

# **Environmental Statement: Volume III**

## **Appendix 9E: Terrestrial Invertebrate Surveys**

## **VPI Immingham OCGT Project**

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### **The Immingham Open Cycle Gas Turbine Order**

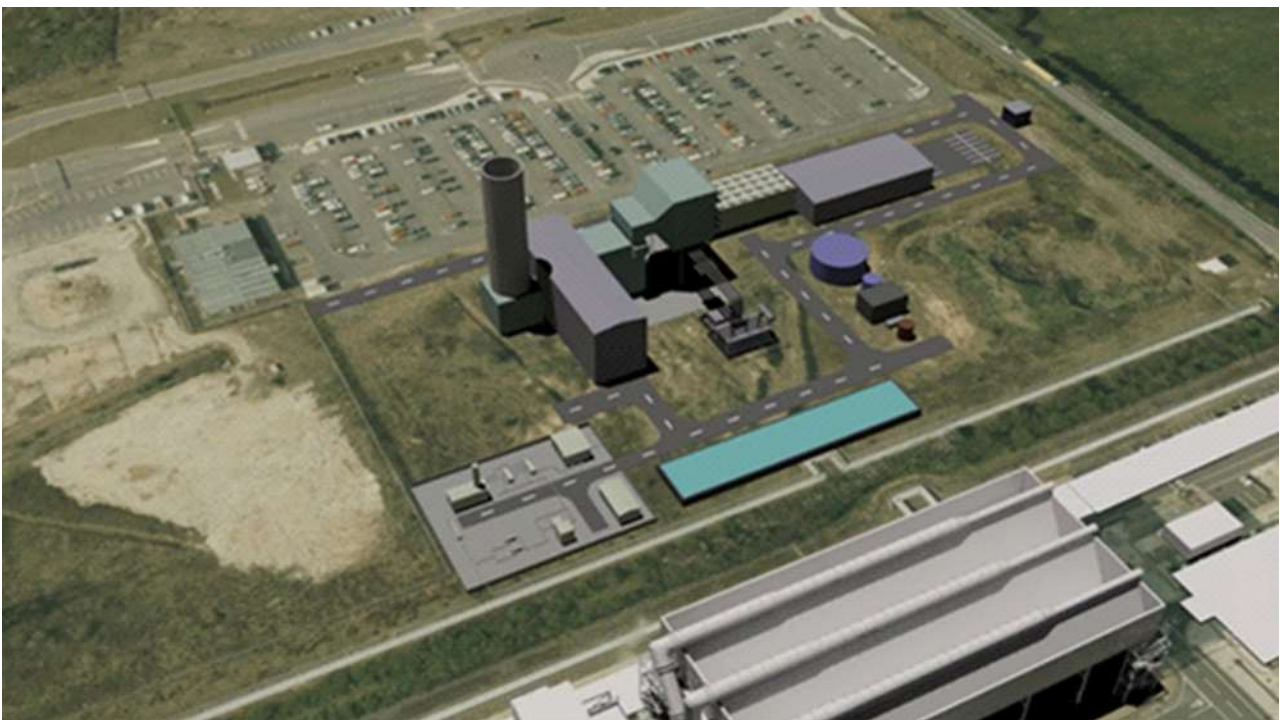
**Land to the north of and in the vicinity of the VPI Immingham Power Station, Rosper Road, South Killingholme, Lincolnshire, DN40 3DZ**

### **Environmental Statement Volume III Appendix 9E: Terrestrial Invertebrates Surveys**

**The Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(q)**

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**Applicant: VPI Immingham B Ltd**

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## GLOSSARY

<b>Abbreviation</b>	<b>Description</b>
BAP	Biodiversity Action Plan
BATs	Broad Assemblage Types
CR	Critically Endangered
DD	Data Deficient
EN	Endangered
ES	Environmental Statement
ISIS	Invertebrate Species-Habitat Information System
JNCC	Joint Nature Conservation Committee
LC	Least Concern
NERC	Natural England Research Council
Nb	Nationally Notable
NR	Nationally Rare
NS	Nationally Scarce
NT	Near Threatened
OCGT	Open Cycle Gas Turbine
PEA	Preliminary Ecological Appraisal
PINS	The Planning Inspectorate
SATs	Specific Assemblage Types
SQI	Species Quality Index
VU	Vulnerable

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## 1.0 INTRODUCTION

1.1.1 This Appendix to the Environmental Statement (ES) presents the results of terrestrial invertebrate surveys undertaken for the Proposed Development. The terms of reference used in this report are consistent with those defined within the main chapters of the ES (Volume I, Application Document Ref. 6.2). This Appendix is intended to be read in conjunction with Chapter 9: Ecology of ES Volume I and the Preliminary Ecological Assessment (Appendix 9A, ES Volume III).

## 1.2 Survey Scope

1.2.1 The objective of the survey was to evaluate the Site in terms of its entomological fauna. A total of three daytime visits were undertaken to meet the minimum requirements for assessing the invertebrate fauna of a site in terms of conservation evaluation (Drake et al. 2007).

