



Rampion Offshore Wind Farm



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PROPOSED CABLE ROUTE IN SUSSEX

TERRESTRIAL INVERTEBRATE SURVEY REPORT

Rev01

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1 INTRODUCTION AND METHODOLOGY

1.1 Introduction

- 1.1.1 **Colin Plant Associates (UK)** were commissioned by **RSK Environment Ltd** to undertake an investigation of terrestrial invertebrates along the route of a proposed subterranean cable that will run from The English Channel northwards, making a landfall near to Worthing and then continue northwards to the Parish of Twineham.
- 1.1.2 Much of the proposed route crosses areas of arable land and others that are known to be of generally very low invertebrate interest. To facilitate a more structured invertebrate survey, we therefore undertook an initial scoping survey of the proposed route, focusing on key areas that appeared likely to be of raised interest.
- 1.1.3 This initial walkover survey was undertaken on 11th May 2011 in the company of RSK Environment personnel. Several areas were selected, by mutual agreement, for subsequent invertebrate sampling on the basis of:
- their representativeness of the habitats crossed by the route;
 - the likelihood that they may support a raised invertebrate interest;
 - the likelihood that they may support target taxa notified to us (see Section 1.3, below), and
 - their accessibility, both in physical and legal terms.

1.2 Survey methodology

- 1.2.1 Subsequent to the initial site visit on 11th May 2011, sampling visits were undertaken by three different specialist surveyors on several dates in each of the months of June, July, August and September 2011. The dates were selected as far as practical to take maximum opportunity of weather windows in a year of generally atypical weather patterns.
- 1.2.2 Terrestrial invertebrates were recorded by direct observations of both species and their signs (such as leaf mines and plant galls). In addition active sampling was also undertaken as follows:

Sweep-netting. A stout hand-held net is moved vigorously through vegetation to dislodge resting insects. The technique may be used semi-quantitatively by timing the number of sweeps through vegetation of a similar type and counting selected groups of species. This technique is effective for many invertebrates, including several beetle families, most plant bug groups and large number of other insects that live in vegetation of this type.

Beating trees and bushes. A cloth tray, held on a folding frame, is positioned below branches of trees or bushes and these are sharply tapped with a stick to dislodge insects. The same technique can be applied to tall perennial herbs and other plants that tower over a sward. Black or white trays are used depending upon which group of invertebrates has been targetted for search. Insects are collected from the tray using a pooter. This technique is effective in obtaining records of most arboreal species, including many beetle groups, bugs, caterpillars of Lepidoptera, spiders and others. It can be undertaken at any site where there are trees or bushes present although is rendered ineffective if the vegetation is wet or if the weather is windy.

- 1.2.3 The open public access to parts of the site as well as the time permitted between visits did not facilitate the use of pitfall traps, Malaise traps or other passive techniques during this survey.

1.3 Target species

- 1.3.1 Although physically narrow and unlikely to sever long-term physical continuity, the route nevertheless crosses a variety of invertebrate habitat types including Chalk Downland – a UK BAP Priority Habitat. A general invertebrate data trawl suggested that these habitats may support a number of invertebrate species of conservation interest in the general vicinity of the route (although not necessarily within the route itself) and it was necessary, therefore, to investigate this to determine which, if any, invertebrate species qualified as potentially likely to be affected.
- 1.3.2 These “target species” identified by the data trawl are listed below. In determining where to focus effort, it was necessary to take into consideration the usual activity periods of the target insects on the South Coast; these data are included in the table.

Species	Usual flight period in southern Britain
Adonis Blue (<i>Lysandra bellargus</i>)	mid 5 to mid 6; mid 8 to mid 9
Chalk Hill Blue (<i>Lysandra bellargus</i>)	late 7 to early 8
Brown Hairstreak (<i>Thecla betulae</i>)	late 7 and 8
Duke of Burgundy (<i>Hamearis lucina</i>)	mid 5 to late 6
Pearl-bordered Fritillary (<i>Boloria euphrosyne</i>)	late 4 to late 7
Small Blue (<i>Cupido minimus</i>)	mid 5 to late 6; late 7 to early 8
White-letter Hairstreak (<i>Satyrrium w-album</i>)	early 7 to mid 8
Stag Beetle (<i>Lucanus cervus</i>)	late 5 to mid 6
Wart-biter (<i>Decticus verrucivorus</i>)	late 5 to early 9

- 1.3.3 For the butterflies, rather more accurate data is available for different latitudes in Britain (Asher et al, 2001). This is expressed in the table below where three “plusses” indicate the peak flight time and one plus the earliest and latest extremes in a “normal” year.

SPECIES MONTH	May ('5')				June ('6')				July ('7')				August ('8')			
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Adonis Blue		+	++	+++	+++	++	++	+					+	+++	+++	++
Chalk-hill Blue									+	+	++	+++	+++	+++	+++	++
Small Blue		+	++	+++	+++	+++	++	+	+	+	+	++	++	+	+	
Brown Hairstreak												+	++	+++	+++	++
White-letter Hairstreak									+	+	++	+++	+++	+++	++	+
Duke of Burgundy Frit.	+	+++	+++	+++	++	+	+									
Pearl Bordered Fritillary	++	+++	+++	++												

- 1.3.4 Thus, we determined to make site visits in the 3rd week of May (Duke of Burgundy and Pearl-bordered Fritillaries), the 4th week of May (Adonis Blue, Small Blue, Duke of Burgundy Fritillary and second survey for Pearl Bordered Fritillary if missed earlier), late July/ August overlap (Chalk-hill Blue, Brown Hairstreak, White-letter Hairstreak and second survey for Small Blue if missed earlier) then finally 2nd/3rd week of August (Adonis Blue, Chalk-hill Blue, Brown Hairstreak, White-letter Hairstreak and second survey for Adonis Blue if missed earlier).
- 1.3.5 However, we also had to take into account the fact that throughout 2011 most insects seem to have appeared approximately 3 weeks ahead of the norm. Our initial selection of dates was adjusted, therefore, by ascertaining when the target species were flying at other sites in southern Britain. As a result, our specialist butterfly surveys were undertaken on the following dates in 2011:
- 25th May (primarily for Adonis Blue, Small Blue, Duke of Burgundy Fritillary and Pearl Bordered Fritillary)
 - 17th July (primarily for Chalk-hill Blue, Small Blue and Duke of Burgundy Fritillary)
 - 14th Aug (primarily for Adonis Blue, Chalk-hill Blue, Brown Hairstreak and White-letter Hairstreak)
- 1.3.6 The dates of our general sampling visits were as follows:
- 11th May (initial walkover/scoping survey)
 - 14th and 15th June
 - 27th and 28th July
 - 4th and 5th August
 - 16th September

2 OVERVIEW OF INVERTEBRATE HABITATS ON THE SITE

2.1 The proposed route

- 2.1.1 The areas selected for subsequent invertebrate species sampling were identified by us in collaboration with RSK Environment during the initial walkover visit on 11th May 2011. A number of subsequent changes made to the proposed route have not significantly altered these selections. An overview of the proposed route assessed is shown in Figure 1.
- 2.1.2 The terrestrial invertebrate survey areas are shown in Figure 2, maps 1 – 8 and the numbers in the maps coincide with those in the following text section.

2.2 Areas examined for invertebrate interest

- 2.2.1 The following progression through the invertebrate study areas goes from south to north.

Area 1: Ruderal grassland and scrub south of railway line (disused allotment)

After it leaves an area of amenity grassland near the end of St Paul's Avenue, the proposed route crosses a peripheral line of ornamental trees and then a chain link fence to enter a linear area of overgrown scrub (photograph 1) followed by a section occupied by dense nettles, brambles and burdock (Area 1a). Invertebrate interest here is at a minimal level.

After crossing this area diagonally it passes another fence line and enters a raised area of floristically poor ruderal grassland (Area 1b), as it heads towards the railway line. We found this ruderal grassland to be quite rich in grasshoppers and crickets and this is undoubtedly a primary reason for the very large number of “baby” and juvenile Slow Worms and Grass Snakes that we encountered whilst looking for beetles and other fossorial invertebrates under the reptile refugia.

Area 2: Area at south end of Loose Lane, north of the railway line

This area of grassland rises gradually to the north and much of the grassland in the northern part of this area is dry, with a cover of open scrub, primarily Common Hawthorn and in some areas there is a ruderal flora with ragworts, Mugwort and similar plants evident (Photograph 2).

Towards the south, particularly against the railway embankment, the land is less well-drained and an area of marshy grassland (Photograph 3) adds significant diversity to the invertebrate habitats. This forms a permanently wet area in the south-east corner where elements of riparian vegetation begin to dominate the flora. Ditches (Photograph 4) provide habitat for truly aquatic invertebrate species as well as those of an amphibious disposition that inhabit the wet grassland.

Area 3: Hedges at Lambley's Lane

We have sampled token sections of hedges along the proposed route as examples of this broad habitat type; these are pooled as compartment 15 in the species lists at Appendix 1. This section affects both sides of the road at the point where the proposed route crosses Lambley's Lane between a small disused quarry in the north and the poorly-defined (with occasional hawthorn bushes) field margin to the south of this. We observed a hedgerow dominated by Common Hawthorn and Blackthorn, with some Wild Rose, Elder and trees of Sycamore. Some growths of ivy in places add to the diversity of invertebrate habitats.

On the sides facing inwards to the lane the banks are fairly wide with a moderately well-developed flora of likely interest to invertebrates including Stinging Nettle, Knapweed, Woody Nightshade,

bedstraws, plantains, bindweeds, Mallow and other plants (Photograph 5). The hedgerow structure here is attractive to invertebrates. On the outer faces, the hedges terminate abruptly at the sheep-grazed grassland and present a rather bleak prospect for most invertebrate species.

Area 4: Abandoned chalk quarry on the east side of Lambley's Lane.

This small site rests just outside the corridor of land affected by the proposal, but was investigated briefly on the basis that it might provide a potential site where invertebrate losses elsewhere could be mitigated.

We recorded very few invertebrates here and in its present state it seems to have relatively low invertebrate interest. Scrub invasion restricts access to the chalk face and casts permanent shade here; it has also obliterated the chalk grassland and so restricted the flora of value to invertebrates (Photograph 6). Complete removal of scrub from here would be highly beneficial.

Area 5: Steep Down (including part of Applesham Farm Bank SNCI)

This section of the route was revised during the course of this survey; we surveyed all the land shown as Area 5 in the attached maps.

Our current understanding is that from Titch Hill (road) in the south-west the planned route now crosses arable land on the west face of the Down heading north-eastwards to just before the track where it then turns sharply east. It passes beneath the power lines just north of a pylon and then just before it reaches to next pylon it loops northwards, crossing the track and skirting the woodland on the north face of the Down across arable land before looping back south to its original course.

This revised route does not seem to affect any habitats of invertebrate interest and accordingly this section is now excluded from discussion in this report.

However, an area of potentially high quality chalk grassland that was originally to be crossed was examined by us for, in particular, butterflies. These are briefly discussed in the species section of this report.

Area 6: Chalk grassland north of Erringham Shaw (part of the Old Erringham Farm Valley & road cutting SNCI)

The proposed route crosses the River Adur and then the A283 road by horizontal directional drill (HDD). It is not yet known where the exact working area will be for the HDD or the layout. However, the existing track with the south-facing downland bank on its left (Photograph 7) will be used and the wide, level area of cattle-grazed grassland on the right, (beyond which is the wet woodland of Erringham Shaw (Photograph 8)) is likely to be used for the HDD area.

This route as currently proposed appears to avoid damage to the chalk grassland shown in Photograph 7; in an earlier option it clipped the corner as the embankment turns to head north-east.

We examined the embankment as well as the edge of the wet woodland; both appear likely to support a very high invertebrate interest.

The level ground between the embankment and the wet woodland, shown as the foreground in Photograph 8, appears to have little or no invertebrate features that would be damaged as a result.

Area 7: Tottington Mount

Initially shown as crossing the chalk grassland of the Down, the present route now describes a much wider loop around the west side of the Mount. It appears now to skirt the northern edge of the Mount through the lower level improved grassland area adjacent to the road, so avoiding the steep chalk grassland slopes.

Unfortunately, in achieving this far more satisfactory line, a small area of flower-rich downland grassland (shown as area 7b on Figure 2) will be disturbed. We consider that this will cause permanent damage to the small area of grassland affected and so will adversely affect the invertebrate fauna here.

Area 7a: Hedges on track between Longlands Wood and Browns Meadow (not mapped)

We have sampled token sections of hedges along the proposed route as examples of this broad habitat type. This section affects both sides of the road at the point where the proposed route crosses the track. These hedges are poorly structured and not likely to support significant invertebrate interest. We did not undertake exhaustive sampling here, but these hedges are covered by our general comments on hedges elsewhere.

Area 8: Hedges along a track north of Truleigh Sands

The hedges here are well-established and appear to flank a green lane (Photograph 10). Hedgerow plant species are limited, but the hedges are well-structured; some of the target butterfly species, especially Brown Hairstreak and White-letter Hairstreak) were looked for here, though none were found. This area is discussed with other hedgerow crossings later in this report.

Area 9: Marshy grassland and a scrub/woodland strip alongside a ditch

This is a more or less linear feature, based on a rather well-structured, overgrown hedge that combines with scattered scrub in the damp grassland zone to provide many well-structured edge habitats that are rather poorly represented elsewhere in the surveyed corridor (Photographs 11 and 12). The proposed route crosses this linear feature and so will disrupt its physical continuity.

Area 10: Land east of The Alders

Access to this land was limited. It is essentially comprised of a damp meadow with a ditch running through it and surrounded by hedges. The latter contain some poplars and some mature oaks at the drier northern boundary next to the adjacent arable fields and on the meadow side are well structured in places. There is a small pond on the western side; south of here, the ground is drier, with short grass and less well-structured edge habitats.

This area was judged to have a quite high invertebrate interest.

Area 11: Marshy grassland east of Firsland Park Industrial Estate

[RSK Note; March 2012 – This area is no longer crossed by the route]

In this area, the route runs through a damp section of rather uninteresting semi-improved grassland adjacent to an arable field. Although we initially thought that this might support a raised invertebrate interest, sampling suggests that this is not the case, and we are not of the opinion that this section of the route causes significant damage.

Area 11a: West of Lanehurst Cottage Farm

[RSK Note; March 2012 – This area is no longer crossed by the route]

The proposed route here has been diverted westwards, perhaps to avoid a light aircraft landing strip. This is unfortunate, since running along its original course it did little damage other than to breach a few hedges (which could easily be re-instated).

