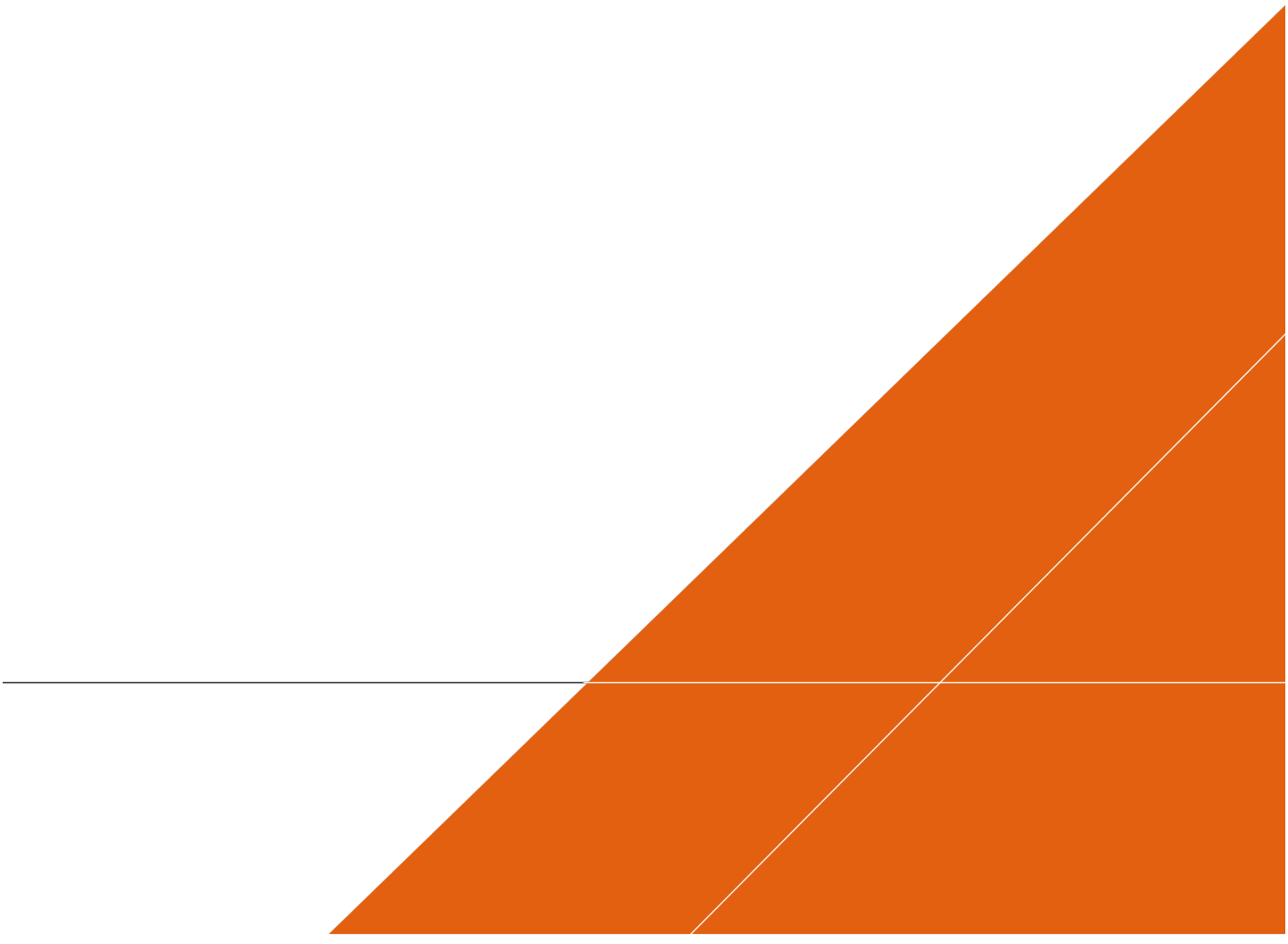
# OTTERPOOL PARK

## Environmental Statement (ES) Appendix 7.17: Invertebrate Scoping Report – Update to include 2020 and 2021 Survey Data

MARCH 2022



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# Executive Summary

Arcadis Consulting (UK) Limited has been commissioned on behalf of Otterpool Park LLP to undertake an invertebrate scoping survey to inform an Environmental Impact Assessment (EIA) for the proposed new development and accompany an outline planning application. The proposed Development is 'Otterpool Park', a garden settlement located within Folkestone, Kent. The development area has been identified as an 'area of search'; hereafter, the area of search is referred to as "the site".

The site is located within Folkestone, Kent within the administrative boundary of Folkestone and Hythe District Council (F&HDC) and spans a large area located immediately south of Junction 11 of the M20. The site is largely agricultural in nature with the majority of the site comprising arable and pasture fields, a disused horseracing course with an artificial lake ('Folkestone Racecourse Lake'), areas modified from historical use (airfields), existing historic settlements and relatively new industrial areas. The site area encompasses the proposed Otterpool Park Area Development application site which is approximately 589 ha in area.

A walkover of the site was conducted on the 8 of August 2018. The areas that are to be lost or degraded as a component of the proposed Development were visited and photographed along with all the areas that present the most promising habitats for invertebrates. Most of the site has been intensively farmed for many decades (arable/grazing) and is of limited value to invertebrates. The field margins and hedgerows in the intensively farmed areas are species poor and would support impoverished invertebrate communities. Indeed, very few species of conservation concern have been recorded from the site.

In 2020, habitat assessment updates were undertaken as part of the Phase 1 habitat survey to update the validity of the survey. The habitat assessment update identified no significant change in the status of invertebrate habitat within the site. The results of the 2020 survey concluded that:

- No further invertebrate surveys are required to inform a 2020 resubmission of the ES; and
- The valuations utilised in the 2018 submission are considered to be valid, with no evidence of any invertebrate habitats increasing in value.

Targeted glow worm surveys were undertaken in 2021 in three locations: the old airfield, east of Westenhanger Castle and fields west of Barrow Hill. Two records of glow worm were found near Sandling, approximately 0.9km and 1.4km to the east of the site boundary.

The more ecologically sensitive habitats within the site include species rich hedgerows, neutral grassland, ancient woodland, water bodies and riparian habitats. Desk study data suggests the more florally rich areas around the site, including those within Lympne Airfield are of value for invertebrates, particularly bees. With the exception of the riparian corridor, these habitats are poorly connected at the landscape scale, which places invertebrates, especially those with limited dispersal abilities at risk of localised extinction.

Within the masterplanning design, the most valuable ecological habitats are retained and buffered and so the potential for significant habitat loss, degradation and or fragmentation has been avoided. The plan for the Otterpool Park development retains the vast majority of the better-quality habitats and has the potential to enhance them by creating buffers and margins between around these existing features as part of 'green infrastructure' proposed throughout the site. Details of the buffers and design are outlined within the Biodiversity section of the Otterpool Park ES and the associated Design and Access Statement (Application Ref.: 3.6). Not only will this increase the amount and variety of potentially valuable invertebrate habitats, but it will also improve connectivity. A network of water-bodies will be created throughout the development, including SuDs features, ponds designed for amphibians and ditched designed primarily for water voles. These features will enhance the whole area for invertebrates. In addition, a new nature reserve

created in the west of the development has the potential to offer a diverse range of habitats of principal importance that are likely to sustain a diverse community of invertebrates.

For glow worm, managing the airfield in a way that nurtures areas of rough grassland and minimises eutrophication would benefit this species. The glow-worm will certainly benefit from the cessation of intensive agriculture and there is the potential for the development to be executed in a way that benefits many other species, not just the glow-worm. Planting throughout the development should be native species with a focus on those plant species that are currently found in the woodland edges, field margins and less improved grassland. Planting in this way will increase the habitat available for the species currently found in the existing margins and will allow them to disperse through the landscape more easily. It is crucial there is a system in place for the long-term management of these margins and the planted areas on the development.

The houses and the gardens of the development of the site should also be an integral part of this 'green infrastructure'. Using green roofs where possible and the planting of residential areas with native species to create a mosaic of trees, species rich grassland and areas of bare ground will ultimately benefit many species and enhance the biodiversity of the whole area. The parameters for the built areas will be set out in the associated Otterpool Park ES.

On the basis of the walkover survey undertaken it is considered that no specific invertebrate surveys were required to further inform the masterplanning and EIA. There are three discrete areas where detailed invertebrate surveys are likely to be warranted following outline planning determination to inform additional design and mitigation. One of these areas consists of two large mounds with large areas of bare ground in a mosaic of grassland and scrub (TN165 and 167), located to the north of Link Park (Ordnance Survey Grid Reference (OSGR) TR 110 358). The other two are the Folkestone Racecourse lake and margins ( OSGR TR 123 368), and a hedgerow and ditch to the west of the site which is to be bisected (TN118). These surveys are likely to include detailed, standardised terrestrial and freshwater invertebrate sampling carried out on three occasions between May and July using a sweep net, suction sampler, pan traps, beating tray and pond net.

It is crucial that subsequent to outline planning permission a long-term management plan for the 'green infrastructure' and the landscaped areas of the proposed Development is in place before the development of each associated zone commences. Executed correctly, the proposed Development has the potential to greatly improve the value if the site for invertebrates on a site that is currently an ecologically impoverished, intensively farmed landscape.

# 1 Introduction

## 1.1 Overview

1.1.1 Arcadis Consulting (UK) Limited has been commissioned on behalf of Otterpool Park LLP to undertake an invertebrate survey to inform an Environmental Impact Assessment (EIA) for the proposed new development and accompany an outline planning application. The proposed Development is 'Otterpool Park', a garden settlement located within Folkestone, Kent. The development area has been identified as an 'area of search'; hereafter, the area of search is referred to as "the site".

## 1.2 Site Location and Setting

1.2.1 The site is located within Folkestone, Kent within the administrative boundary of Folkestone and Hythe District Council (F&HDC) and spans a large area located immediately south of Junction 11 of the M20. The site is largely agricultural in nature with the majority of the site comprising arable and pasture fields, a disused horseracing course with an artificial lake ('Folkestone Racecourse Lake'), areas modified from historical use (airfields), existing historic settlements and relatively new industrial areas.

1.2.2 The M20 motorway, Channel Tunnel Rail Link and Westenhanger Station are located to the north of the site, beyond which lie the villages of Stanford and Postling within a largely rural setting including the Kent Downs Area of Outstanding Natural Beauty (AONB). This AONB extends to the east, beyond which lies the town of Hythe, and to the south where it includes Lympne village. The site also includes the settlements of Barrowhill, Sellindge, Westenhanger and Newingreen. Lympne Industrial Park and some areas of woodland are located immediately south of the site. In addition, East Stour River flows through the site in a north-east to west direction. The site is centred on Ordnance Survey Grid Reference TR 111 363.

1.2.3 An aerial image illustrating the site as surveyed is presented in Image 1. Photographs of the site can be found in Appendix C.

*Image 1: Aerial imagery of the site*

## 1.3 Proposed Development

1.3.1 The proposed Otterpool Park Area Development is located on approximately 589 ha of land. The development proposals are to be submitted in outline for a new garden settlement accommodating up to 8,500 homes (Use Class C2 and C3) and Use Class E, F, B2, C1, Sui Generis development, including use of retained buildings as identified, with related infrastructure, highway works, green and blue infrastructure, with access, appearance, landscaping, layout and scale matters to be reserved. A summary of the maximum floorspace areas for each land use type is provided in Chapter 4: The Site and the proposed Development of the Environmental Statement (ES).

## 1.4 Survey Aims

1.4.1 The aim of the survey was to scope the potential conservation value of invertebrate habitat within the site, considering the habitats present, species observed during the walkover and species recorded within the site and surrounding area within biological records. The objectives of the survey were to:

- Highlight those areas likely to be of greatest importance for rare invertebrates or notable assemblages to inform the masterplanning design;
- Provide sufficient information to identify the likely impact and required mitigation to inform the EIA; and
- Identify the need for any further surveys, to inform the planning process, either for detailed planning permission or within the process of informing detailed design.

