03/06/2021
<b>Coleoptera (Soldier Beetles)</b>	<b>Cantharidae (Soldier Beetles)</b>	<b><i>Cantharis fusca</i></b>		<b>Nationally Scarce N</b>	<b>03/06/2021</b>
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis rustica</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Grammoptera ruficornis</i>		Common Widespread	03/06/2021
<b>Coleoptera (Soldier Beetles)</b>	<b>Chrysomelidae (Leaf Beetles)</b>	<b><i>Agelastica alni</i></b>	<b>Alder leaf beetle</b>	<b>Data Deficient (DD)</b>	<b>03/06/2021</b>
Coleoptera (Soldier Beetles)	Coccinellidae (Ladybirds)	<i>Propylea 14 - punctata</i>	14 spot ladybird	Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Elateridae (Click Beetles)	<i>Athous haemorrhoidalis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Malachiidae (Pollen Beetles)	<i>Malachius bipustulatus</i>		Common Widespread	03/06/2021

Order	Family	Scientific name	English name	Status	Date
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	03/06/2021
Coleoptera (Soldier Beetles)	Pyrochroidae (Cardinal Beetles)	<i>Pyrochroa serraticornis</i>	Red-headed cardinal	Common Widespread	03/06/2021

**Table B-4 Invertebrate species recorded at site 9**

Order	Family	Scientific name	English name	Status	Date
Hemiptera (True Bugs)	Coreidae (Squash Bugs)	<i>Coreus marginatus</i>	Squash bug	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Gonepteryx rhamni</i>	Brimstone	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris brassicae</i>	Large white	Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Parhelophilus versicolor</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Pipizella viduata</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Pipizella virens</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Sphaerophoria scripta</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Muscidae (Blow flies)	<i>Mesembrina meridiana</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Sciomyzidae (Snail – killing flies)	<i>Limnia unguicornis</i>		Common Widespread	04/06/2021
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Eumenidae (Potter &amp; Mason wasps)</b>	<b><i>Gymnomerus laevipes</i></b>		<b>Provisionally Nationally Scarce N</b>	<b>04/06/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena chrysoseles</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena cineraria</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena haemorrhoa</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena nitida</i>		Common Widespread	04/06/2021



Order	Family	Scientific name	English name	Status	Date
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Halictidae (Mining &amp; Cuckoo Bees)</b>	<i>Lasioglossum pauxillum</i>		<b>Nationally Scarce Na</b>	<b>04/06/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum</i>	White-tailed bumblebee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum/terrestris worker</i>	A bumblebee	Common Widespread	04/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis rustica</i>		Common Widespread	04/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Agapanthia villosoviridescens</i>		Local Widespread	04/06/2021
<b>Coleoptera (Soldier Beetles)</b>	<b>Chrysomelidae (Leaf Beetles)</b>	<i>Agelastica alni</i>	<b>Alder leaf beetle</b>	<b>Data Deficient DD</b>	<b>04/06/2021</b>
Coleoptera (Soldier Beetles)	Malachiidae (Pollen Beetles)	<i>Malachius bipustulatus</i>		Common Widespread	04/06/2021
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	04/06/2021

Table B-5 Invertebrate species recorded at site 11

Order	Family	Scientific name	English name	Status	Date
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Pholidoptera griseoptera</i>	Dark bush cricket	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Aricia agestis</i>	Brown argus	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris napi</i>	Green-veined white	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Polyommatus icarus</i>	Common blue	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Thymelicus sylvestris</i>	Small skipper	Common Widespread	04/06/2021