On its present course, it apparently runs the full length of a linear area of semi-improved rough grassland flanked by broad-leaved woodland on either side and separated by hedgerows that appear to contain habitats of interest to invertebrates.

Area 12: No longer within route considerations

Area 13: Riparian vegetation around a square reservoir/balancing pond

[RSK Note; March 2012 – This area is no longer crossed by the route]

This is an artificial water body just south of Twineham Grange, with reeds and other associated vegetation. It seems likely to have limited invertebrate interest and because it lies outside the construction corridor of the proposed route was not examined in great detail. Nevertheless, a brief list of invertebrates is presented, though none are of raised significance.

Area 14: Marshy grassland alongside Herrings Stream south-west of Twineham Place Farm

As the route crosses Herrings Stream it runs through permanently damp grassland. This dominates the northern side of the stream, where the invertebrate biodiversity appears to be greater than that on the southern side where the ground is drier. On both sides, however, the grassland appears to be semi-improved.

Area 15: Hedges along the lane east of Twineham Grange

These hedges are structurally poor and not likely to have a raised intrinsic interest for invertebrates. They are covered by our general comments on hedges elsewhere.

3 RESULTS OF TERRESTRIAL INVERTEBRATE SAMPLING

4.1 Summary

- 3.1.1 Appendix 1 reports the complete list of 464 insect taxa encountered during the survey. The list is annotated with formal National Status codes where these are better than “nationally common” and these status codes are explained in Appendix 2.
- 3.1.2 The list indicates which of the studies areas supported each named species. It should be noted that there was no expectation that the number of species recorded at each area should be numerically equal, since each area supports different habitat types and thus a different invertebrate assemblage.
- 3.1.3 The more noteworthy amongst the recorded species are now briefly discussed.

3.2 Species of conservation interest

- 3.2.1 Several categories of invertebrates are of raised significance in an ecological assessment. These categories are explained in Appendix 2 and the corresponding species are now examined.

Legally Protected Species

- 3.2.2 No invertebrate species that are afforded direct legal protection under any UK or European legislation were encountered during the survey.

UK Biodiversity Action Plan Priority Species

- 3.2.3 Seven UK BAP species was recorded during the survey.
Forester Moth *Adscita statices* is a relative of the familiar red and black burnet moths that are a common feature of many grasslands. The caterpillars feed in the roots of Sorrel *Rumex acetosa*, but the moth has declined in both numbers and geographical range in recent years. At the present site we found it in area 7 – Tottington Mount – in direct line of the proposed route.

The bumble bee *Bombus ruderarius* is a nationally declining species. However, current evidence suggests a drastic decline has occurred, with sites where the bumblebee used to occur in numbers a few years ago now apparently without populations. Like other declining bumblebees, the species requires extensive areas which support a variety of flowering plants, especially Fabaceae and Lamiaceae, and it is essential that suitable forage resources are available throughout the flight period of the colony. The nest is constructed of grass clippings and moss on or just above the ground among long vegetation, often using an old mouse nest as a foundation. We found it in Area 2 and Area 6.

The Small Heath Butterfly *Coenonympha pamphilus* is a grassland species that has declined in recent years. It was added to the UK BAP list at the end of 2007 though there are disagreements over the need for this action. In Sussex it remains widespread, though it has declined numerically here as much as it has elsewhere so that whereas twenty years ago it was usual to see dozens if an afternoon it is now more likely that less than twenty or so will be seen. We found it in Area 9.

The Small Blue butterfly *Cupido minimus* is classed as a species of medium conservation concern. The caterpillars feed on Kidney Vetch *Anthyllis vulneraria* in calcareous grassland and we found the species to be common in areas 6 and 7. See paragraph 3.4.3 in this report

The Dingy Skipper butterfly *Erynnis tages* feeds, as a larva, on *Lotus corniculatus* but on heavier soils may use *L. uliginosus* whilst on chalk downland sites it favours *Hippocrepis comosa*. Recent studies have shown that females only lay eggs on plants that are in sheltered positions – never on those exposed on open short turf. We found adults in areas 5 and 6.

The Wall Brown butterfly *Lasiommata megera* is a declining species in southern Britain in particular. It affects grasslands where the turf is broken or stony. Females lay the eggs on grass leaves adjacent to a vertical face, such as a cliff top, a landslip or areas of turf poached by cattle. We found adults in areas 5 and 6.

Odynerus melanocephalus is a solitary wasp that nests in an excavated burrow in the ground in open situation on light clay soil. It is a predator of the larvae of both weevils and small moths, with which its nest chambers are stocked. We record it in Area 14.

- 3.2.4 The list of UK Biodiversity Action Plan Priority Species *of moths* is divided into two sections. In the first, a total of 81 species are afforded the status of UK BAP Priority Species; none of these is recorded in the surveyed area nor is any likely to be present.
- 3.2.5 The second section is a list of 69 species that have declined in population by a significant amount in the past 25 years. These are not yet rare and are flagged as UK BAP species “**for research only**”. They were inadvertently included in the overall BAP list by non-specialists.
- 3.2.6 This has resulted a confusing situation; these species were not intended to be affected by the requirements of *Planning Policy Statement 9: Biodiversity and Geological Conservation*, published by the Office of the Deputy Prime Minister during 2005, which requires Local Authorities to take measures to protect the habitats of UK BAP species from further decline through policies in local development documents. They were merely flagged for special attention.
- 3.2.7 At the present site, we have recorded two such “Research Only” moth species; several others are confidently predicted to be present.

The Mother Shipton moth *Callistege mi* is associated with coarse grasses; we found it in areas 5, 6 and 7.

The Cinnabar moth *Tyria jacobaeae* is widespread and very numerous and its yellow and black striped caterpillars are a familiar site on almost all ragwort plants. We found it in areas 2 and 7.

Red Data Book Species

- 3.2.8 No species listed in the British Red Data Books (Shirt, 1987; Bratton, 1991) or which has been elevated to the status of Critically Endangered, Endangered, Nationally Vulnerable or Near Threatened (formerly Nationally Rare) by subsequent formal reviews is recorded in the present survey.

Nationally Scarce Species

- 3.2.9 Three species recorded feature in the Nationally Scarce (formerly Nationally Notable - Na) category (see Appendix 2).

The Long-winged Cone-head (*Conocephalus discolor*) is a cricket with a distinctive high-pitched “song” that was formerly restricted to coastal habitats in the south of England. In recent years it has spread around the coast and is also found at some inland sites. It seems to have become fairly prevalent on post-industrial sites in north-east London. It is expected in the survey area, where we found it in Areas 2 and 7.

***Crabro scutellatus* is a sand wasp** (solitary wasp) that nests in dry, sloping exposures near to damp wood or heath and preys on dance flies (Dolichopodidae). We record it in area 14 by the Herrings Stream.

The weevil *Drupenatus nasturtii* affects canals, streams, rivers and other water bodies where the foodplant grows. The larva feeds internally in the stems of white-flowered species of *Rorippa* – especially *Rorippa nasturtium-aquaticum* (water cress). It seems to be absent from Scotland but is not uncommon, albeit locally in the southern half of England. We found it in Area 2.

- 3.2.10 Five species recorded feature in the Nationally Scarce (formerly Nationally Notable - Nb) category (see Appendix 2).

Lasioglossum malachurum is a solitary bee that occurs in southern England, originally on the coast and inland in Essex and Kent, but currently much more widespread throughout the south-east. It constructs its nest chamber in the ground, apparently preferring substrates with a clay content. Adult pollen requirements are un-recorded in Britain, but flower visits are reported from a variety of species, including various yellow composites (Asteraceae). In recent years it has become a widespread and common species in the south-east of Britain and an as yet unpublished review of status removes it from the list of Nationally Scarce species. We found it in Areas 6 and 7.

The flea beetle ***Longitarsus dorsalis*** is widespread, but local, in southern England. It has primarily been found on calcareous or sandy soils. Grassland, maritime cliff, limestone quarries, and woodland rides and clearings. It is phytophagous and is strictly associated with ragwort. Grazing, cutting or some other disturbance, on a rotational basis, may be needed to maintain open conditions. In urban areas, illicit motorcycle scrambling probably helps to maintain the appropriate habitat. We found it in Area 2.

The flea beetle ***Longitarsus ochroleucus*** is widespread, but very local, in eastern and east central England as well as along the chalk downs of the southern coastline. It is phytophagous and is strictly associated with ragwort, where the larvae feed in the roots. We found it in Area 1b.

The plant hopper *Oliarus panzeri* is a bug of dry grasslands but rather little is actually known of its ecology. We found examples in Area 2.

The blue and red leaf beetle *Podagrica fuscicornis* feeds as a grub in the flowers and seeds of mallow (*Malva* species). The plant has become a common feature of verges, hedgerows and other sites and the distinctive beetle has become quite frequent in the past few years. We found it in Area 9.

- 3.2.1 One species is listed formally as Nationally Scarce (formerly Nationally Notable - N) category (see Appendix 2).

The hoverfly *Pipiza lugubris* has an ecology which is unclear, but others in the group are aphid predators in the larval stage. The adults often feed on flowers of meadowsweet where these are available. We found an adult in Area 9.

Nationally Local Species

- 3.2.12 Forty-eight species are listed formally as Nationally Local (see Appendix 2). These are summarised as follows:

Species	Ecological associations	Where found														
		1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H	
<i>Abia sericea</i>	larva feeds on Succisa and Knautia leaves							x								
<i>Acetropis gimmerthalii</i>	damp grasslands												x			
<i>Altica oleracea</i>	widely polyphagous			x						x						
<i>Alydus calcaratus</i>	heaths and dry grassland, perhaps associated with ants							x								
<i>Anaspis lurida</i>	larvae in live and dead wood and fungi; adults at hawthorn blossom			x												
<i>Andrena dorsata</i>	dry, friable ground in which it nests						x									
<i>Anomoia purmunda</i>	Larva feeds in the flesh of hawthorn berries								x							
<i>Aphthona euphorbiae</i>	widely polyphagous			x	x		x	x		x						
<i>Aphthona herbigrada</i>	rock rose in calcareous grassland							x		x						
<i>Argynnis aglaja</i>	Viola species							x								
<i>Byrrhus pilula</i>	associated with moss or rabbit-grazed turf, in open situations.							x								
<i>Centrotus cornutus</i>	oak, aspen and other sapling trees									x				x		
<i>Cerceris rybyensis</i>	ground-nesting, in sandy habitats						x									
<i>Ceutorhynchus picitarsis</i>	associated with various cruciferous plants on disturbed ground						x									
<i>Ceutorhynchus pyrrhorhynchus</i>	Sisymbrium												x			
<i>Chorthippus albomarginatus</i>	grasslands - has spread inland from coastal stations			x				x	x	x			x			
<i>Chrysolina staphylaea</i>	polyphagous, but most often on creeping buttercup												x	x		

Species	Ecological associations	Where found														
		1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H	
<i>Conocephalus dorsalis</i>	formerly at damp coastal sites it is now found in a variety of inland habitats			x			x	x								
<i>Cordylepherus (Malachius) viridis</i>	a common grassland species			x				x	x				x			
<i>Coremacera tristis</i>	dry habitats, especially grasslands									x			x	x		
<i>Cylindroiulus caeruleocinctus</i>	calcareous ground - especially if disturbed				x											
<i>Donacia marginata</i>	Sparganium and Carex in standing water - feeding on the roots			x						x			x			
<i>Epitrix pubescens</i>	associated with woody nightshade												x			
<i>Eupeodes latifasciatus</i>	Damp grassland			x					x	x	x					
<i>Hylaeus confusus</i>	nests in hollow plant stems						x									
<i>Lampyris noctiluca</i>	predatory on snails amongst long grass			x			x		x							
<i>Lasioglossum fulvicorne</i>	a mining bee of chalk grasslands and sand pits etc.				x											
<i>Leptarthrus brevisrostris</i>	in the south it is restricted to chalk grasslands				x			x								
<i>Lysandra coridon</i>	Hippocrepis comosa in old chalk grassland					x	x	x								
<i>Micropeza corrigiolata</i>	Larva feeds in root nodules of Pisum sativum, Trifolium pratense and Medicago sativa								x							
<i>Myrmecina graminicola</i>	nests under deep stones in calcareous grassland or dry woodland							x								
<i>Oedemera lurida</i>	a common grassland species	x	x	x			x	x		x			x			
<i>Oplodontha viridula</i>	marshes and pond margins			x					x			x				
<i>Oxycera trilineata</i>	larvae in mosses in the edge of water bodies - preferring moving water								x							
<i>Pipizella virens</i>	probably associated with root aphids of Umbelliferae						x									
<i>Psylliodes chrysocephala</i>	various Cruciferae												x			
<i>Rhamphus oxyacanthae</i>	larva mines in leaves of hawthorn			x	x				x							
<i>Rhopalus subrufus</i>	St John's Wort (Hypericum perforatum)													x		
<i>Scellus notatus</i>	predatory species in woodland and scrub, the adults predatory								x	x						
<i>Scirtes hemisphaericus</i>	adult amongst rushes; larva is aquatic												x			
<i>Sphaerophoria taeniata</i>	usually in damp habitats, from grassland with Juncus to woodland			x									x			
<i>Sphenella marginata</i>	on various ragwort species, in late summer and autumn			x												
<i>Stenocranus major</i>	Phalaris arundinacea in marshy places								x							
<i>Tephritis cometa</i>	larvae gall the flowers of creeping thistle				x											
<i>Tetrix subulata</i>	bare mud and sparse vegetation			x												

Species	Ecological associations	Where found													
		1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
	in marshy places, especially dune slacks														
<i>Tettigonia viridissima</i>	coarse herbage on banks etc in dry, sunny situations			x											
<i>Vespa crabro</i>	woodland species				x							x		x	
<i>Xanthogramma pedisequum</i> agg.	larvae feed in ants nests								x						

3.3 Target species

3.3.1 The nine species identified by the data trawl include seven butterflies and two other insects.

3.3.2 **The Stag Beetle** breed in subterranean, or partly subterranean, damp though not wet timber that is dead and has started to decay. Since timber has a low nutrient index as a food source, timber-feeding grubs have a choice of two strategies – to eat huge quantities of timber very rapidly or to feed more slowly for a prolonged period of time. Stag Beetles adopt the latter policy and may take up to five years to achieve adulthood. They are, consequently, sensitive to “tidying” of dead wood and so areas that have been managed by neglect, for whatever reason, are far more likely to support them than well-managed woodlands. Moderately large timber units are necessary in order to provide enough material to feed within and the optimum microhabitats are found in the underground portions of tree stumps and the lower surface of large, immovable fallen logs where the contact with the ground provides the required slightly humid microclimate.