# 2 Methodology

## 2.1 Desk Study

2.1.1 Prior to conducting fieldwork, existing information obtained in March 2018 from the Kent and Medway Biological Records Centre (KMBRC) relating to the invertebrate fauna of the site was reviewed. This included a review of historic invertebrate records from within a two-kilometre radius of the site as well as statutory and non-statutory sites of nature conservation importance within a five-kilometre radius.

2.1.2 MAGIC Mapping was reviewed to identify any statutory sites designated for invertebrates in the vicinity of the site.

2.1.3 In addition, a previous planning application from an ecological appraisal for former Lympne Airfield Housing Development conducted in 2012 (CSa 2012) was reviewed. Updated information relating to invertebrate fauna was obtained from KMBRC in April 2020. In 2021, NBN Atlas (NBN, 2021) data was accessed prior to the glow-worm (*Lampyris noctiluca*) surveys. The results of the desk study are presented in Section 3.

2.1.4 A survey from the Lympne Airfield site (Kirby 2020) which was provided to Arcadis by Nikki Gammans (one of the report authors) in 2021 was also reviewed. This provided records from a walkover survey which focussed on bumblebees and solitary bee species, along with flower species.

## 2.2 Field Survey

### Invertebrate scoping survey (2018)

2.2.1 Using a 1:25,000 Ordnance Survey (OS) map of the site and information collected during the Phase 1 habitat surveys, habitats of potential value to invertebrates were initially identified within the site. A dedicated walkover survey focussed on the habitats most likely to be of value for invertebrates. The survey was undertaken by Arcadis Principal Ecologist Brandon Murray (CIEEM) and entomologist Dr Ross Piper on the 8 of August 2018. Pen Portraits of surveyors are presented in Appendix B. For ease of reference, the Target Notes utilised within the invertebrate survey reporting follow the Target Note locations referenced within the ES Appendix 7.3 Habitat and Hedgerow Survey Report. A photographic record was also made of key features recorded during the survey, this is presented in Appendix C.

### Incidental species recording (2018)

2.2.2 No systematic sampling was undertaken during the survey; rather, a basic list of species identifiable without the requirement of microscopic identification was collected. Some notable specimens were collected in clear plastic sampling pots with white screw on lids and identified subsequent to the surveys.

2.2.3 In key areas, a closer inspection was conducted around bare earth and aggregate material and within areas of vegetation, to locate and identify a subset of the species present.

### Habitat assessment update (2020)

2.2.4 An updated Phase 1 habitat survey was undertaken in May 2020. As part of this survey, habitat within the site was assessed to identify any change in the status of invertebrate habitat since the previous invertebrate surveys. The habitat surveys were undertaken by Brandon Murray and Rory Roche (Ecologist).

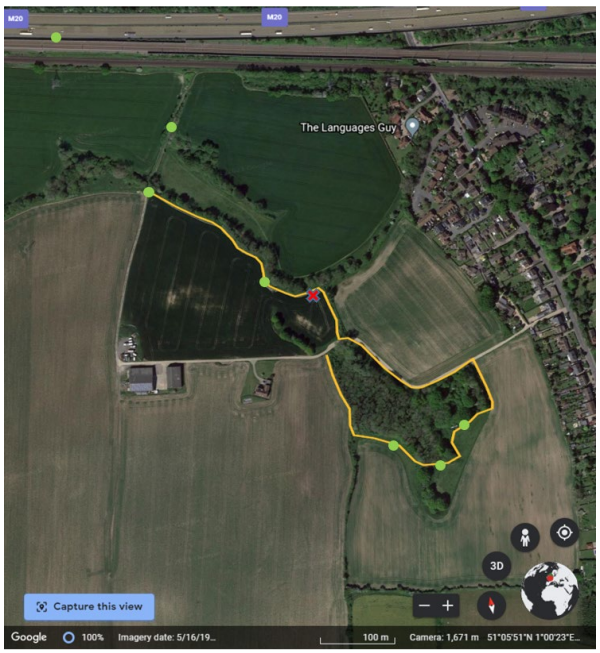
### Glow-worm survey (2021)

2.2.5 Targeted glow-worm *Lampyris noctiluca* surveys were undertaken on 22 July and 05 August 2021 in three locations: the old airfield, east of Westenhanger Castle and fields west of

Barrow Hill. At each location two diurnal and two nocturnal visits, one of each in July and August were undertaken, see Table 1 below for start and end times for the nocturnal surveys. In the day the areas of suitable micro-habitats were searched, including beneath possible refugia such as rocks and logs. At each location as part of the nocturnal survey LED lures and a single actinic trap were set to attract male glow-worms. These lures and traps and checked as part of walked transect routes, which were targeted at observing glowing females. The transects walked and the locations of the traps are shown in Table 1. The transects were selected to cover the areas that offered the optimum habitats for glow worm.

*Table 1: Transects and position of actinic light traps for adult glow-worms. Yellow line = path of transect; Red cross = position of actinic light trap; Green circles = position of LED lures*

| Transect | Notes |
|---|---|
|  | **Transect 1 (old airfield)**<br><br>Airfield walked from small parking area at OSGR TR11763498 northwards along eastern perimeter and round to northern edge of airfield before taking path northwards at TR11423549 and returning back down same path before crossing south-eastwards along footpath to south of airfield. Walked from 21:00-23:15 (22/07/2021 and 05/08/2021)<br><br>8W Actinic Heath-style moth trap at TR11793513 and 7 x 555nm LED lures running from 21:10 to 23:20 (22/07/2021 and 05/08/2021) at the locations shown in green. |
|  | **Transect 2 (east to Westenhanger Castle)**<br><br>Field margins walked from farmyard at TR10953723 northwards along western edge of fields walking around the northern edge along railway to Westenhanger Castle. On returning cut through field at TR11143758 and walked southward along footpath back to farmyard. Walked from 23:30 – 00:40 (22-23/07/2021 and 05/08/2021). Also searched area near railway bridge and Westenhanger Castle where *Lampyris noctiluca* was recorded incidentally on an Arcadis bat survey in 14/07/2021<br><br>1 x 6W Actinic Heath-style moth trap at TR11143758 and 6 x 555nm LED lures running from 20:20 to 00:30 (22-23/07/2021 and 05/08/2021) at the locations shown in green. |

| Transect | Notes |
|---|---|
|  | **Transect 3 (fields to west of Barrow Hill)**<br>Walked woodland edge of small wooded area to south of farm track from north-western corner at TR10493732 anti-clockwise then following footpath around northern edge of field to north of farm track starting at TR10523735. Walked from 00:45 – 01:15 (22-23/07/2021 and 05/08/2021)<br>6W Actinic Heath-style moth trap at TR10493741 and 6 x 555nm LED lures running from 20:45 to 01:15 (22-23/07/2021 and 05/08/2021) at the locations shown in green |

## Limitations

2.2.6 Given the incidental nature of the survey the species recorded were those that were most conspicuous. These consist mainly of common generalist invertebrates.

2.2.7 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 proof of a lack or absence of such species.

2.2.8 This is a dedicated invertebrate scoping survey rather than a full dedicated invertebrate survey. Therefore, these results do not provide a comprehensive representation of the site's invertebrate fauna.

2.2.9 Due to the outbreak of the COVID-19 virus in 2020, survey scope was greatly impacted and had to be altered to what was safe and practical to achieve. As such, the 2020 surveys endeavoured to collect the information intrinsic to ensuring the submission is founded on robust survey data, whilst acknowledging that the surveys needed to be proportionate in light of the additional risks to Arcadis employees and members of the public. As a result, the following changes were made to the scopes:

- For the update surveys, access was not requested to parcels of land where members of the public were likely to be at increased risk of coming into contact with Arcadis employees.
- Access to private homes and businesses (excluding farms) was not requested, both to reduce exposure risk and to avoid potential for negative reactions to interaction with Arcadis staff.
- Where it was felt that the revised three-tiered approach for a reduce presence on site, without impacting upon the needs of the submission, this approach was adopted to reduce risk associated with surveyor travel

2.2.10 Despite these limitations, it is considered that the survey conducted provided sufficient information to fulfil the objectives of the survey.

## Glow worm survey (2021)

2.2.11 Even though this is a very distinctive species it is still easy to overlook as adult females stop glowing after mating and the long period of larval development means adults might not be present in any given population in that particular year.

2.2.12 Warm and humid nights in the peak glowing season are the best time to search for adult females and males. The weather during the surveys was not optimal and the summer of 2021 was very poor for many insects because of the long period of cold weather in May and high rainfall.

# 3 Results

## 3.1 Desk Study

### Data sources

3.1.1 Information was received from the sources presented in Table 2. A composite list of the species recorded is presented in Appendix B.

*Table 2: Desk study data sources*

| Organisation | Data Received |
|---|---|
| Kent and Medway Biological Records Centre obtained March 2018, updated April 2020 | Conservation Concern Species Inventory |
| Kent and Medway Biological Records Centre obtained March 2018, updated April 2020 | Kent Scarce and Red list Species |
| CSa Environmental Planning | Ecological appraisal for former Lympne Airfield Housing Development conducted in 2012. |
| NBN Atlas was searched in 2021 | Nearby glow-worm records |
| Lympne Airfield bumblebee and solitary bee survey | Multople bee species were recorded during the survey on 28/07/2020:<br>Three were considered 'rarer' bees, brown banded carder, Ruderal bumblebee and Moss carder bee. |

### Statutory designated sites

3.1.2 No statutory designations were identified on the site, although the edge of the Kent Downs AONB extends south from the Aldington Road on the southern site boundary. No internationally designated nature conservation sites occur within 5km of the central grid reference for the site. Three nationally designated Sites of Special Scientific Interest (SSSIs), two of which are designated for biological value, occur within 5km as summarised in Table 3.

*Table 3: Site(s) subject to statutory designations due to their nature conservation interest within proximity to the site*

| Site | Location / distance | Summary of designation |
|---|---|---|
| Lympne Escarpment SSSI | South of site between Aldington Road and the Royal Military Canal<br>300m south of the site | A steep escarpment of Kentish ragstone comprising notable grasslands and woodland, including ancient woodland.<br>Grassland and woodland habitats are among the best remaining examples of semi-natural habitats on ragstone in the country. Numerous springs and flushes also present. |
| Otterpool Quarry SSSI | Within the site. | A geological conservation site. Not considered to have particular interest for invertebrates. |

| Site | Location / distance | Summary of designation |
|---|---|---|
| Gibbins Brook SSSI | North, beyond the M20/rail corridor<br>650m north | Marshy grassland on peaty soils which has developed from an acidic valley bog and still retains features characteristics of a bog.<br>Alder carr, dry acidic grassland, hedgerows, a small pond and stream habitats also present.<br>The site is also notable for its invertebrates, particularly moths. |

## Non-statutory designated sites

3.1.3 A number of sites listed within the ancient woodland inventory occur across the wider landscape surrounding the site. Two lie within 1km of the site: Lympne Park Wood and Folks Wood. Harringe Brooks Wood is adjacent to the site and Aldergate Wood lie just over 1km south-west. Lowland calcareous grassland inventory sites occur at Lympne Escarpment SSSI.

3.1.4 The data request response from the KMBRC confirmed that no locally designated County Wildlife Sites (CWS) occur on or immediately adjacent to application site. Two Local Wildlife sites (LWS) occur within 1km of the site – Folks Wood LWS (essentially overlapping the ancient woodland listed above) and the Royal Military Canal LWS. Harringe Brooks Wood LWS (also ancient woodland) lies just over 1km west and 'Pasture & Woods Below Court-at-Street-Lympne' is approximately 1.4km south west.

## Species

3.1.5 The invertebrate surveys conducted on the former Lympne Airfield Housing Development (CSa 2012) recorded two nationally scarce species, both of which are flea beetles (*Longitarsus parvulus* Na and *Longitarsus dorsalis* Nb). In addition, eight 'nationally local species' were recorded: a flea beetle (*Aphthona euphorbiae*), a seed weevil (*Aspidapion aenuem*); a seed weevil (*Ceratapion carduorum*); a flower beetle (*Oedemera lurida*); a weevil (*Phyllobius maculicornis*); a weevil (*Sitona humeralis*); short-winged cone-head (*Conocephalus dorsalis*) and Roesel's bush-cricket (*Metrioptera roeselli*). The two latter species have both undergone dramatic range expansions in recent years and their conservation status requires revising as they are not considered to be species of conservation concern.