Order	Family	Scientific name	English name	Status	Date
Lepidoptera (Butterflies & Moths)	N/A	<i>Vanessa atalanta</i>	Red admiral	Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus clypeatus</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Sphaerophoria taeniata</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syrphus ribesii</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Tephritidae (Picture-winged flies)	<i>Tephritis bardanae</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Tephritidae (Picture-winged flies)	<i>Tephritis divisa</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Tephritidae (Picture-winged flies)	<i>Tephritis formosa</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Scathophagidae (Dung flies)	<i>Scathophaga stercoraria</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena minutula</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena nitida</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum/terrestris worker</i>	A bumblebee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Malachiidae (Pollen Beetles)	<i>Malachius bipustulatus</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Scarabaeidae (Chafers & Dung Beetles)	<i>Melolontha melolontha</i>	Cockchafer	Common Widespread	04/06/2021



**Table B-6 Invertebrate species recorded at site 12**

Order	Family	Scientific name	English name	Status	Date
Lepidoptera (Butterflies & Moths)	N/A	<i>Gonepteryx rhamni</i>	Brimstone	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris brassicae</i>	Large white	Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Brachypalpoides lentus</i>		Local Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis arbustorum</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis pertinax</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma mellinum</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Myathropa florea</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syritta pipiens</i>		Common Widespread	04/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Volucella bombylans</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena chrysoseles</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena cineraria</i>		Common Widespread	04/06/2021
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Andrenidae (Mining Bees)</b>	<b><i>Andrena labialis</i></b>		<b>Provisionally Nationally Scarce N</b>	<b>04/06/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena nitida</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena semilaevis</i>		Common Widespread	04/06/2021
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Halictidae (Mining &amp; Cuckoo Bees)</b>	<b><i>Lasioglossum pauxillum</i></b>		<b>Nationally Scarce Na</b>	<b>04/06/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Megachilidae (Solitary bees)	<i>Osmia bicornis</i>		Common Widespread	04/06/2021

Order	Family	Scientific name	English name	Status	Date
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum/terrestris worker</i>	A bumblebee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Malachiidae (Pollen Beetles)	<i>Malachius bipustulatus</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	04/06/2021

**Table B-7 Invertebrate species recorded at site 13**

Order	Family	Scientific name	English name	Status	Date
Odonata (Dragonflies & Damselflies)	Aeshnidae (Hawkers)	<i>Aeshna mixta</i>	Migrant hawkler	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Libellulidae (Skimmers & Darters)	<i>Sympetrum striolatum</i>	Common darter	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Lycaena phlaeas</i>	Small copper	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris brassicae</i>	Large white	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris napi</i>	Green-veined white	Common Widespread	04/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris rapae</i>	Small white	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pyronia tithonus</i>	Gatekeeper	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Rivula sericealis</i>	Strawdot	Common Widespread	26/08/2021
Diptera (True Flies)	Asilidae (Robberflies)	<i>Dioctria baumhaueri</i>		Common Widespread	04/06/2021

Order	Family	Scientific name	English name	Status	Date
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	04/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Myathropa florea</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Neoascia tenur</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Rhingia campestris</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Sphaerophoria scripta</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syrirta pipiens</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Vespidae (Social Wasps)	<i>Vespa vulgaris</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena haemorrhoa</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Halictus tumulorum</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Anthophoridae (Flower & Nomad bees)	<i>Nomada flava</i>		Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	04/06/2021, 26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lapidarius</i>	Red-tailed bumblebee	Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum</i>	White-tailed bumblebee	Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	04/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	04/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis rustica</i>		Common Widespread	04/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Grammoptera ruficornis</i>		Common Widespread	04/06/2021
Coleoptera (Soldier Beetles)	Malachiidae (Pollen Beetles)	<i>Malachius bipustulatus</i>		Common Widespread	04/06/2021

Order	Family	Scientific name	English name	Status	Date
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	26/08/2021