3.3.3 We did not find evidence of Stag Beetles in areas surveyed during 2011. However, we note that Area 11a results from a diversion from the original route plan. We were not advised of this change until after the optimum survey period for Stag Beetles. It is possible that the woodland edges in Area 11a might support Stag Beetles; if so, then this section of the route will be damaging to that species.

3.3.4 The Wart-biter is protected under UK legislation; the few sites where it is found are all well-known and none is affected by the proposed route. We did not find any new colonies during this survey.

3.4 Butterflies

3.4.1 Adonis Blue

We have recorded Adonis Blue butterflies as present in all three downland survey areas – Area 5: Steep Down, Area 6: north of Erringham Shaw and Area 7: Tottington Mount. The caterpillar foodplant, Horseshoe Vetch (*Hippocrepis comosa*) grows in all three areas and the butterfly, unsurprisingly is a resident breeding species wherever this plant grows on these three chalk grassland sites.

The revised route in the vicinity of Area 5: Steep Down does not include downland habitat nor any area that supports the foodplant. It is unlikely that this section of the route will adversely affect Adonis Blue butterflies.

At Area 6: North of Erringham Shaw, the butterfly affects the embankment on the north side of the route but not any part of the level area from the track southwards. Provided that the route and its construction corridor is deflected away from the bank itself, we are of the opinion that this section of the route will not adversely affect Adonis Blue butterflies.

At Area 7: Tottington Mount, a small section of chalk grassland immediately south of a derelict quarry (7b) lies within the route. Damage is likely to occur to populations of Adonis Blue butterflies

in this area. Because adult butterflies wander, the precise locations of adults is of lesser interest than those of their caterpillars.

However, we are advised by botanical surveyors that the foodplant is widely scattered and local in this area so that specific points of interest cannot be defined. A modification of the route is thus unlikely to reduce the losses that might potentially be sustained by local populations of the Adonis Blue butterfly. It is possible that advance removal and subsequent replacement of turf might be deployed as a means of reducing losses, although it should be remembered that the caterpillars of this butterfly have an obligate relationship with ants and that, consequently, the survival of ants is of paramount importance. We recommend that appropriate bodies be consulted with to determine the likely success of this action.

3.4.2 Chalk-hill Blue

We have recorded Chalk-hill Blue butterflies as present in two of the three downland survey areas – Area 5: Steep Down and Area 6: north of Erringham Shaw. Interestingly we did not find this species on Area 7: Tottington Mount in spite of the fact that the foodplant, Horseshoe Vetch (*Hippocrepis comosa*) is present.

The revised route in the vicinity of Area 5: Steep Down does not include downland habitat nor any area that supports the foodplant. It is unlikely that this section of the route will adversely affect Chalk-hill Blue butterflies.

At Area 6: North of Erringham Shaw, the butterfly affects the embankment on the north side of the route but not any part of the level area from the track southwards. Provided that the route and its construction corridor is deflected away from the bank itself, we are of the opinion that this section of the route will not adversely affect Chalk-hill Blue butterflies.

Area 7: Tottington Mount appears unaffected in this respect.

3.4.3 Small Blue

We have recorded Small Blue butterflies as present in two of the three downland survey areas – Area 5: Steep Down and Area 7: Tottington Mount. To our considerable surprise we did not find this species on Area 6: north of Erringham Shaw. The caterpillar foodplant is Kidney Vetch (*Anthyllis vulneraria*)

The revised route in the vicinity of Area 5: Steep Down does not include downland habitat nor any area that supports the foodplant. It is unlikely that this section of the route will adversely affect Small Blue butterflies.

Area 6: North of Erringham Shaw apparently does not support this butterfly. We find this surprising and comment that inclement weather may have colluded with the minimal number of site visits that we were able to make to mask a presence. In any event, provided that the route and its construction corridor is deflected away from the bank itself, we are of the opinion that this section of the route will not adversely affect any undetected colonies of Small Blue butterflies.

Area 7: Tottington Mount appears unaffected in this respect because we did not find any Small Blue butterflies within or adjacent to the newly defined corridor.

3.4.4 Brown Hairstreak

This is not a chalk downland butterfly; the caterpillar feeds on Blackthorn (*Prunus spinosa*) and is more at home in hedges, along green lanes and in derelict railway cuttings.

We found no evidence of Brown Hairstreak butterflies at any point along the proposed route.

3.4.5 **White-letter Hairstreak**

This, too, is not a chalk downland butterfly; the caterpillar feeds on elms, originally preferring English Elm (*Ulmus procera*) but in its post Dutch Elm Disease recovery era possibly on other elm species.

We found no evidence of White-letter Hairstreak butterflies at any point along the proposed route. Although elm is present in a few places alongside, we could not find any plants likely to be affected by the proposed works.

3.4.6 **Duke of Burgundy Fritillary**

This is a butterfly of sparsely scrub-invaded grassland and sunlit woodland clearings, where the caterpillars feed at night on Primrose (*Primula veris*) and/or Cowslip (*Primula vulgaris*).

We found no evidence of Duke of Burgundy Fritillary butterflies at any point along the proposed route nor in any adjacent areas.

3.4.7 **Pearl-bordered Fritillary**

The preferred habitats are woodland clearings and clearings in scrubby grassland; in both cases a fairly dense cover of Bracken is required along with the caterpillar foodplant of Dog Violet (*Viola riviniana*), or very rarely other *Viola* species.

We found no evidence of Pearl-bordered Fritillary butterflies at any point along the proposed route nor in any adjacent areas.

4 DISCUSSION

4.1.1 Preamble

- 4.1.1 A survey of this nature can only ever be expected to produce representative results; even using the minimum number of five visits per site recommended by Natural England, the 13 sites for which data is presented would have occupied 65 days of field survey and double that in the laboratory naming the species collected.
- 4.1.2 With this firmly in mind we have deliberately varied the effort expended at each of the thirteen selected survey areas. Butterflies were specifically surveyed on the chalk grassland sites, but only casually recorded elsewhere. Hedges were largely sampled by using beating trays whilst wet grassland warranted a good deal of physical searching of litter amongst the vegetation.
- 4.1.3 With these caveats, we consider that our findings do in broad terms reflect the invertebrate species assemblage of each separate area and that, as a consequence, the significance of each area can be assessed in terms of its contribution to the wider aspects of invertebrate ecology.
- 4.1.4 The overall species tally contains several species regarded as being of conservation interest, but this should come as no surprise. What matters is the grouping of these species at certain sites and the overall species diversity at each of these. Interestingly, we have discovered nothing that has altered our opinions drawn following the initial site inspection. These are, essentially, that the proposed works are very unlikely to cause any loss of invertebrate interest other than at one or two specific places.
- 4.1.5 We now offer a brief comment on each of the areas examined. It should be noted that following the selection of these sites in May 2011, we have not found any information to contradict the view that excluded areas have any specific invertebrate interest.

4.2 Assessment of individual sample areas

4.2.1 Area 1a

This area has no outstanding invertebrate interest that we are able to discern. Reinstatement of the ground surface after the works may even improve this situation.

4.2.2 Area 1b

Works here should cause only minimal damage of a temporary nature to populations of invertebrates. Reinstatement of the land after the works are complete might diversify the invertebrate interest.

4.2.3 Area 2

The dry areas of grassland should suffer no permanent damage as a result of the proposed works if the land is reinstated afterwards and the grassland allowed to recolonise naturally. However, we are concerned that there is a raised invertebrate interest in the wetter areas and urge that these be avoided if possible. Damage here might also be expected to negatively affect the wider hydrological regime in the area.

4.2.4 Area 3

This is a fine hedge that supports a high number of invertebrates. Works should strive to minimise the actual gap created in the hedge, tunnelling below if possible. Any breaches should be mitigated by replanting of species already featuring in the hedgerow inventory. It is important that the structure of this hedge line is preserved – in particular the gradual transition from tall hedge to low growing roadside vegetation.

4.2.5 Area 4

The chalk quarry is unaffected by the route but may be a useful mitigation site for other losses. The pit base should be completely cleared of bushes to allow the chalk grassland to re-develop.

4.2.6 Area 5

The revised route does not affect any features of invertebrate interest.

4.2.7 Area 6

The revised route does not affect any features of invertebrate interest. However, we urge caution in “turning the corner” here so that the construction does not affect **any** part of the grassy embankment on the northern side.

4.2.8 Area 7

This is Tottington Mount. Unfortunately, in achieving the generally far more satisfactory line of the revised route, a small area of flower-rich downland grassland in area 7b (Photograph 9) will be disturbed. We consider that this will cause permanent damage to the small area of grassland affected and so will adversely affect the invertebrate fauna here. We suggest that advance removal and subsequent replacement of deeply-cut turf may provide an adequate solution and we recommend that appropriate bodies be consulted with a view to determining the likely success of this action.

4.2.9 Area 8

The proposed route will not affect this ‘green lane’ as it crosses through the field to the east only.

4.2.10 Area 9

Care should be taken here to minimise disruption to the physical habitat mosaic and, of greater importance, to the overall hydrological regime in the damp grassland. In the post works period, the reinstated ground should be allowed to re-vegetate naturally.

4.2.11 Area 10

The flower-rich grassland area here is of potential high interest but as we understand it the route passes to one side of this. The further east it is at this point the less damage that will ensue in terms of effects on invertebrate ecology.

4.2.12 Area 11a

[RSK Note; March 2012 – This area is no longer crossed by the route]

The revised route now runs through the semi-improved grassland that is flanked on both sides by woodland – the latter not at all affected by the works. Consequently, we consider that there will be little or no consequential loss to invertebrate interest here.

4.2.13 Area 12

The revised route no longer passes near area 12 and it is no longer considered.

4.2.14 Area 13

[RSK Note; March 2012 – This area is no longer crossed by the route]

Area 13 falls outside the route and will not suffer any adverse effects before, during or after construction.

4.2.15 Area 14

The area of wet grassland here is sensitive to disturbance and would be best avoided. If it is crossed, the reinstated ground should be allowed to recolonise naturally by adjacent vegetation so that locally native invertebrate populations can recover.

4.2.16 Area 15

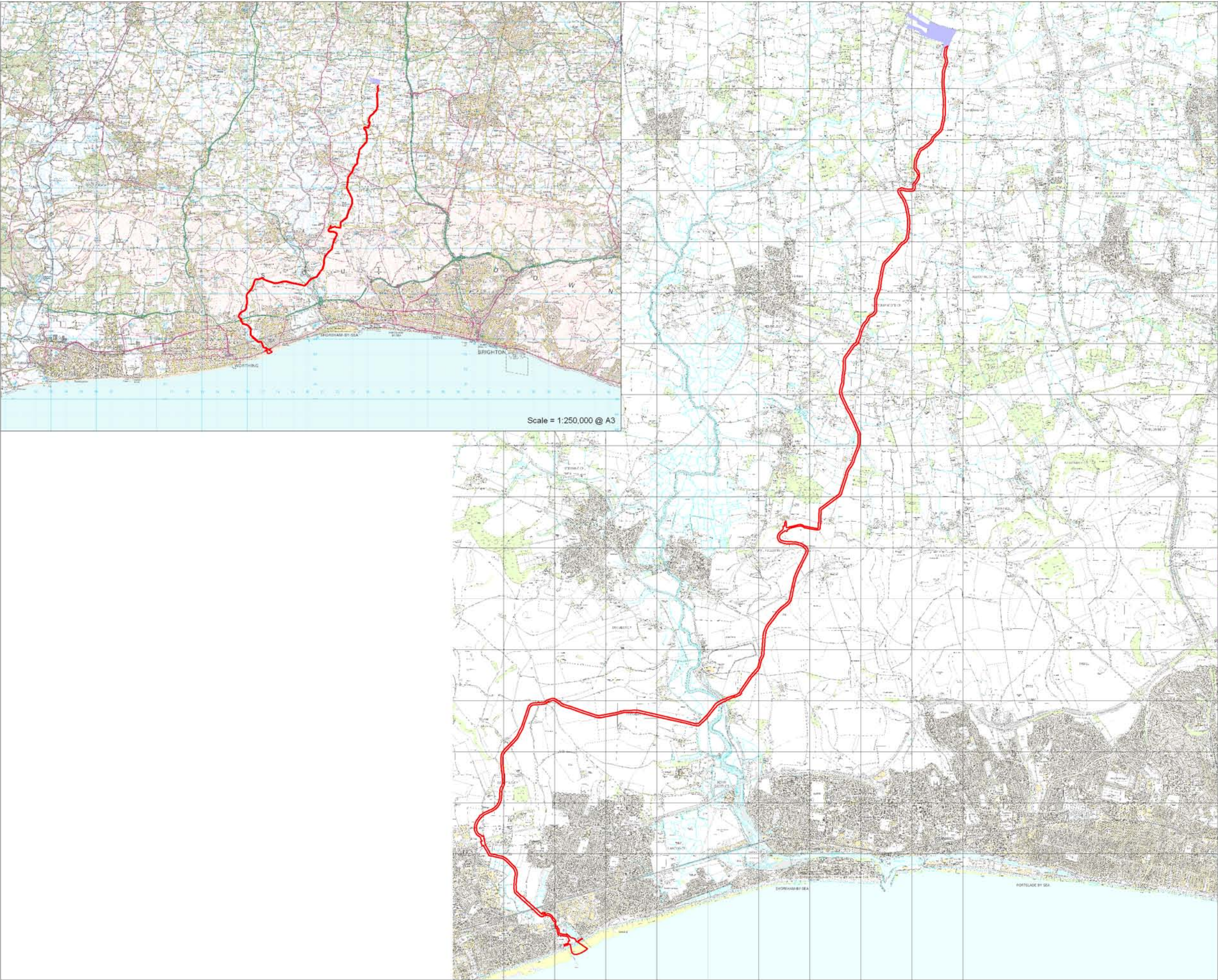
The hedges here are of poor quality and of minimal invertebrate interest. Nevertheless, breached hedges should be repaired using plant species already found in local hedgerows.

6 REFERENCES QUOTED IN THIS REPORT AND ITS APPENDICES

- Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. & Jeffcoate, S., 2001 *The Millennium Atlas of Butterflies in Britain and Ireland*. Oxford University Press
- Bratton, J. H. 1991 *British Red Data Books: 3. Invertebrates other than insects*. NCC
- Shirt, D. B. (ed.) 1987 *British Red Data Books: 2. Insects*. NCC
- UK Biodiversity Group 1999 *Tranche 2 action plans. Volume iv - invertebrates*. English Nature.