3.1.6 The following species were recorded during the bumblebee and solitary bee survey of Lympne Airfield on 28/07/2020:

- Common Carder Bee, *Bombus pascuorum;*
- Buff-tailed Bumblebee, *Bombus terrestris;*
- Red-tailed Bumblebee, *Bombus lapidaries;*
- Southern Cuckoo Bumblebee, *Bombus vestalis;*
- White-tailed Bumblebee, *Bombus lucorum;*
- Brown-banded Carder Bee, *Bombus humilis;*
- Ruderal Bumblebee, *Bombus ruderatus;*
- Red-tailed Cuckoo Bee, *Bombus rupestris;*
- Moss Carder Bee, *Bombus muscorum;*
- Honey Bee, Apis mellifera;
- Common Wasp, Vespula vulgaris;
- Red Bartsia Bee, *Melitta tricinta;*

- Clover Bunthorn Bee, *Melitta leporine and*
- Yellow Legged Mining Bee, *Andrena flavipes.*

3.1.7 Of these species, three were considered 'rarer' bees, brown banded carder, Ruderal bumblebee and Moss carder bee.

3.1.8 Full details of the conservation status of the listed species including listing on section 41 of the NBERC Act is presented in Appendix B.

3.1.9 The KMBRC species information obtained in March 2018 returned a list of 120 species of conservation concern within a 2km radius around the centre of the site (see Appendix A). The data was collated and analysed to present only the most recent record for each species. All pre-1998 records have not been included as this historical records are considered to be too old to be of relevance.

3.1.10 Most of the records were for Lepidoptera, which is likely to be an effect of survey bias, as these are the most conspicuous and commonly recorded group of insects. Most of the Lepidoptera on the list are UK Biodiversity Action Plan (BAP) for research only species. Notable exceptions to this include the Sussex emerald moth (*Thalera fimbrialis*) and the four-spotted moth (*Tyta luctuosa*).

3.1.11 The list also included a number of nationally scarce and locally scarce Coleoptera and a small number of nationally scarce Hymenoptera, Diptera and Hemiptera. Some of the species on the list, such as the beewolf (*Philanthus triangulum*) can no longer be considered as of conservation concern because of recent, rapid range expansions.

3.1.12 The majority of these records are from Gibbin's Brook, Brockhill Country Park and Lympne Park Wood.

3.1.13 The updated KMBRC species information obtained in April 2020 did not return any additional records of invertebrate species of conservation concern or Kent Scarce or Red listed species.

### Glow-worm (2021)

3.1.14 Two records of glow worm were found near Sandling, approximately 0.9km and 1.4km to the east of the site boundary.

## 3.2 Field Survey

### Survey area

3.2.1 The area covered by the survey is outlined in Figure 1 and a table of habitat specific Target Notes corresponding to numbers on the map is included on Figure 1 and photographs are provided in Appendix C.

### General habitat

3.2.2 Full details of the habitats present on the site and plant species present are presented within ES Appendix 7.3 Habitat and Hedgerow Survey Report. The majority of the site comprised arable land and agriculturally improved grassland of limited value to invertebrates, habitats that have the potential to support invertebrates are described below.

### Hedgerow, scrub and woodland edge

3.2.3 The site supported a significant resource of woody habitat in the form of hedgerow, scrub and woodland edge. With a small number of exceptions, the network of hedgerows within the more managed agricultural parts of the site were regularly cut by flailing and such management is generally detrimental to more specialised hedgerow invertebrates. Notable hedgerows and woodland edges that are less regularly cut provided habitat of much higher potential to support scrub edge invertebrate assemblages.

3.2.4 The best hedgerow habitat for invertebrates was found in the west of the site along the tributary from Harringe Brooks Wood to the East Stour River (TN118) and north of the East Stour within two hedgerows (TN115). These areas also supported wood-decay habitat favourable for saproxylic invertebrates. This resource was mainly standing wood-decay habitat in living trees, including both old hedgerow shrubs and oak or ash standard trees.

3.2.5 Besides the hedgerow habitat, small amounts of scrub/woodland edge resource were recorded around a small patch of woodland in the west of the site (TN110).

3.2.6 With very few exceptions, these habitats will be retained within the green corridors and buffers within the site and will be enhanced with buffers supporting semi-natural habitat. These habitats will also benefit from greater connectivity and the provision of more native foodplants and nectar sources throughout the site.

## Grassland, field margins and bare ground

3.2.7 Much of the in-field habitat either comprised arable, grazing or species-poor improved grassland, these habitats being generally of low potential for invertebrates. Some of the more diverse grassland was recorded at the north and the south of the site (TN73, around Westenhanger Castle and TN193, within the disused airfield, along the runway, respectively).

3.2.8 There was a limited resource of bare ground habitat, largely isolated areas within the site's grassland and scrub habitat. There are some large, predominantly bare mounds and areas of bare ground in the grassland surrounding these mounds north of the Link Park area (TN165 and TN167). Ground nesting solitary bees (probably *Lasioglossum* spp.) were observed to be active in this area. There were also significant areas of bare ground in the disused lorry park (TN180 and TN182), but little aculeate (bees, wasps and ants) activity was observed in this area.

## Wetland

3.2.9 Wetland habitat include the East Stour River and its tributaries, the Folkestone Racecourse Lake, ponds, ephemeral pools and an extensive network of ditches.

3.2.10 All of the waterbodies assessed for habitat potential were considered to have potential to support aquatic invertebrate populations of conservation value and potentially the waterbody with the highest potential value was the Folkestone Racecourse Lake (TN19). This lake supports a fairly species-rich wetland plant (macrophyte) flora which created structural diversity of benefit to aquatic invertebrates. The lake supported habitat of varying depth, including extensive shallow areas favourable to invertebrates.

3.2.11 Many of the other ponds were also well vegetated and several supported a diverse macrophyte flora.

3.2.12 Besides the ponds, there were a number of ditches and ephemeral pools within the site. Many of the former were linear and trapezoidal channels, poorly vegetated, heavily shaded, eutrophic, lacking in structure and unlikely to support invertebrate assemblages of high conservation value. One exception to this was the ditch to the west of the racecourse lake (TN41) as it was comparatively wide with greater plant diversity, including many nectar sources. The network of ditches and ephemeral pools to the west of the lake is likely to support invertebrates associated with wet grassland as well as 'Litter-rich fluctuating wetland' and 'mineral marsh and open water' as described in Drake et al., (2007). Such wetland mosaic habitat can support specialist invertebrate assemblages and species of conservation value.

## Invertebrate species recorded (2018)

3.2.13 The walkover survey was conducted in August 2018 and a period of vary hot weather in the months prior to the survey had dried out many habitats. No strategic sampling was undertaken during the survey; however, incidentally observed species were noted. The ditch

and pool complex to the west of the lake supported many fly species 'nectaring' on the water mint (*Mentha aquatica*) flowers. The hornet hoverfly *Volucella zonaria*, the larvae of which are associated with wasp's nests, was observed in this area. On the marginal vegetation of the racecourse lake large numbers of the reed beetle *Donacia marginata* were observed. The larvae of these feed on the roots of aquatic plants and the genus includes many rare species. In the few areas of bare ground in the site that isn't intensive arable land, solitary bees were observed (primarily *Lasioglossum* spp.). It is highly likely the site as a whole supports a considerable assemblage of solitary bees and wasps.

3.2.14 Butterflies recorded were all common and widespread. The larvae of common blue *Polyommatus icarus*, in common with various other insect species associated with less improved grassland habitats, feeds on Common Bird's-foot-trefoil *Lotus corniculatus*. common damselflies including blue-tailed damselfly *Ischnura elegans* and azure damselfly *Coenagrion puella* were well distributed on site, indicating the presence of wetland habitat and broad-bodied chaser *Libellula depressa*, a dragonfly which commonly colonises newly created waterbodies, was also recorded.

## Habitat assessment update (2020)

3.2.15 The habitat assessment update identified no significant change in the type or condition of the invertebrate habitat within the site.

## Glow-worm survey (2021)

3.2.16 Two incidental records of adult female glow-worm were made during the bat activity surveys on 14 July 2021. The first of these was sighted at OSGR TR121372, to the west of Westenhanger Castle and the second at OSGR TR110375, along a hedgerow to the south of the railway line. An indicative location of these sightings is presented as orange dots in Image 2 below.

3.2.17 No observations of glow-worm were made during the glow-worm field surveys.

3.2.18 Anecdotal reports from people in the local area reported that adult female glow-worms had been observed on the disused Lympne airfield area, albeit more three years prior to 2021 (pers. comm. with surveyors with unnamed residents during the surveys).

*Image 2: Locations of incidental sightings of glow worm in 2021*

# 4 Discussion

## 4.1 Discussion of Results

4.1.1 The desk study revealed that few species of high conservation concern are known from the site or the surrounding area (within a radius of 2km). Previous invertebrate surveys that have been carried out in the southern part of the site revealed two 'nationally scarce' species and eight 'nationally local' species; however, two of the latter (the short-winged conehead and Roesel's bush-cricket) have undergone range expansions and their status is due for revision as they are no longer considered to be of conservation concern as they are undergoing an expansion in their range potentially due to climate change.

4.1.2 Within a 5km radius of the site there are two biological SSSIs. The most notable is Gibbin's Brook SSSI designated because it retains features of a bog and supports an interesting invertebrate assemblage, especially moths. This site is the source of many of the records obtained from KMBRC.

4.1.3 The invertebrate scoping survey in 2018 identified that much of the site is intensively farmed, which will have impoverished the invertebrate biodiversity significantly. Arable margins if wide and sympathetically managed can support a notable assemblage of invertebrates, but the margins in the site were largely narrow and botanically homogenous, which would severely limit the number their invertebrate diversity. The high-density grazing of sheep and the 'improvement' of pasture land has severely reduced the ability of pasture fields throughout the site to support anything other than a small community of widespread, generalist invertebrate species.

4.1.4 Beyond the arable land there are pockets of habitat that offer more potential for invertebrates. There is a good network of hedgerows, some of which are old, species rich and probably support a good diversity of invertebrates. Likewise, for the small blocks of woodland throughout the site. Many of the species in these woodland habitats are currently 'marooned' in a sea of intensively farmed land.

4.1.5 The most interesting habitats across the site are the wetland features, which range from small ditches to large open water bodies and a small river. Many of the ditches are botanically species poor and have suffered due to agricultural run-off and regular and excessive cutting, all of which would limit their value to invertebrates. The most notable aquatic features on site for invertebrates are Folkestone Racecourse Lake, its margins and the network of ditches and ephemeral pools to the west of this lake, and the East Stour River corridor. Both of these features are to be retained and enhanced within the development.

4.1.6 A few areas with a mosaic of ruderal grassland, scrub and bare-ground were identified, which can be valuable to a range of invertebrates, some of which are of conservation concern. Lympne Airfield, particularly the areas that are not cut for hay (largely the airfield periphery (TN249) and the runway (TN193)) are of value for invertebrates, as evidenced by the bee survey conducted in 2020 (Kirby 2020).

4.1.7 The habitat assessment updates in 2020 identified no significant change which modified the assessment of the status of invertebrate habitat within the site. The results of the 2020 survey concluded that:

- No further invertebrate surveys are required to inform a 2020 resubmission of the ES; and
- The valuations utilised in the 2018 submission are considered to be valid, with no evidence of any invertebrate habitats increasing in value.

4.1.8 Glow-worms were found to be present on site during bat activity surveys in 2021 but no further observations were made during the targeted glow-worm surveys. Habitats on site are

potentially suitable for this species, including but not limited to arable margins, woodland edges, Folkestone Racecourse and the disused Lympne Airfield.

# 5 Mitigation Recommendations and Further Work

## 5.1 Introduction

5.1.1 This section of this report outlines the mitigation proposed to enhance the site, which will ensure it supports a greater diversity of invertebrate species and contributes to the achievement of biodiversity net gain. This section does not constitute a full outline of the mitigation on the site, this will be provided and will be evolved during detailed design of each of the zones. Consideration of mitigation to be implemented has followed the mitigation hierarchy of avoid, mitigate, compensate, or enhance.