**Table B-8 Invertebrate species recorded at site 14**

Order	Family	Scientific name	English name	Status	Date
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Chorthippus parallelus</i>	Meadow grasshopper	Common Widespread	30/06/2021, 26/08/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Conocephalus discolor</i>	Long-winged Conehead	Common Widespread	26/08/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Leptophyes punctatissima</i>	Speckled bush cricket	Common Widespread	30/06/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Metrioptera roeselii</i>	Roesel's bush cricket	Common Widespread	26/08/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Pholidoptera griseoptera</i>	Dark bush cricket	Common Widespread	26/08/2021
Hemiptera (True Bugs)	Coreidae (Squash Bugs)	<i>Coreus marginatus</i>	Squash bug	Common Widespread	30/06/2021
Hemiptera (True Bugs)	Pentatomidae (Shield Bugs)	<i>Dolycoris baccarum</i>	Sloe bug	Common Widespread	26/08/2021
Hemiptera (True Bugs)	Pentatomidae (Shield Bugs)	<i>Palomena prasina</i>	Green shieldbug	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Aeshnidae (Hawkers)	<i>Aeshna cyanea</i>	Southern hawker	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Aeshnidae (Hawkers)	<i>Aeshna mixta</i>	Migrant hawker	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Libellulidae (Skimmers & Darters)	<i>Sympetrum sanguineum</i>	Ruddy darter	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Libellulidae (Skimmers & Darters)	<i>Sympetrum striolatum</i>	Common darter	Common Widespread	30/06/2021, 26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Aglais urticae</i>	Small tortoiseshell	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Aphantopus hyperantus</i>	Ringlet	Common Widespread	30/06/2021, 26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Aricia agestis</i>	Brown argus	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Celastina argiolus</i>	Holly blue	Common Widespread	26/08/2021

Order	Family	Scientific name	English name	Status	Date
Lepidoptera (Butterflies & Moths)	N/A	<i>Maniola jurtina</i>	Meadow brown	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Melanargia galathea</i>	Marbled white	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Ochlodes faunus</i>	Large skipper	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	30/06/2021, 26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris brassicae</i>	Large white	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris rapae</i>	Green-veined white	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Polyommatus icarus</i>	Common blue	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pyronia tithonus</i>	Gatekeeper	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Vanessa atalanta</i>	Red admiral	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Vanessa cardui</i>	Painted lady	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Abraxus grossulariata</i>	Magpie moth	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Cryptoteuchia culmella</i>	Painted lady	Common Widespread	03/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Orgyia antiqua</i>	Vapourer moth	Common Widespread	26/08/2021
<b>Lepidoptera (Butterflies &amp; Moths)</b>	<b>N/A</b>	<b><i>Tyria jacobaea</i></b>	<b>Cinnabar Moth</b>	<b>UK BAP (Research only)</b>	<b>26/08/2021</b>
Diptera (True Flies)	Asilidae (Robberflies)	<i>Leptogaster cylindrica</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Dasysyrphus albostriatus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalinus sepulchralis</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis arbustorum</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis pertinax</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus trivittatus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma mellinum</i>		Common Widespread	26/08/2021

Order	Family	Scientific name	English name	Status	Date
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Myathropa florea</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus clypeatus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Sphaerophoria scripta</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syritta pipiens</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Volucella pelluscens</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Xylota segnis</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Tephritidae (Picture-winged flies)	<i>Urophora stylata</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Sciomyzidae (Snail – killing flies)	<i>Tetanocera elata</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Tachinidae (Tachinid flies)	<i>Eriothrix rufomaculatus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Tachinidae (Tachinid flies)	<i>Nowickia ferox</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Vespidae (Social Wasps)	<i>Vespa crabro</i>	Hornet	Local Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Halictus tumulorum</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Lasioglossum albipes</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Lasioglossum calceatum</i>		Common Widespread	26/08/2021
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Halictidae (Mining &amp; Cuckoo Bees)</b>	<b><i>Lasioglossum pauxillum</i></b>		<b>Nationally Scarce Na</b>	<b>26/08/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Lasioglossum zonulum</i>		Common Widespread	26/08/2021
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Anthophoridae (Flower &amp; Nomad bees)</b>	<b><i>Nomada flavopicta</i></b>		<b>Nationally Scarce Nb</b>	<b>26/08/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	30/06/2021, 26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lapidarius</i>	Red-tailed bumblebee	Common Widespread	26/08/2021