APPENDICES

MAPS 1 - 8: AREAS SURVEYED FOR INVERTEBRATES



Legend :

- Development Boundary
- Substation Development Boundary

00	21.11.12	Loc	RG	NH	VG
Rev	Date	Description	Drn	Chk	App

Rampion Wind Farm



Title :

Figure 1 -
Site Location Plan



Scale = 1:75,000 @ A3



REV 16



- Legend:
- Ecology survey corridor (65m)
 - Development Boundary
 - Substation Development Boundary
 - No access
 - Terrestrial invertebrate survey area

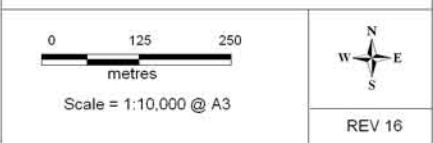


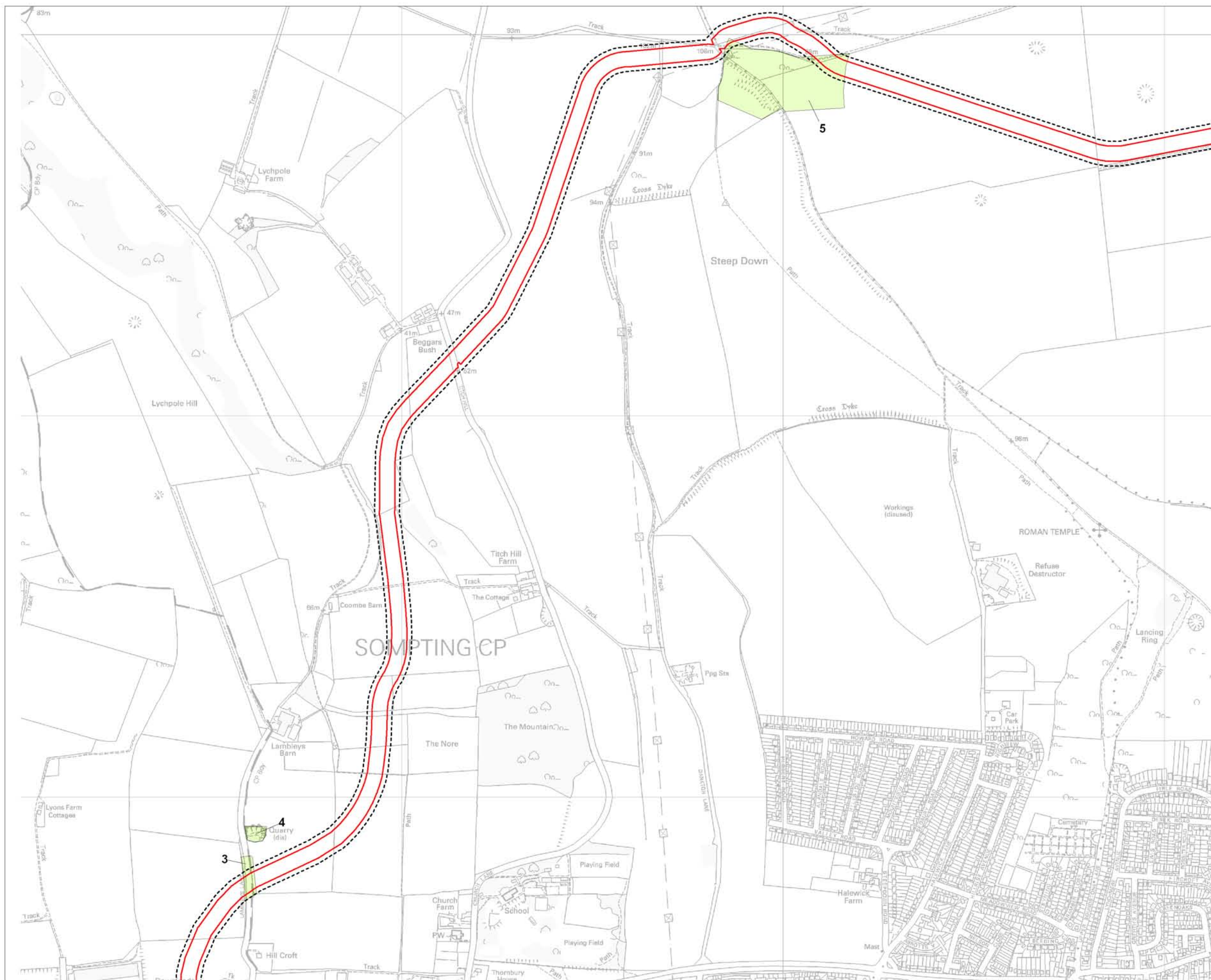
00	21.11.12	P2	RG	NH	VG
Rev	Date	Description	Drn	Chk	App

Rampion Wind Farm



Title:
Figure 2 -
Terrestrial invertebrate Sampling
Locations
Map 1 of 8





Legend :

- Ecology survey corridor (65m)
- Development Boundary
- Substation Development Boundary
- No access
- Terrestrial invertebrate survey area

Rev **Date** **Description** **Drn** **Chk** **App**

00	21.11.12	P2	RG	NH	VG
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Rampion Wind Farm

RSK e-on

Title :

Figure 2 -
Terrestrial invertebrate Sampling
Locations
Map 2 of 8

0 125 250
metres
Scale = 1:10,000 @ A3

N
W E
S

REV 16





Legend:

- Ecology survey corridor (65m)
- Development Boundary
- Substation Development Boundary
- No access
- Terrestrial invertebrate survey area

00	21.11.12	P2	RG	NH	VG
Rev	Date	Description	Drn	Chk	App

Rampion Wind Farm

RSK e-on

Title:

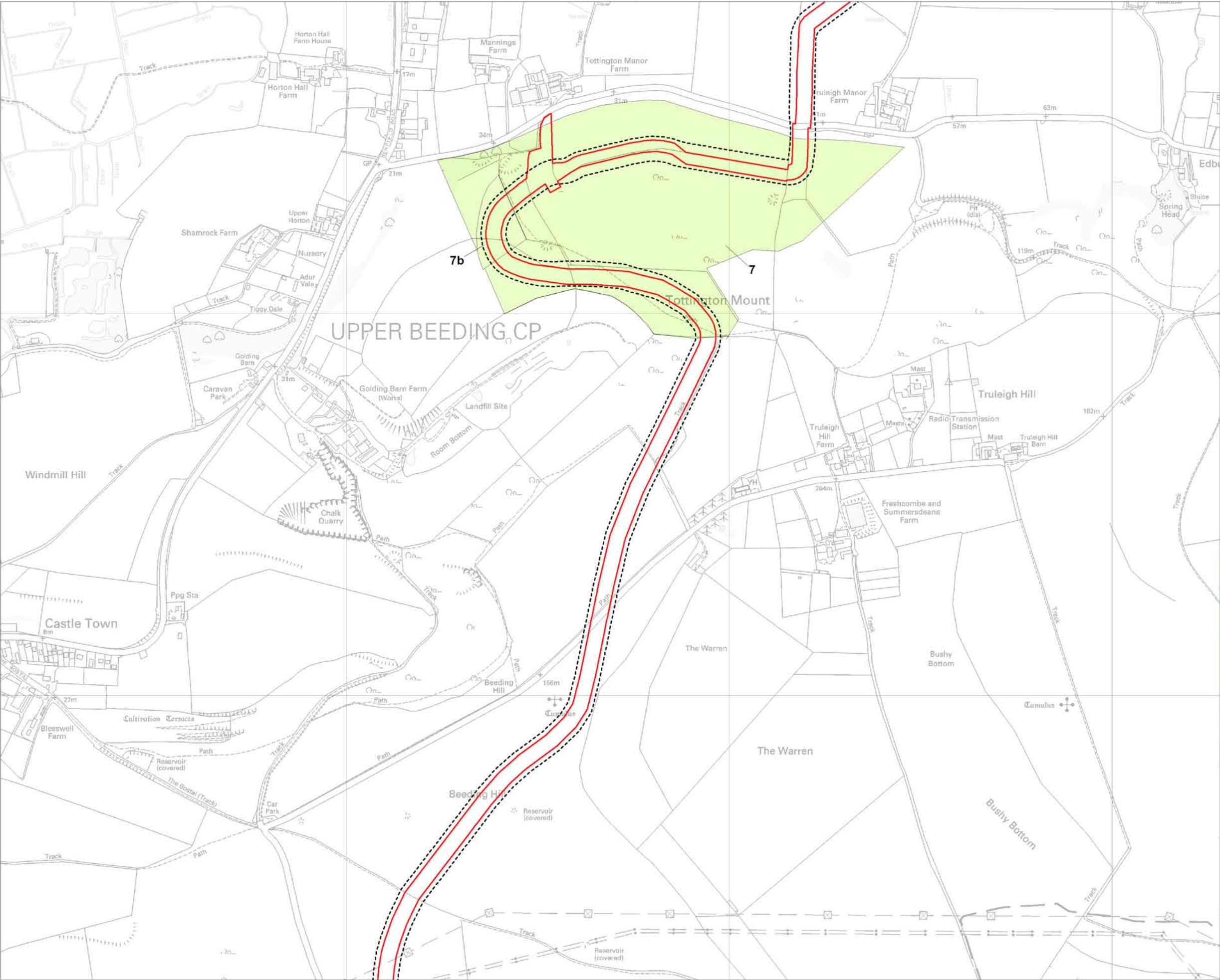
Figure 2 -
Terrestrial invertebrate Sampling
Locations
Map 3 of 8

0 125 250
metres

Scale = 1:10,000 @ A3

N
W
E
S

REV 16



Legend:

- Ecology survey corridor (65m)
- Development Boundary
- Substation Development Boundary
- No access
- Terrestrial invertebrate survey area



00	21.11.12	P2	RG	NH	VG
Rev	Date	Description	Dn	Chk	App

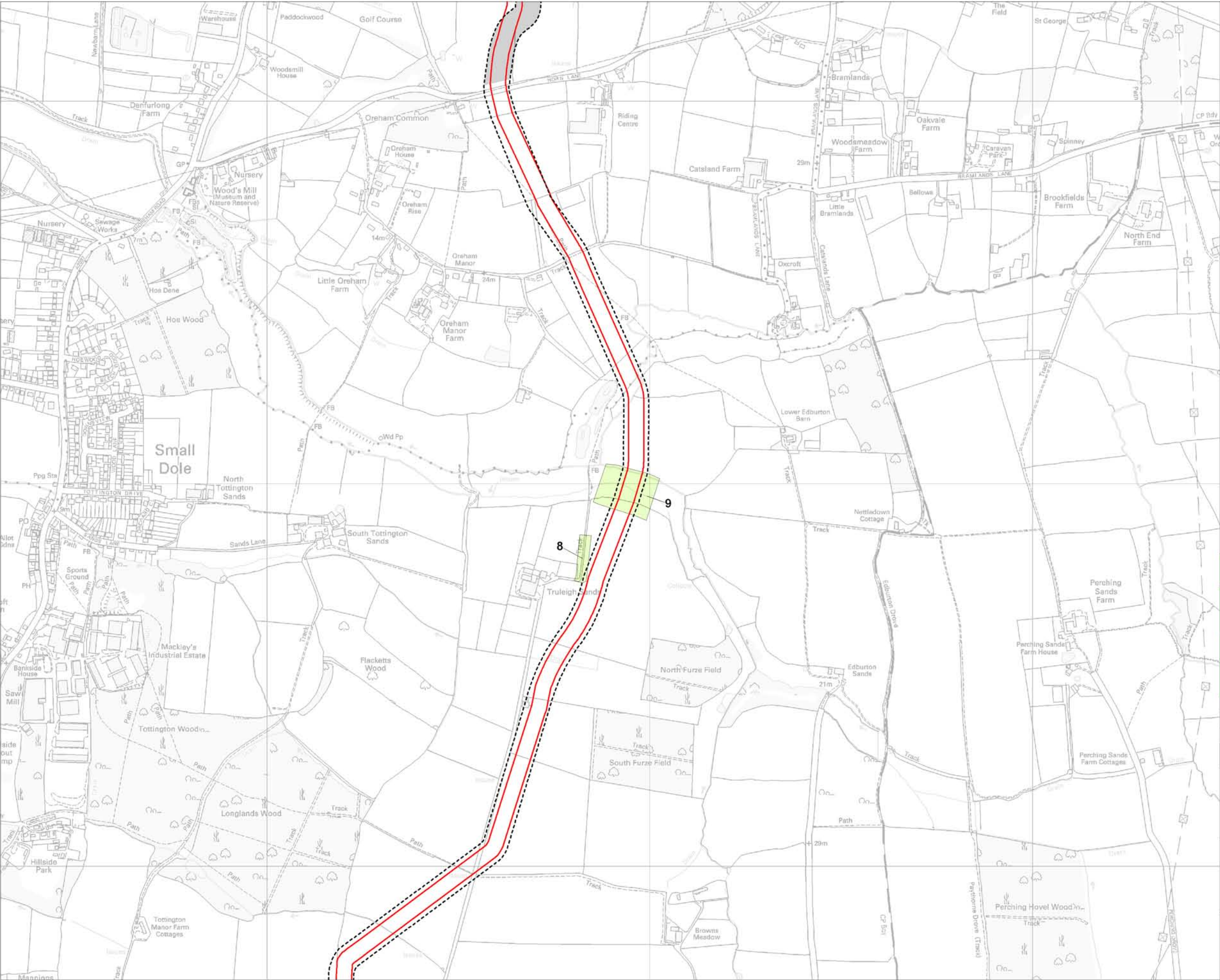
Rampion Wind Farm



Title:
Figure 2 -
Terrestrial invertebrate Sampling
Locations
Map 4 of 8

0 125 250
metres
Scale = 1:10,000 @ A3

N
W E
S
REV 16



Legend :

- Ecology survey corridor (65m)
- Development Boundary
- Substation Development Boundary
- No access
- Terrestrial invertebrate survey area