## 5.2 Design Mitigation

### Avoidance of impacts to invertebrate populations

5.2.1 In line with the mitigation hierarchy, the first step of the mitigation for impacts to invertebrate populations is avoidance. From the start of the masterplanning process, notable habitats with the potential to support notable fauna, including invertebrates, were ranked in terms of relative importance. The vast majority of areas of potentially notable value for invertebrates will be retained, buffered and enhanced. These areas with specific value for invertebrates identified during the scoping surveys which are to be retained within the development are:

- **Hedgerows**: The majority of hedgerows are maintained, where hedgerows are to be bisected, these sections will be translocated. Additional hedgerows are to be planted within the proposed Development;
- **Woodlands**: All woodlands within the development area are to be retained and buffered. Details of the buffers are provided within the Otterpool Park Environmental Statement (ES) Chapter 7: Biodiversity and Otterpool Park Design and Access Statement (DAS) (ES Appendix 4.16);
- **Running water**: The East Stour River corridor, and the two main tributaries on site are being retained and buffered. Details of the buffers are provided within the ES Chapter 7: Biodiversity and DAS (ES Appendix 4.16);
- **Individual trees**: The vast majority of the trees are being retained within green infrastructure (GI). Where trees fall within development parcels, there will be a design parameter that specifies retention of these trees where practicable;
- **Semi-improved neutral grassland**: most of the grassland is improved or species poor semi-improved, the areas around TN73 is semi-improved neutral grassland which is to be retained; and
- **Standing water**: The Folkestone Racecourse Lake (TN19) is being retained and buffered. With the exception of one pond (at TN66) the majority of ponds within the site are being retained within GI.

### Mitigation for unavoidable impacts

5.2.2 The bullet points below outline the key habitat typologies within the site for invertebrates which are to be lost or modified as a component of the development. Appropriate mitigation is proposed and specified. The target notes referred to are taken from the Habitat and Hedgerow Survey (ES Appendix 7.3) and are also presented in Figure 1:

- TN20 – An area of 600m of ditches. This network of ditches to the east of Folkestone Racecourse Lake is being lost during the development. These ditches have suffered from eutrophication and regular flailing. They are therefore of limited value to invertebrates. Approximately 1000 of ditches are being created specifically to replace these ditches, slightly to the east of the ditches to be lost (adjacent to Westenhanger

village) and to the west of the tributary of the East Stour to the south of the A20. These new ditches and the similar habitats that are to be created and restored during the development have the potential to be much more valuable to invertebrates. Targets for these new habitats will be included within the BAP (ES Appendix 7.20).

- TN51 – A seasonal flush in sheep grazed field. This habitat is being lost, but its value to invertebrates is very limited due to grazing pressure. There are similar habitats nearby that are being retained and the creation and restoration of other habitats across the site will mitigate for this loss, specifically the extensive creation of sustainable drainage systems (SuDS) features.
- TN52 – Ditch. This is being lost within the development, but it is botanically species poor, has suffered from eutrophication and is of therefore of little value to invertebrates. There are similar habitats nearby that are being retained and the creation and restoration of other habitats across the site will mitigate for this loss.
- TN53 – Neutral semi improved grassland bordering railway and roundabout. This is being lost, but it is of little value to invertebrates in its current state. Nearby margins, buffers and vegetation along the nearby railway line will be much more valuable to invertebrates. The proposed green infrastructure (GI) for the development will create extensive areas of this habitat.
- TN65 – Young, species poor hawthorn hedge. This hedge is being lost in development, but its value to invertebrates is very limited and there are similar, better quality resources available nearby. The margins of the development will also include the planting of many native species, including hawthorn.

5.2.3 Where hedgerow sections across the site are to be removed, these will be translocated.

- TN66 – Pond. This will be lost in the development, but the current value to invertebrates is limited because of the amount of grazing and resultant eutrophication. The creation and restoration of other habitats across the site will mitigate for this loss.
- TN180 / 182 – Lorry park. This area will be lost in the development. At present it probably supports an assemblage of aculeates (insects having or resembling a stinger or barb; such as bees and wasps) and ground-active thermophilic (heat loving) species. The habitats required for these species would be replaced within the buffers of the developed site.
- TN165 and 167 – Ruderal grassland and mostly bare earth and rubble mounds. These habitats will be lost in the development, but the community of invertebrates using these areas could be supported in the green spaces of the development if there are sufficient areas of nectar sources, scrub and bare ground. This mosaic of habitats would be recreated on the nearby bunds.

5.2.4 For glow-worm, managing the airfield in a way that nurtures areas of rough grassland and minimises eutrophication would benefit this species. The glow-worm will certainly benefit from the cessation of intensive agriculture and there is the potential for the development to be executed in a way that benefits many other species, not just the glow-worm. Planting throughout the development should be native species with a focus on those plant species that are currently found in the woodland edges, field margins and less improved grassland. Planting in this way will increase the habitat available for the species currently found in the existing margins and will allow them to disperse through the landscape more easily. It is crucial there is a system in place for the long-term management of these margins and the planted areas on the development.

## Enhancements proposed within the design

5.2.5 Across the site, a diverse range of habitats are to be created to maximise the value of the GI around the site, for a range of species, including invertebrates. These areas include a

Country Park in the centre of the site, a River Park and a new nature area / wetland in the north west of the development. Habitats to be created include:

- Ponds created for biodiversity, these will be designed to meet the prescriptions of the relevant 'habitat of principal importance' description. Areas where ponds are to be created include the buffer around Harringe Brooks Wood, south of the Folkestone Racecourse Lake (TN21), adjacent to the East Stour (around TN102), and to the west of Lympne Village.
- Areas of woodland planting, these areas are to be planted to screen the Otterpool park development and to create connectivity. This includes panting linking Harringe Brooks Wood to the river corridor to the north. This tree planting will be to the west of the development.
- SuDS features including ponds, drainage ditches, swales and rain gardens (these will not primarily be 'for biodiversity but will have biodiversity value).
- Hedgerows will be planted across the development. These will be native species hedgerows and will be planted to subdivide parcels within the development, but also to provide a permeable barrier for wildlife between properties and GI. These features will provide a notable habitat for a range of species, especially invertebrates.
- Areas of species rich wildflower grassland will be created across the site. The habitat composition / seed and planting mix should be based upon the soil present but should be based upon the descriptions of priority habitat (lowland meadow) this will benefit invertebrates.
- Scattered trees are to be planted through the GI of the development. The species of these will be designed to safeguard against disease and climate change but will be native where appropriate.
- Areas of scrub will be created/allowed to develop, which will have value for invertebrates.

5.2.6 General enhancement will also occur and includes (but is not limited to):

- Hedgerow enhancements tom improve connectivity in the form of gapping up; improved management and restoration of ground flora;
- Pond enhancement to achieve the parameters of the 'habitats of principal importance' descriptions.

5.2.7 The Otterpool Park ES biodiversity net gain report (ES Appendix 7.21) outlines how the creation of these habitats across the site will ensure that the Otterpool Park Development achieves net gain, in line with the Prescriptions of the NPPF (2021).

5.2.8 In addition to this general habitat creation, key areas are to be enhanced for invertebrates (Target Notes are presented on Figure 1).

- **Folkestone Racecourse Lake:** This area (TN19) is to be retained and enhanced. Enhancement includes an increase in the structural complexity of the lake margin and creation of bare ground and dead wood micro-habitats. In addition, a new area of semi-natural water will be created to the south of the lake, to provide a buffer to the lake to the north. This area will also have value for invertebrates.
- **Ephemeral pools and ditches**: The network of ephemeral pools and ditches (TN41) to the west of the Folkestone Racecourse Lake will be enhanced by using management to increase the amount and variety of nectar sources in the surrounding grassland.
- **The East Stour River corridor**: This habitat will benefit from an increased >50m buffer on both sides (TN100). This buffer will include grassland, scrub, trees and SuDS features. The river banks will be improved in areas for invertebrates by increasing the plant diversity, through thinning the overgrowing vegetation. Any trees that are removed

from the river banks will be left as a mixture of standing dead and dead wood on the ground, which are valuable resources for many species. It is considered that this area will benefit from the removal of the adjacent area from agricultural usage, as this will reduce the effect of pesticides and fertilisers on these areas, which is likely to be impacting upon the diversity of invertebrates.

- **Areas of woodland**: Management of the boundary between retained woodlands and land proposed for other uses and enhancement with high value GI. Within these woodland buffer areas, a species rich grassland mosaic and SuDs features ware to be created with will form a valuable ecotone for invertebrates.
- **Hedgerow / ditch connectivity**: Hedgerows and ditches cross the site providing valuable wildlife corridors. An area in the west of the site around TN118, 225, 227 connects Harringe Brooks Wood to the river corridor to the south. This will be enhanced with buffers of grassland. Although there will be three areas of fragmentation for new road accesses, the planting of native plants after the development work and ensuring that an unbroken line of vegetation develops under the crossings after they have been built (where possible) will minimise this impact.
- **Landscape bunds**: These bunds are to be retained within the development (TN197 and 198). These are currently succeeding to scrub and the grassland habitats on them are becoming rank. These could be very valuable habitats because of the steep slopes and warmth they offer in south and south-east-facing aspects. It is proposed that these bunds be enhanced with annual hay cuts and the creation of bare-ground scrapes for thermophilic species. Retaining and maintaining a good age range of scrub on these bunds would also benefit many invertebrates.

5.2.9 The installation and maintenance of the features listed above will be specified within a site BAP (ES Appendix 7.20).

## Summary of Avoidance, Mitigation and Enhancement

5.2.10 Within the development, there will be embedded design mitigation to ensure that the current habitats are enhanced and that invertebrates can more easily move through the landscape. Crucial to this is the creation of buffers around existing and new habitats. To support a diverse assemblage of invertebrates these areas need to species-rich grassland with abundant, native nectar sources. The plant species planted in these areas would reflect the underlying soil types and managed with an annual hay cut.

5.2.11 Trees planted throughout the site would be those that offer the most potential to the greatest range of species and would include native Oak, Willow, Ash, Field Maple, Hawthorn and Dogwood. Hawthorn and Dogwood are particularly important nectar sources in the early part of the summer for a large variety of insect species.

5.2.12 In those areas where the margins/buffers are sufficiently wide a scrub ecotone would be allowed to develop as these habitats provide food-plants and enhance the dispersal of many insect species through the wider landscape.

5.2.13 Bare-ground and deadwood are crucial elements in the green infrastructure of the site as they are often neglected but support a wealth of species. Bare-ground on slopes and small cliff type structures in south and southeast facing aspects are the most valuable and these would be dotted throughout the entire site and managed on a rotational basis, i.e. letting some areas grow over and creating new sites in nearby areas. The species that use bare-ground either to nest, bask or hunt will also benefit from the close proximity of nectar sources in the margins/buffers.

5.2.14 The proposed cutting of trees along the river corridor (proposed as an enhancement for other species, specifically water vole) provides the opportunity for creating an abundance of dead-wood habitat. Dead wood in a variety of situations (i.e. standing, fallen, in full sun and in

shade) will create the greatest variety of niches. Many dead wood invertebrates also need access to nectar sources, especially in the early part of the year (e.g. Hawthorn and Dogwood), so the close proximity of such sources to dead wood habitat as proposed within the riparian corridor buffer would provide a valuable habitat.

5.2.15 The development proposes the creation of wetlands throughout the site, which have the greatest potential for invertebrates as they would be designed to offer a range of micro-habitats, e.g. a range of water depths, aspects, diverse margin vegetation, basking spots, etc. These wetlands can also serve as corridors for the dispersal and movement of species through the landscape.

5.2.16 Proposed wetland feature design is shown within the Otterpool Park EIA, specifically within the sections relating to mitigation for water voles and great crested newts (ES Appendices 7.9, 7.10 and 7.18).