Order	Family	Scientific name	English name	Status	Date
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum</i>	White-tailed bumblebee	Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus terrestris</i>	Buff-tailed bumblebee	Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis nigra</i>		Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Aromia mocschata</i>	Musk beetle	Local Widespread	26/08/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Leptura livida</i>		Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Rutpela maculata</i>	Spotted longhorn beetle	Common Widespread	30/06/2021
<b>Coleoptera (Soldier Beetles)</b>	<b>Cerambycidae (Longhorn Beetles)</b>	<b><i>Agelastica alni</i></b>	<b>Alder leaf beetle</b>	<b>Data Deficient DD</b>	<b>30/06/2021, 26/08/2021</b>
Coleoptera (Soldier Beetles)	Chrysomelidae (Leaf Beetles)	<i>Cassida murraea</i>		Local Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Chrysomelidae (Leaf Beetles)	<i>Oulema melanopa s.l.</i>		Common Widespread	26/08/2021
Coleoptera (Soldier Beetles)	Coccinellidae (Ladybirds)	<i>Coccinella 7 - punctata</i>	7-spot ladybird	Common Widespread	26/08/2021
Coleoptera (Soldier Beetles)	Coccinellidae (Ladybirds)	<i>Propylea 14 - punctata</i>	14-spot Ladybird	Common Widespread	26/08/2021
Coleoptera (Soldier Beetles)	Coccinellidae (Ladybirds)	<i>Psyllobora 22 - punctata</i>	22-spot ladybird	Common Widespread	26/08/2021
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	30/06/2021

**Table B-9 Invertebrate species recorded at site 15**

Order	Family	Scientific name	English name	Status	Date
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Chorthippus parallelus</i>	Meadow grasshopper	Common Widespread	26/08/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Conocephalus discolor</i>	Long-winged Conehead	Common Widespread	26/08/2021
Orthoptera (Grasshoppers and Crickets)	N/A	<i>Leptophyes punctatissima</i>	Speckled bush cricket	Common Widespread	30/06/2021, 26/08/2021
Hemiptera (True Bugs)	Pentatomidae (Shield Bugs)	<i>Palomena prasina</i>	Green shieldbug	Common Widespread	26/08/2021



Order	Family	Scientific name	English name	Status	Date
Odonata (Dragonflies & Damselflies)	Coenagrionidae (Damselflies)	<i>Enallagma cyathigerum</i>	Common blue damselfly	Common Widespread	30/06/2021
Odonata (Dragonflies & Damselflies)	Aeshnidae (Hawkers)	<i>Aeshna cyanea</i>	Southern hawker	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Aeshnidae (Hawkers)	<i>Aeshna mixta</i>	Migrant hawker	Common Widespread	26/08/2021
Odonata (Dragonflies & Damselflies)	Cordulogasteridae (Dragonflies)	<i>Cordulogaster boltonii</i>	Golden-ringed Dragonfly	Local Widespread	30/06/2021
Odonata (Dragonflies & Damselflies)	Libellulidae (Skimmers & Darters)	<i>Libellula depressa</i>	Broad-bodied chaser	Common Widespread	30/06/2021
Odonata (Dragonflies & Damselflies)	Libellulidae (Skimmers & Darters)	<i>Sympetrum striolatum</i>	Common darter	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Aphantopus hyperantus</i>	Ringlet	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Argynnis paphia</i>	Silver-washed fritillary	Local Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Maniola jurtina</i>	Meadow brown	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Melanargia galathea</i>	Marbled white	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Neozephyrus quercus</i>	Purple hairstreak	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Ochlodes faunus</i>	Large skipper	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pararge aegeria</i>	Speckled wood	Common Widespread	30/06/2021, 26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris brassicae</i>	Large white	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pieris rapae</i>	Small white	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Polygonia c - album</i>	Comma	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Pyronia tithonus</i>	Gatekeeper	Common Widespread	26/08/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Vanessa atalanta</i>	Red Admiral	Common Widespread	30/06/2021
Lepidoptera (Butterflies & Moths)	N/A	<i>Eilema griseola</i>	Dingy footman	Common Widespread	26/08/2021
Diptera (True Flies)	Stratiomyidae (Soldier flies)	<i>Chloromyia formosa</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Cheilosia illustrata</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Cheilosia pagana</i>		Common Widespread	26/08/2021