00	21.11.12	P2	RG	NH	VG
Rev	Date	Description	Dn	Chk	App

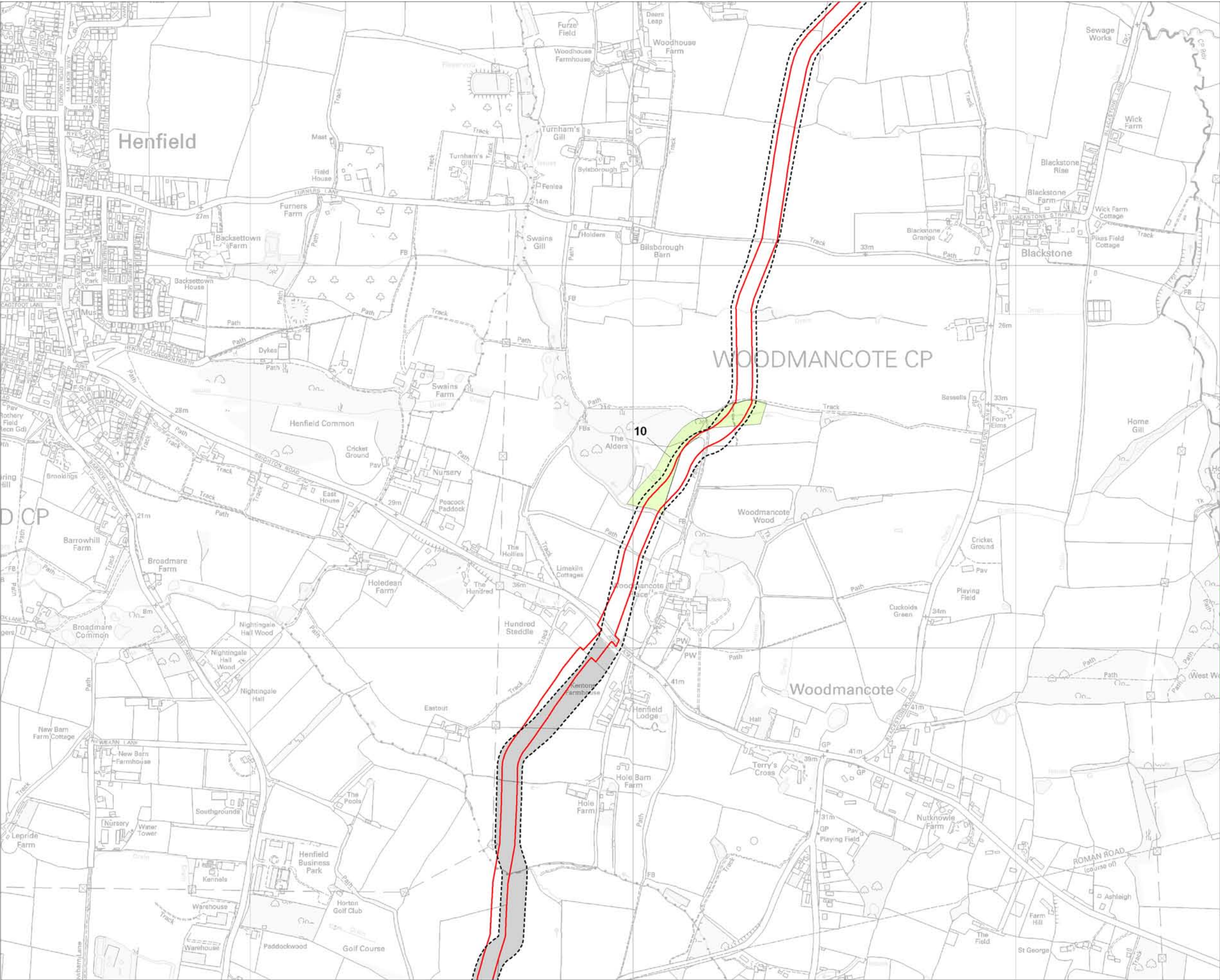
Rampion Wind Farm



Title :
Figure 2 -
Terrestrial invertebrate Sampling
Locations
Map 5 of 8

0 125 250
metres
Scale = 1:10,000 @ A3

N
W
E
S
REV 16



Legend:

- Ecology survey corridor (65m)
- Development Boundary
- Substation Development Boundary
- No access
- Terrestrial invertebrate survey area



00	21.11.12	P2	RG	NH	VG
Rev	Date	Description	Drn	Chk	App

Rampion Wind Farm

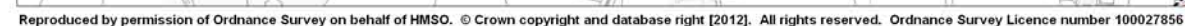


Title:
Figure 2 -
Terrestrial invertebrate Sampling
Locations
Map 6 of 8

Scale = 1:10,000 @ A3

REV 16





APPENDIX 1: TERRESTRIAL INVERTEBRATE SPECIES RECORDED

National status codes are explained in Appendix 2.

[illegible]

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Cantharis cryptica</i>			tall vegetation, especially at the woodland/grassland interface	x	x	x			x	x	x	x	x			x	x
<i>Cantharis lateralis</i>			damp grasslands and wetlands			x											
<i>Cantharis nigra</i>			lowland marsh, rushy pastures, damp hay meadows etc			x					x	x		x	x		
<i>Cantharis nigricans</i>			tussocky grassland, especially if damp								x	x			x		
<i>Cantharis pallida</i>			widespread wetland species								x						
<i>Cantharis rustica</i>			lowland grassland - but always in association with scrub		x						x	x				x	x
<i>Malthodes marginatus</i>			woodland throughout Britain									x					
<i>Malthodes minimus</i>			woodland and scrub									x				x	
<i>Rhagonycha fulva</i>			tall, rank vegetation in lowland areas		x	x			x	x	x	x	x		x	x	x
<i>Rhagonycha lignosa</i>			an arboreal species	x							x						x
<i>Rhagonycha limbata</i>			dry grasslands (formerly called <i>Rhagonycha femoralis</i>)		x				x	x		x					
<i>Rhagonycha testacea</i>			wet woodland and scrubby marshes								x						
Carabidae	ground beetles																
<i>Calathus melanocephalus</i>			dry grasslands, dry ruderal sites and similar but confused with <i>C. cinctus</i>							x							
<i>Demetrias atricapillus</i>			amongst leaf litter and in grasslands			x											
<i>Harpalus (Pseudophonus) rufipes</i>			ubiquitous		x												
<i>Nebria brevicollis</i>			ubiquitous late summer and autumn species		x										x		
Cerambycidae																	
<i>Leptura (Rutpela) maculata</i>	Harlequin beetle		larvae feed in decaying tree stumps; adults wander and are found at flowers													x	
Chrysomelidae	leaf beetles																
<i>Altica lythri</i>			Associated with various willowherbs (Onagraceae)								x	x			x		
<i>Altica oleracea</i>		Local	widely polyphagous			x						x					
<i>Altica palustris</i>			widespread on many plant species			x											
<i>Aphthona euphorbiae</i>		Local	widely polyphagous			x	x		x	x		x					

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Aphthona herbigrada</i>		Local	rock rose in calcareous grassland							x		x					
<i>Cassida rubiginosa</i>			various thistles, burdock and other Asteraceae	x	x	x											
<i>Chaetocnema concinna</i>			Feeds on a variety of both Polygonaceae and Chenopodiaceae			x											
<i>Chaetocnema hortensis</i>			feeds on various grasses													x	
<i>Chrysolina polita</i>			Lamiaceae - especially species of mint. Often found near water												x		
<i>Chrysolina staphylaea</i>		Local	polyphagous, but most often on creeping buttercup												x	x	
<i>Donacia marginata</i>		Local	Sparganium and Carex in standing water - feeding on the roots			x						x			x		
<i>Donacia vulgaris</i>			Typha - the larvae feeding in the roots			x									x		
<i>Epitrix pubescens</i>		Local	associated with woody nightshade												x		
<i>Gastrophysa polygoni</i>			Polygonum species			x					x						
<i>Gastrophysa viridula</i>			larvae feed on dock leaves in damp meadows and elsewhere						x		x				x		
<i>Lema cyanella</i>			Feed on thistles, including creeping thistle												x		
<i>Lochmaea crataegi</i>			Hawthorn - larvae mine the berries. Occasionally on Blackthorn or Rowan			x					x						x
<i>Longitarsus dorsalis</i>		NS(Nb)	Ragworts (Senecio species) - a southern species			x											
<i>Longitarsus flavicornis</i>			ragworts			x			x								
<i>Longitarsus luridus</i>			widely polyphagous			x	x		x	x	x	x					
<i>Longitarsus ochroleucus</i>		NS(Nb)	ragwort in ruderal habitats		x												
<i>Longitarsus parvulus</i>			feeds on many plant species				x				x	x		x			
<i>Neocrepidodera ferruginea</i>			polyphagous			x									x		
<i>Neocrepidodera transversa</i>			polyphagous												x		
<i>Oulema melanopa.</i>			feeds on grasses - very common						x	x	x			x			
<i>Oulema rufocyanea</i>			feeds on grasses - very common			x				x			x		x		
<i>Phaedon cochleariae</i>			various Brassicaceae			x											

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Phyllodecta (Phratora) vulgatissima</i>			willows and perhaps poplars and Aspen								x						
<i>Phyllotreta atra</i>			various Brassicaceae						x		x	x					
<i>Phyllotreta nigripes</i>			various Brassicaceae									x			x		
<i>Phyllotreta undulata</i>			various Brassicaceae			x						x					
<i>Podagrica fuscicornis</i>		NS(Nb)	mallow (Malva species)								x						
<i>Psylliodes affinis</i>			Solanaceae - especially S. dulcamara (woody nightshade)				x								x		
<i>Psylliodes chrysocephala</i>		Local	various Cruciferae												x		
<i>Psylliodes dulcamarae</i>			Woody nightshade (Solanum dulcamara)												x		
<i>Psylliodes napi</i>			various Cruciferae								x						
<i>Timarcha tenebricosa</i>	Bloody-nosed Beetle									x							
Ciidae																	
<i>Cis boleti</i>			fungi - in both brackets and caps													x	
Coccinellidae																	
<i>Adalia 10-punctata</i>	10-spot ladybird		predatory on other insects	x	x						x					x	x
<i>Adalia 2-punctata</i>	2-spot ladybird		predatory on other insects	x	x	x	x		x	x	x	x	x	x	x	x	x
<i>Anisostica 19-punctata</i>	19-spot ladybird		wetland habitats			x					x	x		x			
<i>Coccidula rufa</i>	Spotless ladybird		reed beds and other marshy places			x					x						
<i>Coccinella 7-punctata</i>	7-spot ladybird		predatory on other insects	x	x	x	x		x	x	x	x	x	x	x	x	x
<i>Halyzia 16-guttata</i>	Orange ladybird		predatory on other insects	x							x	x				x	x
<i>Harmonia axyridis</i>	Harlequin ladybird		a recent colonist in Britain				x		x		x	x	x		x	x	x
<i>Propylea 14-punctata</i>	14-spot ladybird		predatory on other insects		x	x	x		x	x	x	x		x		x	x
<i>Rhyzobius litura</i>			predatory on other insects								x						
<i>Scymnus frontalis</i>			predatory on other insects in grassland and herbaceous vegetation			x											
<i>Subcoccinella 24-punctata</i>	24-spot ladybird		predatory on other insects								x			x	x	x	
<i>Thea 22-punctata</i>	22-spot ladybird		feeds on mildews				x				x	x					x
Cryptophagidae																	
<i>Telmatophilus ryphae</i>			a reedbed species			x											
Curculionidae	weevils																
<i>Anthonomus rubi</i>			flowers of brambles and raspberries	x													
<i>Barypeithes araneiformis</i>			ubiquitous amongst moss, litter, etc.				x										
<i>Ceutorhynchus contractus</i>			various Cruciferae												x		

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<i>Ceutorhynchus erysimi</i>			Cruciferae			x									x			
<i>Ceutorhynchus picitarsis</i>		Local	associated with various cruciferous plants on disturbed ground						x									
<i>Ceutorhynchus pyrrhorhynchus</i>		Local	Sisymbrium												x			
<i>Drupenatus nasturtii</i>		NS(Na)	Associated with Water Cress			x												
<i>Gymnetron pascuorum</i>			feeds on flowers of Plantago lanceolata - Ribwort Plantain								x							
<i>Hadroplontus litura</i>			creeping thistle in grasslands etc												x			
<i>Hypera postica</i>			Medicago, Melilotus and Trifolium - on the foliage			x												
<i>Nedys quadrimaculatus</i>			nettles - feeding on the flowers			x	x								x	x	x	
<i>Parethelcus pollinarius</i>			Nettles	x		x									x	x		
<i>Phyllobius pomaceus</i>			Nettles	x								x						
<i>Phyllobius pyri</i>			Larvae develop in the ground an adults feed on a variety of herbage and tree leaves				x				x				x	x	x	
<i>Polydrusus cervinus</i>			trees and shrubs - feeding on the leaves								x						x	
<i>Rhamphus oxyacanthae</i>		Local	larva mines in leaves of hawthorn			x	x				x							
<i>Sitona lineatus</i>			various legumes		x	x	x		x	x	x	x				x	x	
Elateridae	click beetles																	
<i>Agriotes lineatus</i>			larvae feed on grass roots		x				x			x				x		
<i>Agriotes obscurus</i>			larvae feed on grass roots							x								
<i>Agriotes pallidulus</i>			larvae feed on grass roots			x				x		x						
<i>Agriotes sputator</i>			larvae feed on grass roots			x			x				x					
<i>Athous (Hemicrepidus) hirtus</i>			grassland, woodland rides, etc. The larvae feed in decaying wood and in soil			x												
<i>Athous haemorrhoidalis</i>			the larva feeds on the roots of grasses								x							
<i>Kibunea (Cidnopus) minuta</i>			a species of dry grasslands						x									
Kateretidae																		
<i>Brachypterus glaber</i>			Nettles	x												x	x	
<i>Brachypterus urticae</i>			Nettles	x	x		x									x	x	
Lampyridae																		
<i>Lampyris noctiluca</i>	Glow Worm	Local	predatory on snails amongst long grass			x			x		x							
Latridiidae																		