## 5.3 Construction Mitigation

5.3.1 In addition to the design mitigation above, during detailed design and construction of the development, it is likely that additional actions may be required to safeguard the current invertebrate populations. These actions would be specified within a Code of Construction Practice (CoCP) plan and would include:

- Clear demarcation of areas that are to be retained with minimal disturbance to the buffers. Many species of invertebrate overwinter as eggs, larvae or adults in the soil, leaf-litter, under bark, etc. so it is imperative that these habitats are not disturbed in the buffers surrounding the more important retained habitats;
- Appropriate measures are put in place to control dust and other emissions that could affect air quality;
- Site compounds, storage facilities and staff facilities are suitably bunded and located in places that would not have an adverse effect on the environment; in particular, the CoCP would ensure that retained trees are protected;
- In advance of site clearance, protective fencing is installed to protect retained and/or ecologically sensitive habitats (woodlands, mature trees and hedgerows) and their associated buffer zones to ensure that they are not subject to accidental damage (to be determined on a phase by phase basis);
- Haul routes, storage compounds and staff facilities would be located away from retained habitats to minimise disturbance to the species they support;
- An ecological clerk of works is in place to oversee site clearance, in particular any works that have the potential to disturb notable receptors. They would also ensure that the mitigation measures proposed adhere to best practice guidelines and take account of any changes in legislation that may have occurred;
- The ecological clerk of works would ensure that hedgerow translocation is undertaken in accordance with an agreed method statement. They would also ensure that the retained and translocated hedgerows are monitored to ensure that they are managed appropriately;
- An ecological clerk of works would be employed to ensure that the ecological protection measures outlined in the CoCP are adhered to. They would also undertake regular monitoring to ensure that the protection measures remain in place for the time that they are required; and
- The Ecological Clerk of Works would report to the Site Manager and/or Environmental Clerk of Works to ensure that remedial actions are undertaken in a timely manner.

## 5.4 Additional Mitigation

5.4.1 Additional actions may be required to safeguard the current invertebrate populations. These actions may include:

- Habitat manipulation to displace invertebrates into retained habitats adjacent to habitats to be removed prior to removal;
- Any large pieces of dead wood in areas that are to be developed can be moved to retained areas and deposited in a range of situations, i.e. full shade through to full sun; and
- Any trees that are cut in the retained areas should be left as dead-wood with a mixture of standing (2-3m high) and boughs and trunks on the ground.

### Operational Mitigation

#### Safeguarding habitats

5.4.2 In order to minimise operational impacts to retained and enhanced invertebrate populations. The following approaches would be implemented:

- GI would be designed to limit human accessibility to the most sensitive areas, GI design will minimise impacts to these areas, utilising topography, habitat and fencing to control recreational pressures;
- Buffers will be created and maintained around retained and created notable invertebrate areas;
- Newly created habitats, particularly the are in the north west will be positioned away from development where possible to minimise impacts from humans.

#### Maintenance and monitoring

5.4.3 It is imperative that the long-term management of the habitats (both retained and created) be agreed before the development. This will need to be specified in a management plan at the appropriate time in the planning process, likely within an EMP (Ecological Management Plan) prior to any parcel of the development being developed.

5.4.4 The Otterpool Park BAP (ES Appendix 7.20) will specify broad target for species and groups, including invertebrates. This will drive future management and conservation actions. It is envisioned that this will be alive document, to be updated with input from key stakeholders, including the town's residents.

## 5.5 Further Survey

5.5.1 The vast majority of the habitats that have potential for invertebrates are being retained further detailed surveys are not deemed necessary to inform the masterplan design or ES.

5.5.2 There are a small number of areas which would benefit from further survey to inform the detailed design for the subsequent detailed planning applications. Due to the extended timeframe for build out of the development (19 years in duration), the timing of the surveys would be appropriate to be aligned with the phasing of the detailed design.

5.5.3 While the Folkestone racecourse lake is being retained, there will be landscaping around the northern margin to permit easier access for human recreation. This work would need to be proceeded by detailed surveys, which should be conducted at an appropriate time in the planning process.

5.5.4 If any modification works are required within this area, detailed invertebrate surveys may be required to inform the detailed planning, design and mitigation. These surveys should be conducted at an appropriate stage of the planning process and are outlined within Table 4.

5.5.5 There was a limited resource of bare ground habitat, largely isolated areas within the site's grassland and scrub habitat. There are some large, predominantly bare mounds and areas of bare ground in the grassland surrounding these mounds north of the Link Park area (TN165 and 167). Ground nesting solitary bees (probably *Lasioglossum* spp.) were observed to be active in this area. It may be necessary to conduct invertebrate surveys to inform detailed design and mitigation prior to development within this area. There were also significant areas of bare ground in the disused lorry park (TN180 and 182), but minimal aculeate activity (insects having or resembling a stinger or barb; such as bees and wasps) was observed in this area. Surveys, where required should be conducted at an appropriate stage of the planning process and are outlined within Table 4.

5.5.6 The areas where further surveys are recommended are around the Folkestone Racecourse Lake, an area to the north of Link Park and a long hedgerow / ditch which is to be bisected in the west of the site (around TN118).

*Table 4: Summary of further surveys recommended*

| Location | Habitat | Timing of survey within planning process | Type of survey to be conducted | Seasonal timings |
|---|---|---|---|---|
| Folkestone Racecourse Lake | Freshwater Pond | Prior to detailed planning application | Standardised pond netting and sweeping/beating of marginal vegetation* | May, June and July |
| Bunds to the north of link park | Bare ground slopes, bae ground, scrub | Prior to detailed planning application | Standardised sweep netting, beating, suction sampling and pan-trapping* | May, June and July |
| Hedgerow in the west of the site. | Hedgerow, shallow ditch. | Prior to detailed planning application | Standardised sweep netting, beating, suction sampling and pan-trapping* | May, June and July |

*Sampling protocol after Drake *et al.* 2007

5.5.7 Any changes to the plans that have impacts on the retained areas/green infrastructure will need to be reviewed and further detailed surveys carried out where appropriate.

# 6 Conclusions

6.1.1 A walkover of the site was conducted on the 8 August 2018 with a habitat assessment update undertaken in May 2020 to update the validity of the survey The areas that were to be lost in the development were visited and photographed along with all the areas that present the likely most valuable habitats for invertebrates. The majority of the site has been intensively farmed for many decades (arable/grazing) and is of limited value to invertebrates. The field margins and hedgerows in the intensively farmed areas are species poor and would support impoverished invertebrate communities.

6.1.2 The more interesting habitats in the development site includes species rich hedgerows, semi-improved neutral grassland, woodland, water bodies and riparian habitats. However, with the exception of the riparian corridor there is limited connectivity of these habitats at the landscape scale, which places invertebrates, especially those with limited dispersal abilities, at rick of localised extinction.

6.1.3 The vast majority of the habitats that have potential for invertebrates are being retained. Further detailed surveys are not deemed necessary to inform the masterplan design or EIA. It is considered that the information collated to date is sufficient to inform the masterplan design and provide ample information for the EIA. There are three discrete areas where detailed invertebrate surveys are warranted at the appropriate time within the planning process, to inform detailed design and mitigation and provide a baseline for monitoring. One of these consists of two large mounds with large areas of bare ground in a mosaic of grassland and scrub (TN 165 and 167) and the others are Folkestone Racecourse Lake (TN19) and its margins and a hedgerow / line of trees and ditch in the west of the site (TN118).

6.1.4 The habitat assessment update in 2020 identified no significant change in the status of invertebrate habitat within the site. The results of the 2020 survey concluded that:

- No further invertebrate surveys are required to inform a 2020 resubmission of the ES; and
- The valuations utilised in the 2018 submission are considered to be valid, with no evidence of any invertebrate habitats increasing in value.

6.1.5 The plan for the Otterpool development retains the vast majority of the higher-quality habitats and will achieve biodiversity net gain by creating buffers and margins around these existing features as part of ‘green infrastructure’ throughout the site. Not only will this increase the amount and variety of potentially valuable invertebrate habitats, but it will also improve connectivity. A network of water-bodies will be created throughout the development that will enhance the value of the site for invertebrates. In addition, a new wetland area created in the north-west of the development has the potential to offer a range of interesting habitats that could sustain a diverse community of invertebrates.

# 7 References


| Ref | Reference Description |
|---|---|
| Ref 1 | CSa Environmental Planning (2012). Ecological appraisal for former Lympne Airfield Housing Development. |
| Ref 2 | Drake, C.M., Lott, D.A., Alexander, K.N.A. and Webb, J. 2007. Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England Research Report NERR005. |
| Ref 3 | Kirby, G, ed. Gammans, N. (2020) Lympne Airfield Site, Ecological Survey Report, September 2020. |
| Ref 4 | Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework, 2021. Ministry of Housing, Communities and Local Government London. |
| Ref 5 | HMSO (1981) Wildlife and Countryside Act 1981. HMSO, London. |
| Ref 6 | HMSO (2006) Natural Environment and Rural Communities Act 2006. HMSO, London. |
| Ref 7 | Kent Biodiversity Partnership (2017) *UK BAP priority species are* available at: http://www.kentbap.org.uk/habitats-and-species/priority-species/ [Accessed: October 2017]. |
| Ref 8 | HMSO (2000) Countryside and Rights of Way Act 2000. HMSO, London. |
| Ref 9 | HMSO (2017) The Conservation of Habitats and Species Regulations 2017. HMSO, London |

# Figure 1: Habitats on Site and Target Notes Relating to the value of Each Area to Invertebrates

N.B. Target Notes are those utilised in the Habitat and Hedgerow report for clarity between reports

| Target Note | Notes Specific to Invertebrate Scoping Survey |
|---|---|
| 20 | A network of c.600m of ditches. This network of ditches to the east of Folkestone Racecourse Lake is being lost during the development. These ditches have suffered from europhication and regular flailing. They are therefore of limited value to invertebrates. Mitigation for this loss is accounted for in the form of replacement ditches. these new ditches and the similar habitats that are created and restored during the development have the potential to be much more valuable to invertebrates. |
| 38/105 | Glow worm recorded in these areas |
| 51 | Shallow seasonal flush in sheep-grazed field. This habitat is likely to be impacted, but its value to invertebrates is very limited due to grazing pressure. There are similar habitats nearby that are being retained and the creation and restoration of other habitats across the site will mitigate for this loss. |
| 52 | Ditch. This is being lost to the development, but it is botanically species poor, has suffered from eutrophication and is of therefore of little value to invertebrates. There are similar habitats nearby that are being retained and the creation and restoration of other habitats across the site will mitigate for this loss. |
| 53 | Neutral semi improved grassland bordering the railway (to the north) and the A20 road to the east. This area is being lost to the development, but it is of little value to invertebrates in its current state. Nearby margins, buffers and vegetation along the adjacent railway line offer much more valuable habitats for invertebrates. |
| 65 | Young, species poor howthorn hedge. This hedge is being lost to the development, but its value to invertebrates is very limited and there are similar, better quality resources availabe nearby. The margins of the development (as shown in the DAS) will also include the planting of many native species, including hawthorn hedging. |
| 66 | Pond. This will likely be impacted by the development, but the current value to invertebrates is limited because of the amount of grazing and resultant eutrophication. The creation and restoration of other habitats across the site will mitigate for this loss. |
| 110 | A small area of woodland, Park Wood. This woodland has an interesting ecotone between the woodland and arable land. This area is to be retained within the development. |
| 118 | This long hedge / line of trees will enhanced by buffers of grassland and ditches either side as a component of the development. Three road crossings bisecting this hedge are required, and the resultant impacts will be mitigated for. Mitigation includes the planting of native plants after the development work and ensuring that a unbroken line of vegetation develops under the crossings after they have been built, where possible. |
| 180 | Disused lorry park. This area will be lost to the development. At present it probably supports an assemblage of aculeates and ground-active thermophilic species. The habitats required for these species will be created in the margins of the development in this area as mitigation. |
| 193 | A disused runway. This runway area is species rich and is likely to support a notable assembalge of invertebrates. This area will be retained within the development. A survey in 2020 recorded a notable assemblage of bees in this area including three 'rarer' species' |
| 165 / 167 | Two areas dominated by ruderal grassland and mostly bare ground mounds. These habitats will be lost to the development. This mosaic of habitats will be created on the nearby bunds as mitigation for this loss. |
| 197 / 198 | A number of long landscape bunds. These are currently scrubbing over and the grassland habitats on them are becoming rank. These could be very valuable habitats because of the steep slopes and warmth they would be enhanced with annual hay cuts and the creation of bare-ground scrapes for thermophilic species (this would also be of value for reptiles). |
| 98/ 113 | Riparian corridor. This valuable habitat for invertebrates will be retained, buffered and for invertebrates as part of the development. The East Stour River corridor represents a very valuable corridor for the movement and dispersal of many species. This entire habitat will benefit from a >50m margin on both sides. the river banks will be improved for invertebrates by creating more open areas and increasing the plant diversity. a proportion of the trees that are removed from the river banks would be left as a mixture of standing dead and dead wood on the ground, which are valuable resources for many invertebrate species. |

Note -
Target note numbers are taken from the Habitat Survey.
Target notes are focussed on areas with the highest value for invertebrates, especially where the development will impact these habitats.