Order	Family	Scientific name	English name	Status	Date
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Chrysogaster solstitialis</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Chrysotoxum bicinctum</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Dasysyrphus albostrigatus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Episyrphus balteatus</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis arbustorum</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis horticola</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis interruptus</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis pertinax</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Eristalis tenax</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus pendulus</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Helophilus trivittatus</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Melanostoma mellinum</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Myathropa florea</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus albimanus</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Platycheirus rosarum</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syritta pipiens</i>		Common Widespread	26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syrphus ribesii</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Syrphus vitripennis</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Volucella pelluscens</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Xanthogramma pedisequum</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Syrphidae (Hoverflies)	<i>Xylota segnis</i>		Common Widespread	30/06/2021, 26/08/2021
Diptera (True Flies)	Conopidae (Thick – headed flies)	<i>Sicus ferrugineus</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Tephritidae (Picture-winged flies)	<i>Tephritis bardanae</i>		Common Widespread	30/06/2021

Order	Family	Scientific name	English name	Status	Date
Diptera (True Flies)	Sciomyzidae (Snail – killing flies)	<i>Limnia unguicornis</i>		Common Widespread	30/06/2021
Diptera (True Flies)	Tachinidae (Tachinid flies)	<i>Eriothrix rufomaculatus</i>		Common Widespread	26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Eumenidae (Potter & Mason wasps)	<i>Symmorphus gracilis</i>		Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Vespidae (Social Wasps)	<i>Vespa crabro</i>	Hornet	Local Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Colletidae (Mining & Yellow faced bees)	<i>Hylaeus communis</i>		Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Andrenidae (Mining Bees)	<i>Andrena scotica</i>		Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Halictus tumulorum</i>		Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Halictidae (Mining & Cuckoo Bees)	<i>Lasioglossum calceatum</i>		Common Widespread	30/06/2021, 26/08/2021
<b>Hymenoptera (Bees, Wasps, Ants and Relatives)</b>	<b>Halictidae (Mining &amp; Cuckoo Bees)</b>	<b><i>Lasioglossum pauxillum</i></b>		<b>Nationally Scarce Na</b>	<b>26/08/2021</b>
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Apis mellifera</i>	Honeybee	Common Widespread	30/06/2021, 26/08/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus lucorum</i>	White-tailed bumblebee	Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pascuorum</i>	Common carder bee	Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus pratorum</i>	Early bumblebee	Common Widespread	30/06/2021
Hymenoptera (Bees, Wasps, Ants and Relatives)	Apidae (Social & Cuckoo Bees)	<i>Bombus terrestris</i>	Buff-tailed bumblebee	Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Cantharis nigra</i>		Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Cantharidae (Soldier Beetles)	<i>Rhagonycha fulva</i>		Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Cerambycidae (Longhorn Beetles)	<i>Leptura livida</i>		Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Coccinellidae (Ladybirds)	<i>Harmonia axyridis</i>	Harlequin ladybird	Common Widespread	30/06/2021

Order	Family	Scientific name	English name	Status	Date
Coleoptera (Soldier Beetles)	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common Widespread	30/06/2021
Coleoptera (Soldier Beetles)	Pyrochroidae (Cardinal Beetles)	<i>Pyrochroa serraticornis</i>	Red-headed cardinal	Common Widespread	30/06/2021

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