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<i>Aridius bifasciatus</i>			litter, compost, tussocks etc - more or less ubiquitous		x							x				x	x
<i>Aridius nodifer</i>			litter, compost, tussocks etc - more or less ubiquitous	x	x							x					
<i>Corticaria impressa</i>			amongst plant litter	x													
<i>Corticarina fuscata</i>			amongst plant litter	x													
<i>Corticaria gibbosa</i>			amongst plant litter	x						x							x
<i>Enicmus transversus</i>			associated with fungi under bark and in other places	x													
Melyridae																	
<i>Cordylepherus (Malachius) viridis</i>		Local	a common grassland species			x				x	x				x		
<i>Malachius bipustulatus</i>			grasslands		x	x	x		x	x		x		x			
Nitidulidae																	
<i>Meligethes aeneus</i>			various flowers		x	x	x				x	x					x
<i>Meligethes nigrescens</i>			White Clover								x						
Oedemeridae																	
<i>Oedemera lurida</i>		Local	a common grassland species	x	x	x			x	x		x			x		
<i>Oedemera nobilis</i>			a common grassland species	x	x	x	x		x	x		x		x			
Pyrochroidae																	
<i>Pyrochroa serraticornis</i>	Cardinal beetle		Larvae predatory under loose tree bark	x													
Scirtidae																	
<i>Scirtes hemisphaericus</i>		Local	adult amongst rushes; larva is aquatic												x		
Scaphitidae																	
<i>Anaspis frontalis</i>			larvae in twigs of oak and other trees; adults at hawthorn blossom			x					x						x
<i>Anaspis lurida</i>		Local	larvae in live and dead wood and fungi; adults at hawthorn blossom			x											
<i>Anaspis pulicaria</i>			larvae probably in plant stems or twigs of trees			x											
Silphidae																	
<i>Necrodes littoralis</i>			carrion								x						
Staphylinidae																	
<i>Paederus riparius</i>			striking red and black beetle of the mud at the edge of reed beds and fens												x		
CRUSTACEA: ISOPODA	WOODLICE																
Armadillidiidae																	
<i>Armadillidium vulgare</i>			under stones etc				x		x	x		x					
Oniscidae																	
<i>Oniscus asellus</i>			damp, but not wet, habitats everywhere	x		x	x		x								x

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Philosciidae																	
<i>Philoscia muscorum</i>			under stones etc	x	x		x										x
Platyarthridae																	
<i>Platyarthrus hoffmanseggii</i>			lives inside the nests of ants, usually <i>Lasius niger</i>						x								
Porcellionidae																	
<i>Porcellio scaber</i>			under stones etc		x						x						x
DERMAPTERA	EARWIGS																
Forficulidae																	
<i>Forficula auricularia</i>	common earwig		generalist species	x	x	x	x		x	x	x	x			x	x	x
DIPTERA	TRUE FLIES																
Agromyzidae																	
<i>Agromyza anthracina</i>			larva makes mines in nettle leaves	x													
<i>Agromyza reptans</i>			larva makes mines in nettle leaves	x													
<i>Agromyza vicifoliae</i>			larva makes mines in leaves of vetches								x						
<i>Calomyza artemisiae</i>			larva mines leaves of Mugwort			x											
<i>Liriomyza amoena</i>			mines leaves of elder	x													
<i>Liriomyza artemisicola</i>			larva mines leaves of Mugwort			x											
<i>Phytomyza lappae</i>			mines leaves of Burdock (<i>Arctium</i> species)	x	x												
<i>Phytomyza ranunculi</i>			mines leaves of <i>Ranunculus repens</i>										x				
Anthomyiidae																	
<i>Pegomya solennis</i>			larva mines the leaves of dock plants						x								
Asilidae	robber flies																
<i>Dioctria atricapilla</i>			predatory -mainly in edge habitats								x				x		
<i>Dioctria baumhaueri</i>			predatory -mainly in edge habitats	x	x					x						x	
<i>Dioctria linearis</i>			predatory -mainly in edge habitats														
<i>Dioctria rufipes</i>			predatory -mainly in edge habitats						x								
<i>Leptarthrus breviostris</i>		Local	in the south it is restricted to chalk grasslands				x			x							
<i>Leptogaster cylindrica</i>			grassland predator	x	x	x	x		x	x	x		x		x		
<i>Machimus atricapillus</i>			grassland predator			x			x	x	x						
Bibionidae																	
<i>Dilophus febrilis</i>			associated with dung			x											
Calliphoridae	blowflies																
<i>Calliphora vicina</i>			dung or dead bodies				x										
<i>Calliphora vomitoria</i>			dung or dead bodies				x										
<i>Lucilia caesar</i>			carion and dung				x										

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Cecidomyiidae																	
<i>Dasineura crataegi</i>			forms galls on hawthorn			x					x						
<i>Dasineura urticae</i>			forms galls on nettles	x													
Dolichopodidae																	
<i>Poecilobothrus nobilitatus</i>			aquatic larvae			x					x						
<i>Scellus notatus</i>		Local	predatory species in woodland and scrub, the adults predatory								x	x					
Empididae																	
<i>Empis (Kritempis) livida</i>			predatory on other flies			x	x					x				x	
<i>Empis (Pachymeria) tessellata</i>			predatory on other flies			x	x				x						
Limoniidae																	
<i>Limonia nigropunctata</i>			scrub and woodland, mainly on calcareous soils. Larvae develop amongst litter								x						
<i>Limonia tripunctata</i>			lowland deciduous woodland, the larvae developing in the soil/litter													x	
<i>Rhipidia (Limonia) duplicata</i>			various habitats, including woodland and grassland, the larvae feeding in animal dung	x													
Micropezidae																	
<i>Micropeza corrigiolata</i>		Local	Larva feeds in root nodules of Pisum sativum, Trifolium pratense and Medicago sativa								x						
Opomyzidae																	
<i>Geomyza balachowskyi</i>			larvae feed inside the stems of grasses								x						
<i>Geomyza tripunctata</i>			larvae feed inside the stems of grasses								x						
<i>Opomyza germinationis</i>			larvae feed inside the stems of grasses								x						
Pallopteridae																	
<i>Palloptera umbellatarum</i>			larvae feed inside stems of false oat-grass			x											
Platystomatidae																	
<i>Platystoma seminationis</i>			larvae develop in decaying vegetable matter						x			x					
Ptychopteridae																	
<i>Ptychoptera albimana</i>			damp habitats, including seepages			x						x					
<i>Ptychoptera contaminata</i>			Wetland habitats			x					x						
Rhagionidae																	
<i>Chrysopilus asiliformis</i>			damp habitats								x						
<i>Chrysopilus</i>			damp habitats								x			x			

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<i>cristatus</i>																	
<i>Rhagio lineola</i>			woodland and scrub - especially at the edges	x	x		x				x	x			x	x	x
<i>Rhagio scolopaceus</i>			woodland edge and other wooded areas - in clearings and at edges								x	x			x	x	x
Sciomyzidae	snail-killing flies																
<i>Coremacera tristis</i>		Local	dry habitats, especially grasslands									x			x	x	
<i>Dichetophora oblitterata</i>			calcareous grassland, wetland and coastal dunes								x						
<i>Pherbina coryleti</i>			predatory on water snails			x					x						
Sepsidae																	
<i>Nemopoda nitidula</i>			shade-loving species, larvae in dung and carrion			x					x						
<i>Sepsis cynipsea</i>			Larvae feed in animal dung			x					x						
<i>Sepsis fulgens</i>			the most ubiquitous member of this group, feeding in mammal dung								x						
<i>Themira annulipes</i>			damp habitats, especially on organically enriched soils								x						
Stratiomyidae	soldier flies																
<i>Beris chalybata</i>			associated with the scrub/grassland interface						x	x	x						x
<i>Beris vallata</i>			saprophagous larvae		x				x	x		x					
<i>Chloromyia formosa</i>			ubiquitous		x	x	x		x	x	x	x					
<i>Chorisops tibialis</i>			saprophagous larvae				x		x		x						
<i>Microchrysa polita</i>			larvae require decomposing organic matter	x													
<i>Oplodontha viridula</i>		Local	marshes and pond margins			x					x			x			
<i>Oxycera trilineata</i>		Local	larvae in mosses in the edge of water bodies - preferring moving water								x						
<i>Pachygaster atra</i>			woodland edge & scrubland species - larvae under dead bark of trees	x							x						x
<i>Pachygaster leachii</i>			woodland edge & scrubland species - larvae under dead bark of trees	x							x						x
Syrphidae	hoverflies																
<i>Baccha elongata</i>			shaded woodland	x													x
<i>Cheilosia albitarsis</i> s. str.			larvae feed in the roots of <i>Ranunculus repens</i>			x											

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<i>Cheilosia bergenstammi</i>			larvae feed in the stems and roots of ragwort on dry chalky or sandy sites or in ruderal areas						x								
<i>Cheilosia grossa</i>			larvae mine the stems of thistles, both <i>Cirsium</i> and <i>Carduus</i> species									x					
<i>Cheilosia pagana</i>			larvae are thought to feed in the roots of <i>Anthriscus sylvestris</i>		x												
<i>Cheilosia proxima</i>			larvae feed in the roots of <i>Cirsium</i> species of thistle, especially <i>Cirsium palustre</i>		x	x					x					x	
<i>Chrysogaster cemitiorum</i>			associated with flowers in wet meadows and valley bogs								x						
<i>Chrysotoxum bicinctum</i>			grassland species - associated with ants' nests				x		x	x	x					x	
<i>Dasysyrphus albobristatus</i>			aphid predator at woodland edge habitats				x										
<i>Epistrophe eligans</i>			mainly at edge habitats				x		x	x	x						
<i>Episyrphus balteatus</i>			ubiquitous species, partly immigrant, and a predator of aphids	x	x	x	x		x	x	x	x	x	x		x	x
<i>Eristalis arbustorum</i>			Larvae require damp habitats but adults are more or less ubiquitous		x	x											
<i>Eristalis pertinax</i>			Larvae require damp habitats but adults are more or less ubiquitous	x	x						x			x			
<i>Eristalis tenax</i>			Larvae require damp habitats but adults are more or less ubiquitous								x			x		x	
<i>Eupeodes corollae</i>			Grassland		x	x				x	x		x			x	
<i>Eupeodes latifasciatus</i>		Local	Damp grassland			x					x	x	x				
<i>Eupeodes luniger</i>			Grassland				x		x	x							
<i>Helophilus pendulus</i>			Larvae require damp habitats but adults are more or less ubiquitous			x					x					x	
<i>Lejogaster metallina</i>			rushy meadows etc. the larvae feed amongst roots of aquatic plants			x								x			
<i>Leucozona lucorum</i>			larvae feed on ground layer aphids				x										
<i>Melanostoma</i>			Grassland		x	x	x		x	x	x	x	x	x			x

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<i>mellinum</i>																	
<i>Melanostoma scalare</i>			Grassland			x			x	x	x	x	x				
<i>Merodon equestris</i>			larvae feed inside plant bulbs								x						
<i>Myathropa florea</i>			larvae are semi-aquatic			x								x			
<i>Neoscia podagrica</i>			edge-habitat species		x						x					x	
<i>Neoscia tenur</i>			reed beds and similar emergent vegetation											x			
<i>Paragus haemorrhous</i>			bare or sparsely vegetated, dry sandy ground				x			x							
<i>Pipiza lugubris</i>		NS (N)	ecology unclear, but adults often feed on flowers of meadowsweet								x						
<i>Pipizella viduata</i>			Larvae feed on root aphids on Umbelliferae				x		x								
<i>Pipizella virens</i>		Local	probably associated with root aphids of Umbelliferae						x								
<i>Platycheirus albimanus</i>			ubiquitous - larvae prey on aphids	x	x	x	x		x	x	x	x					
<i>Platycheirus angustatus</i>			damp habitats			x					x		x				
<i>Platycheirus clypeatus s. str.</i>			Damp habitats		x	x						x	x				
<i>Platycheirus fulviventris</i>			larvae feed on the aphid Hyalopterus pruni on monocotyledonous plants in wetlands			x						x					
<i>Platycheirus granditarsus</i>			wetland sites			x											
<i>Platycheirus peltatus s. str.</i>			aphid predator				x							x			
<i>Platycheirus rosarum</i>			shaded wetland and carr woodland			x					x						
<i>Platycheirus scutatus</i>			an edge-habitat species	x	x												
<i>Scaeva pyrastris</i>			immigrant from overseas - feeds on aphids				x				x						
<i>Sphaerophoria scripta</i>			Grassland - larvae prey on aphids		x	x	x		x	x	x	x	x				
<i>Sphaerophoria taeniata</i>		Local	usually in damp habitats, from grassland with Juncus to woodland			x									x		
<i>Syrphoctonus pipiens</i>			larvae in decaying vegetation; adults at flowers				x		x		x	x				x	x
<i>Syrphoctonus ribesii</i>			larvae are aphid predators on trees and bushes				x				x						x
<i>Syrphoctonus vitripennis</i>			larvae are aphid predators on trees and bushes			x	x		x		x	x	x			x	x

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<i>Volucella bombylans</i>			inquiline in nests of bumble bees				x				x						
<i>Volucella pellucens</i>			inquiline in nests of social wasps/hornet	x	x		x				x					x	
<i>Xanthogramma citrofasciatum</i>			larvae feed in ants nests							x							
<i>Xanthogramma pedisequum</i> agg.		Local	larvae feed in ants nests								x						
Tabanidae																	
<i>Chrysops caecutiens</i>			damp habitats, rarely far from damp woodland			x					x						x
<i>Haematopota pluvialis</i>			damp habitats - adult females are blood sucking horseflies			x			x		x		x				
<i>Tabanus autumnalis</i>			damp habitats - adult females are blood sucking horseflies								x						
Tachinidae																	
<i>Eriothrix rufomaculata</i>			larva parasitises moth larvae		x	x			x		x		x				
<i>Tachina fera</i>			parasitic on larvae of noctuid moths	x	x												
Tephritidae	picture-winged flies																
<i>Anomoia purmunda</i>		Local	Larva feeds in the flesh of hawthorn berries								x						
<i>Euleia heraclei</i>			white-flowering Umbelliferae								x						
<i>Sphenella marginata</i>		Local	on various ragwort species, in late summer and autumn			x											
<i>Tephritis bardanae</i>			larvae gall the flowers of burdock	x													
<i>Tephritis cometa</i>		Local	larvae gall the flowers of creeping thistle				x										
<i>Trypeta artemisiae</i>			larva mines leaves of mugwort. Curiously, almost never found as an adult			x											
<i>Urophora cardui</i>			larvae gall the flowers of thistles		x		x				x	x			x		
<i>Urophora stylata</i>			larvae form galls on thistle stems			x											
<i>Xyphosia miliaria</i>			larvae gall the flowers of thistles - ubiquitous		x												
Tipulidae	crane flies																
<i>Lunatipula fascipennis</i>			damp woodland edges and hedges								x						
<i>Nephrotoma flavipalpis</i>			hedges and other wooded edge habitats, appearing after N. appendiculata				x										
<i>Nephrotoma</i>			common in				x										