0 1:18,000 1 km

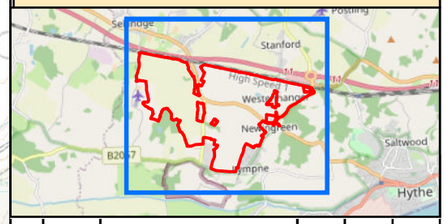
N W E S

**Legend**

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Phase 1 Target Note
- Invertebrate Target Note
- Scattered scrub
- Scattered trees
- Earth Bank
- Species poor hedgerow with trees (confier)
- Native species-rich intact hedge
- Species poor intact hedge
- Species poor defunct hedge
- Native species-rich hedge with trees
- Species poor hedge with trees
- Fence
- Ditch
- Running water
- Wall
- Broad-leaved semi-natural woodland
- Broad-leaved parkland scattered trees
- Mixed plantation woodland
- Plantation woodland
- Dense/continuous scrub
- Ephemeral / short-perennial
- Introduced shrub
- Tall ruderal
- A Amenity grassland
- A Arable
- SI Semi-improved neutral grassland
- SI Species poor semi-improved grassland
- I Improved grassland
- Bare ground
- Building
- Hardstanding
- Standing water
- Riparian corridor *

*Riparian Corridor within the site consists of a 1-3m wide stream / river largely surrounded on both banks by trees and scrub






| REV | Date | Description | Drawn | Check | Approv |
|---|---|---|---|---|---|
| 01 | 11/11/21 | FOR INFORMATION | RM | EG | BM |

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London
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OTTERPOOL PARK
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**Figure 1**
**Invertebrate Survey**
**Target Notes**

| scale | original size | datum | grid |
|---|---|---|---|
| 1: 15,000 | A3 | Sx | BNG |

# APPENDIX A: Historical Records

*Table 5: Conservation concern species inventory provided by Kent and Medway Biological Records Centre (edited to remove duplicates and pre-1998 records).*

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| **DIPLOPODA** | | | | |
| *Polyzonium germanicum* | Boring Millipede | UKBAP_P, NERC_S.41 | TR13E | Gibbins' Brook |
| | | | | |
| **GASTROPODA** | | | | |
| *Arion ater* | Large Black Slug | " | TR13J | |
| *Helicigona lapicida* | Lapidary Snail | Kent RDB2 | TR099347 | Aldergate Wood |
| | | | | |
| **MALACOSTRATA: DECAPODA** | | | | |
| *Austropotamobius pallipes* | White-clawed Freshwater Crayfish | RedList_Global_post2 001-EN, UKBAP_P, NERC_S.41 | TR13 | Seabrook |
| | | | | |
| **INSECTA: LEPIDOPTERA** | | | | |
| *Hepialus humuli* | Ghost Moth | UKBAP_P, NERC_S.41 | TR077388 | M20 N verge nr Sellinge converter stn |
| *Lasiommata megera* | Wall | " | TR122351 | Lympne |
| *Coenonympha pamphilus* | Small Heath | " | TR1334 | Hythe |
| *Limenitis camilla* | White Admiral | " | TR1335 | Pedlinge, Folks Wood |
| *Satyrium w-album* | White-letter Hairstreak | " | TR1434 | Hythe, The Roughs |
| *Watsonalla binaria* | Oak Hook-tip | " | TR1335 | Folks' Wood |
| *Malacosoma neustria* | Lackey | " | TR1234 | Hythe, West Hythe (Lympne Park Wood) |

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| *Scopula marginepunctata* | Mullein Wave | " | TR13H | West Hythe |
| *Timandra comae* | Blood-Vein | " | TR1233 | Nickolls Quarry |
| *Scotopteryx chenopodiata* | Shaded Broad-bar | " | TR1137 | Sellindge, Hythe |
| *Xanthorhoe ferrugata* | Dark-barred Twin-spot Carpet | " | TR1536 | Heane Wood |
| *Ecliptopera silaceata* | Small Phoenix | " | TR123343 | West Hythe, Hythe |
| *Melanthia procellata* | Pretty Chalk Carpet | " | TR1234 | Hythe, Lympne Royal Military Canal |
| *Chiasmia clathrata subsp. clathrata* | Latticed Heath | " | TR1034 | Hythe, Lympne (Royal Military Canal) |
| *Ennomos quercinaria* | August Thorn | " | TR1038 | The Silver Spray, Sellindge |
| *Ennomos fuscantaria* | Dusky Thorn | " | TR1038 | Hythe, Sellindge ("The Silver Spray") |
| *Hemistola chrysoprasaria* | Small Emerald | " | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Thalera fimbrialis* | Sussex Emerald | RedList_GB_Pre94- EN, UKBAP_P, NERC_S.41 | TR123343 | West Hythe, Hythe |
| *Spilosoma lutea* | Buff Ermine | " | TR1536 | Heane Wood |
| *Spilosoma lubricipeda* | White Ermine | " | TR123343 | West Hythe, |
| *Arctia caja* | Garden Tiger | UKBAP_P, NERC_S.41 | TR1038 | Hythe, Sellindge ("The Silver Spray") |
| *Tyria jacobaeae* | Cinnabar | " | TR1173338645 | Hythe, Sellindge (Gibbin's Brook) |
| *Paracolax tristalis* | Clay Fan-foot | " | TR135356 | Hythe, Folks' Wood |
| *Tyta luctuosa* | Four-spotted | RedList_GB_Pre94- VU, UKBAP_P, NERC_S.41 | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Acronicta psi* | Grey Dagger | " | TR1234 | Hythe, Lympne Royal Military Canal |
| *Acronicta rumicis* | Knot Grass | " | TR123343 | West Hythe, Hythe |

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| *Amphipyra tragopoginis* | Mouse Moth | " | TR123343 | West Hythe, Hythe |
| *Allophyes oxyacanthae* | Green-brindled Crescent | " | TR1537 | Cowtye Wood |
| *Caradrina morpheus* | Mottled Rustic | UKBAP_P, NERC_S.41 | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Hoplodrina blanda* | Rustic | " | TR123343 | West Hythe, Hythe |
| *Hydraecia micacea* | Rosy Rustic | " | TR1233 | Nickolls Quarry |
| *Amphipoea oculea* | Ear Moth | " | TR135356 | Hythe, Folks' Wood |
| *Rhizedra lutosa* | Large Wainscot | " | TR13C | Lympne |
| *Cirrhia icteritia* | Sallow | " | TR1537 | Cowtye Wood |
| *Cirrhia gilvago* | Dusky-lemon Sallow | " | TR1034 | Hythe, Port Lympne |
| *Agrochola lychnidis* | Beaded Chestnut | " | TR1034 | Hythe, Port Lympne |
| *Atethmia centrago* | Centre-barred Sallow | " | TR1034 | Hythe, Port Lympne |
| *Brachylomia viminalis* | Minor Shoulder-knot | " | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Aporophyla lutulenta* | Deep-brown Dart | " | TR1333 | |
| *Tholera cespitis* | Hedge Rustic | " | TR1333 | |
| *Tholera decimalis* | Feathered Gothic | " | TR0833 | Dymchurch, Lower Wall Farm |
| *Melanchra persicariae* | Dot Moth | " | TR123343 | West Hythe, Hythe |
| *Leucania comma* | Shoulder-striped Wainscot | " | TR1034 | Hythe, Port Lympne |
| *Euxoa tritici* | White-line Dart | " | TR124344 | West Hythe, RM Canal |
| *Diarsia rubi* | Small Square-spot | " | TR1233 | Nickolls Quarry |

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| *Eugnorisma glareosa subsp. glareosa* | Autumnal Rustic | " | TR1333 | |
| *Oegoconia caradjai* | Straw Obscure | Notable-B | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Bisigna procerella* | Kent Tubic | Kent RDB2 | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Pexicopia malvella* | Hollyhock Seed Moth | Notable-B | TR15383668 | Froggies, Saltwood |
| *Cochylidia subroseana* | Dingy Roseate Conch | Kent RDB2 | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Argynnis paphia* | Silver-washed Fritillary | Kent RDB1 | TR1335 | Pedlinge, Folks Wood |
| *Moitrelia obductella* | Kent Knot-horn | RedList_GB_Pre94- VU | TR123343 | West Hythe, Hythe |
| *Oncocera semirubella* | Rosy-striped Knot-horn | " | TR123343 | West Hythe, Hythe |
| *Pempelia genistella* | Gorse Knot-horn | " | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Gymnancyla canella* | Hoary Knot-horn | Notable- | TR124344 | Hythe, West Hythe (Royal Military Canal) |
| *Synaphe punctalis* | Long-legged Tabby | " | TR1434 | |
| *Sitochroa palealis* | Sulphur Pearl | Notable | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Anania verbascalis* | Golden Pearl | Notable-B | TR135356 | Hythe, Folks' Wood |
| *Evergestis extimalis* | Marbled Yellow Pearl | Notable-B | TR123343 | West Hythe, Hythe |
| *Calamotropha paludella* | Bulrush Veneer | " | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Platytes alpinella* | Hook-tipped Grass-veneer | RedList_GB_Pre94-R | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Scopula nigropunctata* | Sub-angled Wave | Kent RDB1, RedList_GB_Pre94- VU | TR1234 | Hythe, West Hythe (Lympne Park Wood) |
| *Calophasia lunula* | Toadflax Brocade | Kent RDB1, RedList_GB_Pre94-R | TR13 | Hythe Ranges, just to the east |
| | | | | |

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| **INSECTA: DIPTERA** | | | | |
| *Dorycera graminum* | Phoenix Fly | RedList_GB_Pre94-R, UKBAP_P, NERC_S.41 | TR12253540 | Walnut Tree Cottage, Lympne |
| *Stratiomys potamida* | Banded General | Notable | TR12253540 | Walnut Tree Cottage, Lympne |
| *Cheilosia barbata* | A fly | Notable, NS-excludes | TR1435 | Brockhill Country Park |
| *Dioxyna bidentis* | A fly | Notable | TR14933558 | Brockhill Country Park |
| *Trypeta zoe* | A fly | RedList_GB_Pre94- EN | TR14683595 | Brockhill Country Park |
| *Piezura graminicola* | A fly | Kent RDB1, Kent RDB2, RedList_GB_Pre94- Insu | TR14683595 | Brockhill Country Park |
| *Helina abdominalis* | A fly | Notable | TR14683595 | Brockhill Country Park |
| | | | | |
| **INSECTA: HEMIPTERA** | | | | |
| *Macrosteles cristatus* | A bug | Notable-B | TR14783545 | Brockhill Country Park |
| *Empicoris baerensprungi* | A bug | Notable-A | TR148357 | Brockhill Country park |
| | | | | |
| **INSECTA: COLEOPTERA** | | | | |
| *Gymnetron villosulum* | A beetle | Notable-B | TR03U | |
| *Polydrusus formosus* | A beetle | Notable-A | TR130356 | Woods at Bilsington,western section |
| *Acrotona troglodytes* | A beetle | RedList_GB_Pre94- Insu | TR1234 | |
| *Aleochara verna* | A beetle | RedList_GB_Pre94- Insu | TR148357 | Brockhill Country park |
| *Gyrophaena congrua* | A beetle | Notable | TR148357 | Brockhill Country park |
| *Gyrophaena manca* | A beetle | Notable | TR148357 | Brockhill Country park |
| *Cypha discoidea* | A beetle | Notable-B | TR13C | |
| *Oligota apicata* | A beetle | Notable | TR148357 | Brockhill Country park |
| *Carpelimus fuliginosus* | A beetle | Notable | TR13C | |