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<i>quadrifaria</i>			woodlands, also in hedgerows, scrub and similar														
<i>Nigrotipula nigra</i>			Wetland								x						
<i>Tipula oleracea</i>			ubiquitous, larvae feeding on roots of grasses			x	x				x	x					x
<i>Tipula paludosa</i>			ubiquitous, larvae feeding on roots of grasses			x	x				x	x					x
HETEROPTERA	TRUE BUGS																
Acanthosomatidae																	
<i>Acanthosoma haemorrhoidale</i>	hawthorn shield bug		hawthorn			x					x					x	
Alydidae																	
<i>Alydus calcaratus</i>		Local	heaths and dry grassland, perhaps associated with ants							x							
Anthocoridae																	
<i>Anthocoris nemoralis</i>			trees and shrubs	x			x		x		x	x				x	x
<i>Anthocoris nemorum</i>			low vegetation		x	x	x		x	x	x	x	x	x	x	x	x
Berytinidae																	
<i>Cymus glandicolor</i>			sedges, reeds etc in marshy places												x		
<i>Cymus melanocephalus</i>			Juncus (rush) in a wide variety of habitats in the south-east region												x		
Cimicidae																	
<i>Orius majusculus</i>			low vegetation							x							
<i>Orius niger</i>			low vegetation on a variety of dry sites							x							
<i>Orius vicina</i>			predatory amongst low growing vegetation						x	x							
Coreidae																	
<i>Coreus marginatus</i>			Develops on a variety of Polygonaceae in open habitats								x				x		
Lygaeidae																	
<i>Drymus brunneus</i>			amongst litter or moss in damp or shaded places						x								
<i>Heterogaster urticae</i>			Nettles	x					x		x	x			x	x	x
<i>Ischnodemus sabuleti</i>			reed beds			x								x			
<i>Kleidocerys resedae</i>			trees and shrubs generally				x		x		x					x	
<i>Scolopostethus affinis</i>			usually on nettles	x							x						
<i>Scolopostethus thomsoni</i>			usually on nettles				x								x		
Microphysidae																	
<i>Loricula elegantula</i>			predatory amongst trees and bushes								x						
Miridae																	
<i>Acetropis gimmerthalii</i>		Local	damp grasslands												x		

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<i>Adelphocoris lineolatus</i>			leguminous plants						x								
<i>Blepharidopterus angulatus</i>			a wide range of broad-leaved trees													x	
<i>Calocoris norvegicus</i>			polyphagous													x	
<i>Capsus ater</i>			Grassland		x	x				x					x		
<i>Cyllocoris histrionicus</i>			associated with oak									x				x	x
<i>Deraeocoris lutescens</i>			predatory amongst trees and bushes	x							x				x	x	
<i>Deraeocoris ruber</i>			nettles, brambles and similar rough vegetation	x								x				x	x
<i>Dicyphus epilobii</i>			<i>Epilobium hirsutum</i>								x	x				x	
<i>Dryophilocoris flavo-4-maculatus</i>			associated with oak									x				x	x
<i>Harpocera thoracica</i>			Oaks -solitary and in woods													x	
<i>Heterotoma meriopterum</i> (= <i>planicornis</i>)			edge habitats - especially in association with nettles			x			x		x					x	
<i>Leptoterna dolabrata</i>			found in a wide range of grassland habitats			x			x	x	x	x	x	x			
<i>Leptoterna ferrugata</i>			grassland species			x				x				x			
<i>Liocoris tripustulatus</i>			stinging nettle	x							x						x
<i>Lygocoris pabulinus</i>			Polyphagous amongst low vegetation			x									x		
<i>Notostira elongata</i>			grasslands			x	x		x	x		x	x				
<i>Orthonotus rufifrons</i>			nettles - often in damp woodlands												x		
<i>Phylus melanocephalus</i>			restricted to oak trees													x	
<i>Phytocoris tiliae</i>			predatory on trunks and branches of deciduous trees													x	
<i>Plagiognathus albipennis</i>			Mugwort - probably wherever this grows			x											
<i>Plagiognathus arbustorum</i>			polyphagous, but usually associated with stinging nettles				x										
<i>Plagiognathus chrysanthemi</i>			polyphagous				x										
<i>Polymerus nigrinus</i>			goosegrass (<i>Galium aparine</i>) and other bedstraws												x		
<i>Stenodema calcaratum</i>			grasslands							x		x			x		
<i>Stenodema laevigatum</i>			grasslands		x	x	x				x	x	x		x	x	
<i>Stenotus binotatus</i>			grasslands		x	x						x	x	x			
Nabidae																	
<i>Nabicula limbata</i>	marsh damsel bug		marshy places								x		x				
<i>Nabis ferus</i>			dry sites, especially							x						x	

Group / species	English name if available	National status	Ecological associations	Area where recorded													
				Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Nabis rugosus</i>			ruderal grassland common predator amongst long grass and herbs												x		
Pentatomidae																	
<i>Aelia acuminata</i>			Thistles		x	x			x		x	x					
<i>Eysarcoris fabricii</i>			probably polyphagous													x	x
<i>Palomena prasina</i>			trees and shrubs	x			x				x			x		x	x
<i>Podops inuncta</i>	the Turtle Bug		dry places, especially ruderal sites. A markedly southern species				x			x							
Rhopalidae																	
<i>Rhopalus subrufus</i>		Local	St John's Wort (Hypericum perforatum)													x	
Saldidae																	
<i>Saldula pilosella</i>						x											
Tingidae																	
<i>Tingis cardui</i>			spear thistle - Cirsium vulgare			x											
HOMOPTERA	PLANT HOPPERS																
Cercopidae																	
<i>Aphrophora alni</i>			larvae feed under froth on a wide range of trees and shrubs	x							x					x	x
<i>Cercopis vulnerata</i>			woodland edge, other edge habitats and damp ditches									x			x		
<i>Neophilaenus lineatus</i>			grasslands								x				x		
<i>Philaenus spumarius</i>	spittle-bug		larvae feed under froth on a wide range of herbaceous plants		x	x					x				x	x	
Cicadellidae																	
<i>Cicadella viridis</i>			grasses and rushes in marshy places				x				x						
<i>Empoasca decipiens</i>			Usually on nettles	x													
<i>Eupteryx urticae</i>			Usually on nettles	x													
<i>Iassus lanio</i>			usually on oak, occasionally on other trees									x				x	
Cixiidae																	
<i>Oliarus panzeri</i>		NS(Nb)	dry grassland			x											
Delphacidae																	
<i>Stenocranus major</i>		Local	Phalaris arundinacea in marshy places								x						
<i>Stenocranus minutus</i>			grasses in a range of habitats			x					x			x			
Membracidae																	
<i>Centrotus cornutus</i>		Local	oak, aspen and other sapling trees									x				x	
HYMENOPTERA: ACULEATA	BEEES, WASPS & ANTS																
Apidae																	
<i>Andrena bicolor</i>			open woodland and							x							

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
			grassland - nests in the ground														
<i>Andrena dorsata</i>	a solitary bee	Local	dry, friable ground in which it nests						x								
<i>Apis mellifera</i>	honey bee		flowers in general	x	x	x	x		x	x			x	x		x	
<i>Bombus hortorum</i>	a bumble bee		a bumble bee			x											
<i>Bombus lapidarius</i>	red-tailed bumble bee		ubiquitous		x	x	x		x								
<i>Bombus lucorum</i>	white-tailed bumble bee		ubiquitous			x			x	x	x			x		x	
<i>Bombus pascuorum</i>	common carder bee		ubiquitous	x	x	x	x		x	x	x	x	x			x	x
<i>Bombus ruderarius</i>	a bumble bee	BAP				x			x								
<i>Bombus terrestris</i>	buff-tailed bumble bee		ubiquitous				x					x					
<i>Halictus rubicundus</i>	a solitary bee		ground nesting solitary bee							x							
<i>Hylaeus brevicornis</i>	a solitary bee		nests in hollow plant stems, such as docks, etc				x									x	
<i>Hylaeus confusus</i>	a solitary bee	Local	nests in hollow plant stems						x								
<i>Lasioglossum calceatum</i>	a solitary bee		nests in burrows on steep sandy banks							x							
<i>Lasioglossum fulvicorne</i>	a solitary bee	Local	a mining bee of chalk grasslands and sand pits etc.				x										
<i>Lasioglossum malachurum</i>	a solitary bee	NS(Nb)	ground nesting species - prefers soils with a clay component						x	x							
<i>Lasioglossum morio</i>	a solitary bee		excavates nest burrows in level ground						x							x	
<i>Nomada flava</i>	a solitary bee		nest parasite of <i>Andrena scotica</i>			x										x	
<i>Psithyrus campestris</i>	a bumble bee		a cuckoo bee parasite of <i>Bombus pascuorum</i> and <i>Bombus humilis</i>								x						
Chrysididae	ruby-tailed wasps																
<i>Chrysis ignita</i>			cleptoparasitic on eumenid wasps, especially <i>Ancistrocerus</i> species						x								
<i>Trichrysis cyanea</i>			parasite of sphecid wasps, especially <i>Trypoxylon</i> species													x	
Eumenidae																	
<i>Odynerus melanocephalus</i>		BAP	preys on weevils associated with Black Medic and builds nest burrow in sunny clay slopes												x		
Formicidae	ants																
<i>Lasius flavus</i>	yellow ant		grassland. A high nest density indicates long term grassland continuity							x							
<i>Lasius niger s. str.</i>	common black ant.		generalist species				x				x						

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Myrmecina graminicola</i>		Local	nests under deep stones in calcareous grassland or dry woodland							x							
<i>Myrmica rubra</i>	a red ant		ubiquitous						x	x							
<i>Myrmica scabrinodis</i>			grassland - preferring shorter, damp turf			x											
Sphecidae																	
<i>Cerceris rybyensis</i>	a sand wasp	Local	ground-nesting, in sandy habitats						x								
<i>Crabro scutellatus</i>		NS(Na)	nests in dry, sloping exposures near to damp wood or heath and preys on dolichopodid flies												x		
<i>Crossocerus quadrimaculatus</i>			nests in ground, especially amongst exposed tree roots; preys on nematoceran flies												x		
<i>Passaloecus clypealis</i>			larvae are inquiline in Lipara (Diptera) galls on reed stems			x											
<i>Passaloecus singularis</i>			nests in hollow plant stems, dividing individual egg chambers with mud walls			x											
<i>Spilomena troglodytes</i>			minute wasp, nesting in old woodworm holes and preying on the nymphs of thrips								x						
<i>Trypoxylon attenuatum</i>			preys on spiders. Nests in plant stems, beetle tunnel or other cavities												x	x	
Vespidae																	
<i>Dolichovespula sylvestris</i>	the tree wasp		nests in trees or (20%) in existing cavity in the ground								x						
<i>Vespa crabro</i>	Hornet	Local	woodland species				x							x		x	x
<i>Vespula germanica</i>	a common social wasp		ubiquitous			x			x		x					x	x
<i>Vespula vulgaris</i>	a common social wasp		ubiquitous				x					x				x	
HYMENOPTERA: PARASITICA	GALL WASPS																
Cynipidae																	
<i>Andricus kollari</i>			forms the oak marble gall									x				x	
<i>Andricus quercuscalicis</i>			forms galls in acorns													x	
<i>Biorhiza pallida</i>			forms the oak apple gall									x				x	
<i>Diplolepis rosae</i>			forms pin cushion gall on wild rose													x	
<i>Neuroterus</i>			forms the button													x	

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>numismalis</i>			spangle gall on oak leaves														
<i>Neuroterus quercusbaccarum</i>			forms the hairy spangle gall on oak leaves									x				x	
HYMENOPTERA: SYMPHYTA	SAWFLIES																
Cephalidae																	
<i>Calameuta filiformis</i>			larvae mine the stems of grasses in damp habitats								x						
<i>Calameuta pallipes</i>			a grassland sawfly						x	x							
<i>Cephus cultratus</i>			larvae mine the stems of grasses						x								
<i>Cephus pygmaeus</i>			larvae mine the stems of grasses						x							x	
Cimbicidae																	
<i>Abia sericea</i>		Local	larva feeds on Succisa and Knautia leaves							x							
Tenthredinidae																	
<i>Rhogogaster scalaris</i>			predatory species	x												x	
<i>Rhogogaster viridis</i>			larvae on a variety of plant species								x						
LEPIDOPTERA	BUTTERFLIES																
Hesperiidae																	
<i>Erynnis tages</i>	Dingy Skipper	BAP	larvae fed on Lotus corniculatus and L. uliginosus					x	x								
<i>Ochlodes faunus</i>	Large skipper		grassland			x			x	x	x						
<i>Thymelicus sylvestris</i>	Small skipper		grassland			x		x	x	x	x						
Lycaenidae																	
<i>Aricia agestis</i>	Brown Argus		usually on rock rose, but must have an alternative on calcareous urban sites						x	x							
<i>Celastrina argiolus</i>	Holly blue		both holly and ivy are required - as there are two generations per year								x					x	
<i>Cupido minimus</i>	Small Blue	BAP	Anthyllis vulneraria - in calcareous habitats						x	x							
<i>Lysandra bellargus</i>	Adonis Blue							x	x	x							
<i>Lysandra coridon</i>	Chalk-hill Blue	Local	Hippocrepis comosa in old chalk grassland					x	x	x							
<i>Polyommatus icarus</i>	Common blue		various legumes, especially Bird's-foot Trefoil				x	x	x	x	x	x					
Nymphalidae																	
<i>Aglais urticae</i>	Small tortoiseshell		larvae feed on Stinging Nettle					x	x	x						x	
<i>Argynnis aglaja</i>	Dark-green Fritillary	Local	Viola species							x							
<i>Coenonympha pamphilus</i>	Small Heath	BAP	grassland								x						
<i>Cynthia cardui</i>	Painted lady		immigrant species													x	