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| *Philonthus confinis* | A beetle | RedList_GB_Pre94- Inde | TR148357 | Brockhill Country park |
| *Quedius fulgidus* | A beetle | Notable-B | TR1234 | |
| *Hypnogyra angularis* | A beetle | Notable-A | TR1234 | |
| *Peltodytes caesus* | A beetle | " | TR13E | Gibbins' Brook |
| *Rhantus frontalis* | A beetle | " | TR13M | Hythe |
| *Dytiscus dimidiatus* | A beetle | Kent RDB3, RedList_GB_post2001- NT | TR03S | Aldington Knoll |
| *Tachys bistriatus* | A beetle | " | TR13C | |
| *Bembidion octomaculatum* | A beetle | Kent RDBK, RedList_GB_Pre94- EX | TR13M | Hythe |
| *Platyderus depressus* | A beetle | Notable-B | TR13M | Hythe |
| *Ophonus azureus* | A beetle | Notable-B | TR13M | Hythe |
| *Ophonus sabulicola* | A beetle | RedList_GB_Pre94-R | TR13M | Hythe |
| *Ophonus sabulicola* | A beetle | " | TR1434 | |
| *Stenolophus skrimshiranus* | A beetle | Notable-A | TR13C | |
| *Acupalpus brunnipes* | A beetle | Notable-A | TR13C | |
| *Acupalpus exiguus* | A beetle | Notable-B | TR13E | Gibbins' Brook |
| *Demetrias imperialis* | A beetle | Notable-B | TR13C | |
| *Cryptopleurum crenatum* | A beetle | Notable | TR14953555 | Brockhill Country Park |
| *Choleva cisteloides* | A beetle | RedList_GB_Pre94- Insu | TR13C | |
| *Elodes pseudominuta* | A beetle | NS-excludes | TR1138 | |
| *Orthoperus nigrescens* | A beetle | Notable-B | TR148357 | Brockhill Country park |
| *Orchesia minor* | A beetle | Notable-B | TR148357 | Brockhill Country park |
| *Prionychus ater* | A beetle | Notable-B | TR1234 | |

| Scientific Name | Common Name | Species Status (Definitions of these status codes is presented below the table in Table 6) | Grid Ref. | Location |
|---|---|---|---|---|
| *Scaphidema metallicum* | A beetle | Notable-B | TR13E | Gibbins' Brook |
| *Pyrochroa coccinea* | A beetle | Notable-B | TR148357 | Brockhill Country park |
| *Phyllotreta vittula* | A beetle | Notable-A | TR148357 | Brockhill Country park |
| *Longitarsus parvulus* | A beetle | Notable-A | TR148357 | Brockhill Country park |
| *Apion rubiginosum* | A beetle | Kent RDB1, RedList_GB_Pre94-R | TR14813595 | Brockhill Country Park |
| | | | | |
| **INSECTA: HYMENOPTERA** | | | | |
| *Andrena bucephala* | Big-headed Mining Bee | Notable-A | TR14863568 | Brockhill Country Park |
| *Andrena trimmerana* | Trimmer's Mining Bee | Notable-B | TR14933558 | Brockhill Country Park |
| *Andrena labiata* | Red-girdled Mining Bee | Notable-A | TR14863568 | Brockhill Country Park |
| *Lasioglossum pauxillum* | Lobe-spurred Furrow Bee | Notable-A | TR148357 | Brockhill Country Park |
| *Dolichovespula media* | A social wasp | Notable-A | TR122354 | Walnut Tree Cottage; Lympne |
| *Philanthus triangulum* | Bee Wolf | RedList_GB_Pre94- VU | TR122354 | Walnut Tree Cottage; Lympne |
| *Nomada fucata* | Painted Nomad Bee | Notable-A | TR14933558 | Brockhill Country Park |
| *Bombus rupestris* | Red-tailed Cuckoo Bee | Notable-B | TR1034 | Port Lympne Zoo |