Group / species	English name if available	National status	Ecological associations	Area where recorded													
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				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Inachis io</i>	Peacock		nettles						x								
<i>Lasiommata megera</i>	Wall Brown	BAP	declining species in southern Britain					x	x								
<i>Maniola jurtina</i>	Meadow brown		grassland species			x		x	x	x	x		x				
<i>Pararge aegeria</i>	Speckled wood		grasses in light woodland or scrub				x		x			x				x	x
<i>Polygonia c-album</i>	Comma		nettles					x	x								
<i>Pyronia tithonus</i>	Gatekeeper		larvae feed on coarse grasses					x	x	x	x	x	x				x
<i>Vanessa atalanta</i>	Red admiral		most often recorded as an immigrant from overseas			x				x							
Pieridae																	
<i>Anthocharis cardamines</i>	Orange-tip		edge habitats are preferred						x								
<i>Gonepteryx rhamni</i>	Brimstone		buckthorn							x							
<i>Pieris brassicae</i>	Large white		various Cruciferae					x	x							x	
<i>Pieris napi</i>	Green-veined white		ubiquitous					x	x	x			x			x	
<i>Pieris rapae</i>	Small white		ubiquitous				x	x	x	x	x					x	
LEPIDOPTERA	MOTHS																
Arctiidae																	
<i>Tyria jacobaeae</i>	Cinnabar	BAP(R)	Ragwort			x				x							
Choreutidae																	
<i>Anthophila fabriciana</i>	Nettle-tap		nettles									x					
Coleophoridae																	
<i>Coleophora artemisicolella</i>			mugwort			x											
Gracillariidae																	
<i>Parornix anglicella</i>			mines leaves of hawthorn			x					x						x
<i>Phyllonorycter corylifoliella</i>			mines leaves of hawthorn and other rosaceous shrubs, rarely on birch														
<i>Phyllonorycter geniculella</i>			mines leaves of sycamore														
<i>Phyllonorycter oxyacanthae</i>			mines leaves of hawthorn and other rosaceous shrubs			x					x						x
Lyonetiidae																	
<i>Bedellia somnulentella</i>			bindweed, making windows in the leaves	x													
<i>Lyonetia clerkella</i>			mines leaves of rosaceous bushes and trees, birch etc	x		x						x					x
Nepticulidae																	
<i>Ectoedemia atricollis</i>			rosaceous trees, especially hawthorn, mining the leaves								x						
<i>Stigmella aurella</i> agg.			mines leaves of bramble	x													x
<i>Stigmella hybnerella</i>			mines leaves of hawthorn			x											
<i>Stigmella oxyacanthella</i>			mines leaves of hawthorn			x											
<i>Stigmella perpygmaeella</i>			mines leaves of hawthorn								x						x
<i>Stigmella</i>			mines leaves of	x	x												x

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>plagicolella</i>			blackthorn														
<i>Stigmella speciosa</i>			mines leaves of sycamore													x	
Noctuidae																	
<i>Callistege mi</i>	Mother Shipton	BAP(R)	coarse grasses, including reeds					x	x	x							
<i>Euclidia glyphica</i>	Burnet Companion		Medicago, Trifolium and Lotus corniculatus					x	x	x							
<i>Hypena proboscidalis</i>	Snout		nettles	x													
Pyralidae																	
<i>Chrysoteuchia culmella</i>			grasses				x	x	x				x				
<i>Crambus lathoniellus</i>			grasses				x	x	x			x	x				
<i>Crambus pascuella</i>			grasses				x	x	x			x	x				
<i>Pleuroptya ruralis</i>			nettles	x													
Tischeriidae																	
<i>Emmetia marginea</i>			mines leaves of bramble	x													x
Tortricidae																	
<i>Cochylis atricapitana</i>			ragwort			x											
<i>Epiblema uddmanniana</i>			Rubus spp., mainly brambles	x													
Zygaenidae																	
<i>Adscita statices</i>	Forester Moth	BAP	Rumex acetosa							x							
MECOPTERA	SCORPION FLIES																
Panorpidae																	
<i>Panorpa germanica</i>			edge habitats	x			x									x	
MYRIAPODA: CHILOPODA	CENTIPEDES																
Lithobiidae																	
<i>Lithobius forficatus</i>			many habitats				x										
<i>Lithobius microps</i>			detritivorous				x										
MYRIAPODA: DIPLOPODA:	MILLIPEDES		amongst litter				x										
Julidae																	
<i>Cylindroiulus caeruleocinctus</i>		Local	calcareous ground - especially if disturbed				x										
NEUROPTERA	LACEWINGS																
Chrysopidae	green lacewings																
<i>Chrysopa perla</i>			aphid predator amongst herbage	x							x					x	
<i>Chrysoperla carnea</i>			aphid predator of trees and bushes	x							x	x				x	
<i>Cunctochrysa albolineata</i>			predatory on aphids in tree foliage				x									x	
<i>Dichochrysa prasina</i>			aphid predator on various plant species			x											
Coniopterygidae																	
<i>Conwentzia psociformis</i>			arboreal on deciduous trees													x	
Hemerobiidae	brown lacewings																
<i>Hemerobius humulinus</i>			trees and bushes, hedges, etc	x							x					x	
<i>Hemerobius</i>			trees and bushes,	x	x		x									x	

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>lutescens</i>			hedges, etc														
<i>Hemerobius micans</i>			oak									x				x	
<i>Micromus paganus</i>			ubiquitous, but usually in association with wood or scrub								x					x	
<i>Micromus variegatus</i>			probably a predator of root aphids			x										x	
<i>Psectra diptera</i>										x							
<i>Wesmaelius subnebulosus</i>			larvae are aphid predators on trees and bushes				x									x	
ODONATA	DRAGONFLIES & DAMSELFLIES																
Aeshnidae																	
<i>Aeshna mixta</i>	Migrant Hawker dragonfly		partially immigrant, flying from the end of July to October			x											
Coenagriidae																	
<i>Coenagrion puella</i>	Azure Damselfly		well-vegetated water bodies, the adults flying from May to August			x											
<i>Enallagma cyathigerum</i>	Common blue damselfly		static, open water bodies with emergent vegetation, flying mid May to early October			x											
<i>Ischnura elegans</i>	Blue-tailed damselfly		found in most permanent water bodies, the adults flying from May to August			x					x						
Libellulidae																	
<i>Sympetrum striolatum</i>	Common Darter dragonfly		water-bodies with emergent vegetation, flying mid June to October and often wandering			x											
ORTHOPTERA	GRASSHOPPERS & CRICKETS																
Acrididae																	
<i>Chorthippus albomarginatus</i>	Lesser marsh Grasshopper	Local	grasslands - has spread inland from coastal stations			x				x	x	x			x		
<i>Chorthippus brunneus</i>	Field grasshopper		grassland		x		x		x					x	x		x
<i>Chorthippus parallelus</i>	Meadow grasshopper		grassland		x					x			x		x		
<i>Omocestus viridulus</i>	Common Green Grasshopper		tall, undisturbed calcareous grassland						x								
Tetrigidae																	
<i>Tetrix subulata</i>	Slender Ground-hopper	Local	bare mud and sparse vegetation in marshy places, especially dune slacks			x											

Group / species	English name if available	National status	Ecological associations	Area where recorded Area numbers repeat in text. "H" relates to hedges in general.													
				1a	1b	2	4	5	6	7	9	10	11a	13	14	15	H
<i>Conocephalus discolor</i>	Long-winged Cone-head	NS(Na)	coarse vegetation on the coast - recently it has colonised inland sites			x					x						
<i>Conocephalus dorsalis</i>	Short-winged Cone-head	Local	formerly at damp coastal sites it is now found in a variety of inland habitats			x			x	x							
<i>Leptophyes punctatissima</i>	Speckled Bush-cricket		rough herbage and scrub	x	x		x		x		x					x	
<i>Meconema thalassinum</i>	Oak Bush-cricket		oak trees, especially when at the woodland edge									x				x	
<i>Pholidoptera griseoptera</i>	Dark Bush-cricket		scrub and edge habitats	x	x		x		x							x	
<i>Tettigonia viridissima</i>	Great Green Bush-cricket	Local	coarse herbage on banks etc in dry, sunny situations			x											

APPENDIX 2: INVERTEBRATE STATUS CODES

Earlier published reviews of scarce and threatened invertebrates employed the Red Data Book criteria used in the British Insect Red Data Book (Shirt 1987) with the addition of the category RDBK (Insufficiently Known) after in 1983. In addition, the status category Nationally Notable (now termed Nationally Scarce) was used from 1991. The original criteria of the International Union for the Conservation of Nature (IUCN – now called the World Conservation Union) for assigning threat status used in these publications had the categories *Endangered*, *Vulnerable*, and *Rare*, which were defined rather loosely and without quantitative parameters. The application of these categories was largely a matter of subjective judgment, and it was not easy to apply them consistently within a taxonomic group or to make comparisons between groups of different organisms. The deficiencies of the old system were recognised internationally, and in the mid-1980s proposals were made to replace it with a new approach which could be more objectively and consistently applied. In 1989, the IUCN's Species Survival Commission Steering Committee requested that a new set of criteria be developed to provide an objective framework for the classification of species according to their extinction risk. The first, provisional, outline of the new system was published in 1991. This was followed by a series of revisions, and the final version adopted as the global standard by the IUCN Council in December 1994. The guidelines were recommended for use also at the national level. In 1995, the Joint Nature Conservation Committee (JNCC) endorsed their use as the new national standard for Great Britain, and subsequent British Red Data Books have used these revised IUCN criteria. These criteria are used in this present report and are as follows:

EXTINCT (EX) A species is *Extinct* when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD A species 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.

CRITICALLY ENDANGERED

A species 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 following criteria:

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 direct observation, an index of abundance appropriate for the species, a decline in area of occupancy, extent of occurrence and/or quality of habitat, actual or potential levels of exploitation or the effects of introduced species, 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 any of these parameters.

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 extent of occurrence, area of occupancy, number of locations or sub-populations or number of mature individuals.

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 severely fragmented (*i.e.* no sub-population estimated to contain more than 50 mature individuals) or all individuals are in a single sub-population

D. British population estimated to number less than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild of at least 50% within 10 years or 3 generations, whichever is the longer.

ENDANGERED (Formerly RDB category 1)

A species is Endangered when it is not *Critically Endangered* but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria:

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 direct observation, an index of abundance appropriate for the species, a decline in area of occupancy, extent of occurrence and/or quality of habitat, actual or potential levels of exploitation or the effects of introduced species, hybridisation, pathogens, pollutants, competitors or parasites.
2. A reduction of at least 50%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based any of these parameters.

B. Extent of occurrence estimated to be less than 5,000 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 no more than five locations.
2. Continuing decline, observed, inferred or projected, in extent of occurrence, area of occupancy, area, extent and/or quality of habitat, number of locations or sub-populations or the number of mature individuals.

C. Population estimated to number less than 2500 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 severely fragmented (*i.e.* no sub-population estimated to contain more than 250 mature individuals) or all individuals are in a single sub-population

D. British population estimated to number less than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild of at least 20% within 20 years or 5 generations, whichever is the longer..

VULNERABLE (Formerly RDB category 2)

A species 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, as defined by any of the following criteria (A to E):

A. 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 direct observation, an index of abundance appropriate for the species, a decline in area of occupancy, extent of occurrence and/or quality of habitat, actual or potential levels of exploitation or the effects of introduced species, hybridisation, pathogens, pollutants, competitors or parasites.
2. A reduction of at least 20%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based any of these parameters.

B. Extent of occurrence estimated to be less than 20,000 Km² or areas of occupancy estimated to be less than 20,000 Km² and estimates indicating any two of the following:

1. Severely fragmented or known to exist at no more than ten locations. Continuing decline, observed, inferred or projected, in extent of occurrence, area of occupancy, area, extent and/or quality of habitat, number of locations or sub-populations or the number of mature individuals.
2. Extreme fluctuations in extent of occurrence, area of occupancy, number of locations or sub-populations or number of mature individuals.

C. 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 severely fragmented (*i.e.* no sub-population estimated to contain more than 1000 mature individuals) or all individuals are in a single sub-population

D. 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 km) or in the number of locations (typically less than 5). Such a species would thus be prone to the effects of human activities (or stochastic events whose impact is 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.

E. Quantitative analysis showing the probability of extinction in the wild of at least 10% within 100 years.

LOWER RISK (Formerly RDB category 3)

A species is Lower Risk when it has been evaluated but does not satisfy the criteria for any of the categories *Critically Endangered*, *Endangered* or *Vulnerable*. Species included in the Lower Risk category can be separated into three sub-categories:

- **Conservation Dependent** species which are the focus of a continuing species -specific or habitat-specific conservation program targeted towards the species in question, the cessation of which would result in the species qualifying for one of the threatened categories above within a period of five years.
- **Near Threatened** Species which do not qualify for *Lower Risk (Conservation Dependent)*, but which are close to qualifying for *Vulnerable*.
- **Least Concern**
Species which do not qualify for *Lower Risk (Conservation Dependent)* or *Lower Risk (Near Threatened)*.

DATA DEFICIENT A species 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 species 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.

LOWER RISK (NATIONALLY SCARCE – FORMERLY NATIONALLY NOTABLE)

Species which are not included within the IUCN threat categories and are estimated to occur less than 100 hectads of the Ordnance Survey national grid in Great Britain. It should be noted that Lower Risk (Nationally Scarce) is not a threat category, but rather an estimate of the extent of distribution of these species. Lower Risk species are subdivided as follows:

- Na** species estimated to occur within the range of 16 to 30 10-kilometre squares of the National Grid System.
- Nb** species estimated to occur within the range 31 to 100 10-kilometre squares of the National Grid System.
- N** Diptera (flies) not separated, falling into either category Na or Nb.

NATIONALLY LOCAL (L)

Species which, whilst fairly common, are evidently less widespread than truly common species, but also not qualifying as Nationally Notable having been recorded from over one hundred, but less than three hundred, ten-kilometre squares of the UK National Grid.

ASSOCIATED DEFINITIONS

Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a species, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of species (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

Area of occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a species, excluding cases of vagrancy. The measure reflects the fact that a species will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a species (e.g. colonial nesting sites, feeding sites for migratory species). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the species. The criteria include values in km², and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small.

APPENDIX 3

SELECTED SITE PHOTOGRAPHS

SUSSEX – IMAGES



Photo 1: Area 1: Gate



Photo 2: Area 2: The drier, northern ruderal grassland area with scrub in the distance.



Photo 3: Area 2 – the damper southern grassland (looking south towards Area 1).



Photo 4: Area 2 – Areas of permanently wet grassland are crossed by ditches. These areas have a raised invertebrate interest.



Photo 5: Lambley's Lane, looking south, showing the well structured hedge on the east (left of photo) bank.



Photo 6: Area 4 – disused chalk quarry to one side of the proposed route



Photo 7: South-facing chalk grassland slope opposite Erringham Shaw; this has a very high value for invertebrate ecology.



Photo 8: The wet woodland of Erringham Shaw also has high invertebrate interest. However, the thistle-dominated level, dry grassland in the foreground is of minimal value.



Photo 9: Area 7: The revised route crosses an area of chalk grassland shown as area 7b on Figure 2, map 4. This affected grassland area has a high invertebrate interest.



Photo 10: Area 8: Hedges along a green lane at Truleigh Sands.



Photo 11: The damp grassland of Area 9 is crossed from left to right by a wet ditch. The scrub here provides well-structured edge habitats that are rather poorly represented elsewhere in the surveyed corridor.



Photo 12: Some of the scrub and overgrown hedges at Area 9 support saproxylic habitats - apparently scarce resource in the surveyed area.