*Table 6: Status and protection codes utilised in this report*

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| Kent RDB | Kent Red Data Book | Species whose stronghold in Kent, although not necessarily scarce here, the Kent populations are<br>significant in a national context. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| Kent RDB1 | Kent Red Data Book 1 - Endangered | Species that have been recorded in 1-2 tetrads only |
| Kent RDB2 | Kent Red Data Book 2 - Vulnerable | Species that have been recorded in 3-5 tetrads or, if more than this, where the species is considered to be undergoing a significant decline. |
| Kent RDB3 | Kent Red Data Book 3 - Rare | Species that have been recorded in 6-10 tetrads |
| Kent RDB4 | Kent Red Data Book 4 | (flies only) species which have been assigned RDB1, 2, 3, or K status nationally and which are now known from more than 10 discrete sites within Kent |
| Kent RDBK | Kent Red Data Book - County Important | Species of county importance: no further breakdown has been possible |
| Kent RDBX | Kent Red Data Book - Extinct | Species considered to be extinct in Kent |
| Marine-NR | Nationally rare marine species | Species which occur in eight or fewer 10km X 10km grid squares containing sea (or water of marine saline influence) within the three mile territorial limit. |
| Marine-NS | Nationally scarce marine species | Species which occur in nine to 55 10km X 10km grid squares containing sea (or water of marine saline influence) within the three mile territorial limit. |
| Notable | Nationally Notable | Species which are estimated to occur within the range of 16 to 100 10km squares. (subdivision into Notable A and Notable B is not always possible because there may be insufficient information available). Superseded by Nationally Scarce, and therefore no longer in use. |
| Notable-A | Nationally Notable A | Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties. Superseded by Nationally Scarce, and therefore no longer in use. |
| Notable-B | Nationally Notable B | Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties. Superseded by Nationally Scarce, and therefore no longer in use. |
| RedList GB post 2001-CR | IUCN (2001) - Critically endangered | A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria A to E. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| RedList GB post 2001-DD | IUCN (2001) - Data Deficient | 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 or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that a threatened category is appropriate. |
| RedList GB post 2001-EN | IUCN (2001) - Endangered | A taxon is Endangered when it is not Critically endangered but is facing a very high risk of extinction in the wild in the near future. |
| RedList GB post 2001-EW | IUCN (2001) - Extinct in the wild | A taxon is Extinct in the wild in Great Britain when it is known to survive only in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinctin the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) throughout its range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form. |
| RedList GB post 2001-EX | IUCN (2001) - Extinct | A taxon is Extinct in Great Britain when there is no reasonable doubt that the last individual in Great Britain has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historical range have failed torecord an individual. Surveys should be over a time scale appropriate to the taxon's life cycle and life form. |
| RedList GB post 2001-NT | IUCN (2001) - Lower risk - near threatened | Taxa which do not qualify for Lower Risk (conservation dependent), but which are close to qualifyingfor Vulnerable. In Britain, this category includes species which occur in 15 or fewer hectads but do notqualify as Critically Endangered, Endangered or Vulnerable. |
| RedList GB post 2001-RE | IUCN (2001) - Regionally Extinct | Category for a taxon when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or has disappeared from the wild in the region, or when, if it isa former visiting taxon, the last individual has died or disappeared in the wild from the region. The setting of any time limit for listing under RE is left to the discretion of the regional Red List authority, but should not normally pre-date 1500 AD. |
| RedList GB post 2001-VU | IUCN (2001) - Vulnerable | A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk ofextinction in the wild in the medium term future. |
| RedList GB post 94-CR | IUCN (1994) - Critically endangered | A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in theimmediate future, as defined by any of the criteria A to E. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| RedList GB post 94-DD | IUCN (1994) - Data Deficient | 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 or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that a threatened category is appropriate. |
| RedList GB post 94-EN | IUCN (1994) - Endangered | A taxon is Endangered when it is not Critically endangered but is facing a very high risk of extinction in the wild in the near future. |
| RedList GB post 94-EX | IUCN (1994) - Extinct | Taxa which are no longer known to exist in the wild after repeated searches of their localities and other known likely places. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList GB post 94-NT | IUCN (1994) - Lower risk - near threatened | Taxa which do not qualify for Lower Risk (conservation dependent), but which are close to qualifying for Vulnerable. In Britain, this category includes species which occur in 15 or fewer hectads but do not qualify as Critically Endangered, Endangered or Vulnerable. |
| RedList GB post 94-VU | IUCN (1994) - Vulnerable | A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future. |
| RedList GB Pre 94-EN | IUCN (pre 1994) - Endangered | Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList GB Pre 94-EX | IUCN (pre 1994) - Extinct | Taxa which are no longer known to exist in the wild after repeated searches of their localities and other known likely places. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList GB Pre 94-Inde | RDB - Indeterm | Taxa not seen since 1970 but require further survey before they can be declared extinct. Known to be Extinct, Endangered, Vulnerable or Rare, but where there is not enough information to say which of these categories is appropriate. Superseded by new IUCN categories in 1994, so no longer in use. |
| RedList GB Pre94-Insu | RDB - Insuff known | Taxa that are suspected but not definitely known to belong to any of the above categories (i.e. Endangered, Vulnerable, Rare), because of the lack of information. Superseded by new IUCN categories in 1994, so no longer in use. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| RedList GB Pre 94-R | IUCN (pre 1994) - Rare | Taxa with small populations that are not at present Endangered or Vulnerable, but are at risk. (In GB, this was interpreted as species which exist in fifteen or fewer 10km squares). Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList GB Pre 94-Thre | RDB - Threatened endemic | Taxa which are not known to occur naturally outside Britain. Taxa within this category may also be in any of the other RDB categories or not threatened at all. |
| RedList GB Pre 94-VU | IUCN (pre 1994) - Vulnerable | Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList Global post 2001DD | IUCN (2001) - Data Deficient | 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. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified. |
| RedList Global post 2001EX | IUCN (2001) - Extinct | A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form. |
| RedList Global post 2001NT | IUCN (2001) - Lower risk - near threatened | 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. |
| RedList Global post 2001-CR | IUCN (2001) - Critically endangered | 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 Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild. |
| RedList Global post 2001-EN | IUCN (2001) - Endangered | A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| | | E for Endangered (see Section V), and it is therefore considered to be facing a very high risk ofextinction in the wild. |
| RedList Global post 2001-VU | IUCN (2001) - Vulnerable | A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to Efor Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild. |
| RedList Global post 94-CR | IUCN (1994) - Critically endangered | A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in theimmediate future, as defined by any of the criteria A to E. |
| RedList Global post 94-DD | IUCN (1994) - Data Deficient | 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 or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that a threatened category is appropriate. |
| RedList Global post 94-EN | IUCN (1994) - Endangered | Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewedsince 1994. |
| RedList Global post 94-LR(cd) | IUCN (1994) - Lower risk - conservation dependent | Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. |
| RedList Global post 94-NT | IUCN (1994) - Lower risk - near threatened | Taxa which do not qualify for Lower Risk (conservation dependent), but which are close to qualifying for Vulnerable. In Britain, this category includes species which occur in 15 or fewer hectads but do notqualify as Critically Endangered, Endangered or Vulnerable. |
| RedList Global post 94-VU | IUCN (1994) - Vulnerable | Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList Global pre 94-EN | IUCN (pre 1994) - Endangered | Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewedsince 1994. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| RedList Global pre 94-EX | IUCN (pre 1994) - Extinct | A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historical range have failed to record an individual. Surveys should be over a time scale appropriate to the taxon's life cycle and life form. |
| RedList Global pre 94-NR | IUCN (pre 1994) - Rare | Taxa with small populations that are not at present Endangered or Vulnerable, but are at risk. (In GB, this was interpreted as species which exist in fifteen or fewer 10km squares). Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList Global pre 94-VU | IUCN (pre 1994) - Vulnerable | Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994. |
| RedList post 94-CR | IUCN (1994) - Critically endangered | A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria A to E. |
| RedList post 94-CR(A) | IUCN (1994) - Critically endangered-criterion A | Population reduction in the form of either of the following: 1. An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following: a. direct observation b. an index of abundance appropriate for the taxon c. a decline in area of occupancy, extent of occurrence and/or quality of habitat d. actual or potential levels of exploitation e. the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites. 2. A reduction of at least 80%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above. |
| RedList post 94-CR(B) | IUCN (1994) - Critically endangered-criterion B | Extent of occurrence estimated to be less than 100 km2 or areas of occupancy estimated to be less than 10 km2, and estimates indicating any two of the following: 1. Severely fragmented or known to exist at only a single location. 2. Continuing decline, observed, inferred or projected, in any of the following: a. extent of occurrence b. area of occupancy c. area, extent and/or quality of habitat d. number of locations or sub-populations e. number of mature individuals 3. Extreme fluctuations in any of the following: a. extent of occurrence b. area of occupancy c. number of locations or sub- populations d. number of mature individuals |
| RedList post 94-CR(C) | IUCN (1994) - Critically endangered-criterion C | Population estimated to number less than 250 mature individuals and either: 1. An estimated continuing decline of at least 25% within 3 years or one generation, whichever is longer or 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either a. severely fragmented (i.e. no sub-population estimated to contain |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| | | more than 50 mature individuals) b. all individuals are in a single sub-population |
| RedList post 94-CR(D) | IUCN (1994) - Critically endangered-criterion D | Population estimated to number less than 50 mature individuals. |
| RedList post 94-DD | IUCN (1994) - Data Deficient | 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 or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that<br>future research will show that a threatened category is appropriate. |
| RedList post 94-EN | IUCN (1994) - Endangered | A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction inthe wild in the near future, as defined by any of the criteria A to E. |
| RedList post 94-EN(A) | IUCN (1994) - Endangered-criterion A | Population reduction in the form of either of the following: 1. An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following: a. direct observation b. an index of abundanceappropriate for the taxon c. a decline in area of occupancy, extent of occurrence and/or quality of habitat d. actual or potential levels of exploitation e. the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites. 2. A reduction of at least 50%, projected or suspectedto be met within the next ten years or three generations, whichever is the longer, based on (and<br>specifying) any of b, c, d, or e above. |
| RedList post 94-EN(B) | IUCN (1994) - Endangered-criterion B | Extent of occurrence estimated to be less than 5,000 km2 or area of occupancy estimated to be less than 500 km2, and estimates indicating any two of the following: 1. Severely fragmented or known to exist at no more than five locations. 2. Continuing decline, inferred, observed or projected, in any of the following: a. extent of occurrence b. area of occupancy c. area, extent and/or quality of habitat d. number of locations or sub-populations e. number of mature individuals 3. Extreme fluctuations in anyof the following: a. extent of occurrence< b. area of occupancy c. number of locations or sub-<br>populations d. number of mature individuals |
| RedList post 94-EN(C) | IUCN (1994) - Endangered-criterion C | Population estimated to number less than 2,500 mature individuals and either: 1. An estimated continuing decline of at least 20% within 5 years or 2 generations, whichever is longer, or 2. A continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either: a. severely fragmented (i.e. no sub-population estimated to contain |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| | | more than 250 mature individuals) b. all individuals are in a single sub-population. |
| RedList post 94-EN(D) | IUCN (1994) - Endangered-criterion D | Population estimated to number less than 250 mature individuals. |
| RedList post 94-EW | IUCN (1994) - Extinct in the wild | A taxon is Extinct in the wild when it is known to survive only in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in thewild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) throughout its range have failed to record an individual. Surveys should be over a<br>time frame appropriate to the taxon's life cycle and life form. |
| RedList post 94-II | IUCN (1994) - Internationally Important | Taxa that are common and/or widespread, but considered to be Rare or Threatened in the European<br>Community. These taxa are listed in Annex I of the Birds Directive and/or Appendix II of the BernConvention and/or Annexes II,III and V of the Habitats Directive |
| RedList post 94-LR(cd) | IUCN (1994) - Lower risk - conservation dependent | Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme<br>targeted towards the taxon in question, the cessation of which would result in the taxon qualifying forone of the threatened categories above within a period of five years. |
| RedList post 94-LR(lc) | IUCN (1994) - Lower risk - least concern | Taxa which do not qualify for Lower Risk (conservation dependent) or Lower Risk (near threatened) or(in Britain) Nationally Scarce. |
| RedList post 94-LR(ns) | IUCN (1994) - Lower risk - nationally scarce | A taxon is Lower Risk when it has been evaluated but does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. If taxa do not meet the criteria for NearThreatened or Conmservation Dependent sub-categories, but never the less, occur in only 16-100<br>hectads, they are classed as Nationally Scarce. |
| RedList post 94-LR(nt) | IUCN (1994) - Lower risk - near threatened | Taxa which do not qualify for Lower Risk (conservation dependent), but which are close to qualifying<br>for Vulnerable. In Britain, this category includes species which occur in 15 or fewer hectads but do notqualify as Critically Endangered, Endangered or Vulnerable. |
| RedList post 94-V | IUCN (1994) - Vulnerable | A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk ofextinction in the wild in the medium-term future, as defined by any of the criteria A to E. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| RedList post 94-V(A) | IUCN (1994) - Vulnerable-criterionA | Population reduction in the form of either of the following: 1. An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following: a. direct observation b. an index of abundanceappropriate for the taxon c. a decline in area of occupancy, extent of occurrence and/or quality of habita d. actual or potential levels of exploitation e. the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites. 2. A reduction of at least 20%, projected or suspectedto be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of b, c, d or e above. |
| RedList post 94-V(B) | IUCN (1994) - Vulnerable-criterionB | Extent of occurrence estimated to be less than 20,000 km2 or area of occupancy estimated to be less than 2000 km2, and estimates indicating any two of the following: 1. Severely fragmented or known to exist at no more than ten locations. 2. Continuing decline, inferred, observed or projected, in any of the following: a. extent of occurrence b. area of occupancy c. area, extent and/or quality of habitat d.number of locations or sub-populations e. number of mature individuals. 3. Extreme fluctuations in any of the following: a. extent of occurrence b. area of occupancy c. number of locations or sub-populations d. number of mature individuals. |
| RedList post 94-V(C) | IUCN (1994) - Vulnerable-criterionC | Population estimated to number less than 10,000 mature individuals and either: 1. An estimated continuing decline of at least 10% within 10 years or 3 generations, whichever is longer, or 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either: a. Severely fragmented (i.e. no subpopulation estimated to contain more than 1000 mature individuals). b. All individuals are in a single subpopulation. |
| RedList post 94-V(D) | IUCN (1994) - Vulnerable-criterionD | Population very small or restricted in the form of either of the following: 1. Population estimated to number less than 1,000 mature individuals 2. Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km2) or in the number of locations (typically less than 5). such a taxon would thus be prone to the effects of human activities (or stochastic events whose impactis increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period. |
| RedList pre 94-EN | IUCN (pre 1994) - Endangered | Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating..Superseded by new IUCN categories in 1994, so no longer in use. |
| RedList pre 94-EX | IUCN (pre 1994) - Extinct | Taxa which are no longer known to exist in the wild after repeated searches of their localities and otherknown likely places. Superseded by new IUCN categories in 1994, so no longer in use. |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| RedList pre 94-Inde | IUCN (pre 1994) - Indeterminate | Taxa not seen since 1970 but require further survey before they can be declared extinctknown to beExtinct, Endangered, Vulnerable or Rare, but where there is not enough information to say which of these categories is appropriate. Superseded by new IUCN categories in 1994, so no longer in use. |
| RedList pre 94-Insu | IUCN (pre 1994) - Insufficientlyknown | Taxa that are suspected but not definitely known to belong to any of the above categories (i.e. Endangered, Vulnerable, Rare), because of the lack of information. Superseded by new IUCN categories in 1994, so no longer in use. |
| RedList pre 94-NR | IUCN (pre 1994) - Rare | Taxa with small populations that are not at present Endangered or Vulnerable, but are at risk. (In GB, this was interpreted as species which exist in fifteen or fewer 10km squares). Superseded by new IUCNcategories in 1994, so no longer in use. |
| RedList pre 94-OD | IUCN (pre 1994) - Out of danger | Taxa formerly meeting the criteria of one of the RDB threat categories (Endangered, Vulnerable, Rare), but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival has been removed. Superseded by new IUCN categories in 1994, so no longer in use. |
| RedList pre 94-VU | IUCN (pre 1994) - Vulnerable | Taxa believed likely to move into the Endangered category in the near future if the causal factorscontinue operating. Superseded by new IUCN categories in 1994, so no longer in use. |
| Status-NR | Nationally rare | Occurring in 15 or fewer hectads in Great Britain. Excludes rare species qualifying under the main IUCN criteria. |
| Status-NR (excl RedListed) | Nationally rare | Occurring in 15 or fewer hectads in Great Britain. Excludes rare species qualifying under the main IUCN criteria. |
| Status-NR (incl RedListed) | Nationally rare | Occurring in 15 or fewer hectads in Great Britain (includes all red listed species under IUCN criteria |
| Status-NS | Nationally scarce | Occurring in 16-100 hectads in Great Britain. |
| Threatened endemic | RDB - Threatened endemic | Taxa which are not known to occur naturally outside Britain. Taxa within this category may also be in any of the other RDB categories or not threatened at all |

| Status - Short Name | Status - Long Name | Description |
|---|---|---|
| CITES | | Protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CRoW | | Listed on the Countryside and Rights of Way Act 2000 |
| NERC S41 | | Listed on section 41 of the NERC Act |
| UK BAP | | Listed on the UK BAP |
| Kent BAP | | Listed on the Kent BAP |

# APPENDIX B: Key Surveyor Pen Portrait (2018)

| Surveyor | Pen Portrait |
|---|---|
| Ross Piper PhD, BSc (hons) | Dr Ross Piper has been an entomologist and ecologist for 20 years. He has conducted entomological surveys around the world and discovered several new taxa. In addition, he advises several organisations on rare invertebrates, including habitat requirements and habitat management. |
| Brandon Murray BSc (hons) MCIEEM | Brandon has been an ecologist for over 11 years and has experience on a range of protected species surveys including those for bats, badgers, great crested newt, dormouse, reptiles and water voles. |

# APPENDIX C: Photographs

N.B. Target Note Numbers are shown on the map in Figure 1.

TN19 – Racecourse lake

TN19 – Racecourse lake margins

TN20 – 600m of ditches

TN41 – Ephemeral pools

TN41 – Ditches – retained and scope for much enhancement

TN51 – Large dead sallow

| | |
|---|---|
| TN51 – Wet flush in sheep pasture | TN51 – Dead oak bough |
|  |  |
| TN52 – Species poor ditch | TN52 – Species poor ditch |
|  |  |
| TN53 – Semi-improved grassland | TN53 – Semi-improved grassland |
|  |  |
| TN65 – Species-poor hedge to be lost | TN66 – Pond that will be lost |
|  |  |
| TN66 – Pond is in sheep pasture | TN73 – Semi-improved neutral grassland |

TN100 – Riparian habitat

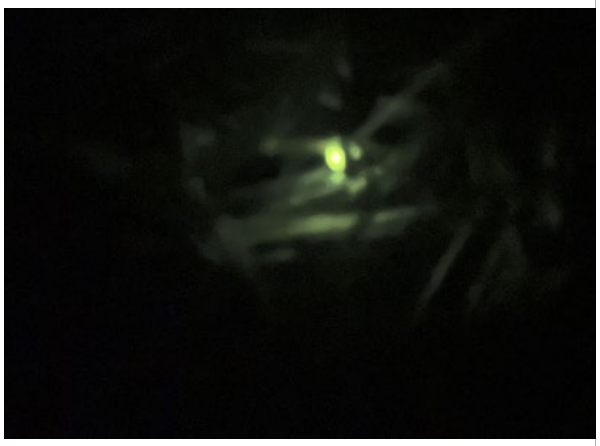
TN110/111 – Woodland edge scrub

TN110/111 – Woodland edge scrub

TN115 – Mature, species-rich hedge

TN118/225/227 – Mature, species-rich hedge over which 3 crossings will be needed

TN165/167 – Mounds of debris, in a mosaic of bare ground, grassland and scrub.

| | |
|---|---|
| TN180/182 – Lorry park spoil heaps and abundant bare-ground | TN193 – Neutral semi improved grassland |
|  |  |
| TN195 – Old runway | TN197/198 – Bunds |
|  |  |
| Glow worm on site | Glow worm on site |

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