1.2.2 The aims of the survey were:

- To sample areas of high entomological value using several sampling methods;
- To identify collected specimens to species level where possible;
- To identify any significant species either in terms of local or national rarity;
- To identify any significant groups of species associated with specific habitats or plants;
- To identify the most likely areas of the site to have a diverse invertebrate fauna; and
- To identify the areas with the most potential for invertebrates.

1.2.3 The survey area included all accessible habitats within the OCGT Power Station Site including an approximate 10 m buffer (see Chapter 3: Site Description (ES Volume I) for definitions and descriptions of the areas of the Proposed Development Site). This area is herein referred to as the 'Survey Area' and is shown on Figure 9E.1. The Survey Area includes all habitats within the Site that were identified in the Preliminary Ecological Appraisal (PEA) report (see Appendix 9A: PEA Report in ES Volume III) as being potentially suitable to support a diverse assemblage of terrestrial invertebrates.

## 1.3 Relevant Legislation

1.3.1 Whilst a large number of the UK invertebrate species are widespread and common, there are many threatened and/or vulnerable species that are covered by policy and legislation; these include domestic wildlife legislation, local and national biodiversity policies, and relevant international statutes. Most of these measures aim to protect vulnerable species, but some invasive species are also covered by legislation.

1.3.2 The relevant policies are as follows:

- UK invertebrate species protected by international statutes;
- Invertebrate species listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) for England and Wales;
- Invertebrate species listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006 for England;

- Invertebrate species endangered by trade and listed under the European Union Convention of International Trade of Endangered Species of Wild Fauna and Flora; and,
- Invertebrate species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

1.3.3 Full details of these policies and how they relate to UK invertebrate species is available at: <https://www.buglife.org.uk/sites/default/files/Policy> .

## 2.0 METHODS

### 2.1 Desk Study

2.1.1 A desk study was undertaken as part of the scope of works for the Phase 1 Habitat survey and is reported in detail in the PEA report (Appendix 9A in ES Volume III). Terrestrial invertebrate records were obtained from the local ecological records centre (Greater Lincolnshire Nature Partnership) for a search radius of 1 km from the Survey Area boundary, referred to as the Study Area in this report.

### 2.2 Terrestrial Invertebrate Survey

2.2.1 A terrestrial invertebrate survey was undertaken following best practice guidelines as detailed in NERR005 Drake et al. (2007) comprising a number of passive trapping, active trapping and direct observational survey techniques. As attempting to undertake a total inventory of the terrestrial invertebrate assemblage present is neither feasible nor considered necessary: Drake et al. (2007) recommend recording beetles (Coleoptera), grasshoppers (Orthoptera), true bugs (Hemiptera), bees, wasps and ants (aculeate Hymenoptera), hoverflies (Syrphidae) and some other true flies (Diptera: 'larger Brachycera') and spiders (Araneae). This restriction on the diversity of taxa recorded is not considered a limitation as these taxa are expected to be representative of the quality of the terrestrial invertebrate fauna overall.

2.2.2 Three entomological sampling methods were used; sweep netting, yellow water traps, and direct observation/spot checking. The sampling techniques chosen were in line with recommended sample techniques provided in the NERR005 "*Surveying Terrestrial and Aquatic Invertebrates for Conservation Evaluation*" (Drake et al. 2007).

2.2.3 The Survey Area was visited on three dates, May 10<sup>th</sup>, June 4<sup>th</sup> and July 10<sup>th</sup> 2018. These dates were selected as they covered the activity period of most spring and summer diurnal invertebrates. Each visit lasted 5-6 hours and the weather conditions encountered are shown in Table 9E.1 below.

**Table 9E.1: Survey Dates and Weather Conditions**

Visit No.	Date	Temperature °C	Cloud (0/8)	Wind	Rain
1	10/05/2018	14	5	2	0
2	04/06/2018	14	8	1	Drizzle showers
3	10/07/2018	19	6	1	0

### 2.3 Sweep netting

2.3.1 Sweep netting was chosen as a technique as it can collect insects from a wide range of insect Orders. A 14 inch wide white sweep net with a fixed handle was used to collect insects from vegetation up to a height of three metres.

2.3.2 Due to the small area of the Survey Area, three ten minute sweep samples were undertaken with all habitat ecotones swept ensuring that survey effort was distributed evenly across the area and less promising areas were surveyed with equal effort as apparently good areas.

- 2.3.3 Each sample consisted of sweeping for 10 minutes, using back-and-forth sweeps while walking at a moderate pace, and keeping the net as low as practical in the vegetation for the whole length of the sweep. Captured invertebrates were removed frequently from the net, with large specimens that were easily identifiable (e.g. some Syrphidae, Hymenoptera and Coleoptera) noted and released and smaller specimens removed with a pooter and preserved in 70 % isopropyl alcohol for later identification.

## 2.4 Yellow Water Traps

- 2.4.1 Yellow water traps target those orders of insects that visit flowers such as the Hymenoptera (Bees and wasps), some families of Coleoptera (beetles) and Diptera (true flies).
- 2.4.2 Ten pairs of identical shallow yellow trays were located throughout the Survey Area and filled with slightly soapy water to half their depth (approximately 0.8 l). They were set up upon arrival on site at 08:30 am to allow time for insects to be attracted to them. The traps were left in the field for approximately six hours, whereupon the contents of the traps were carefully sieved and the specimens preserved in 70 % isopropyl alcohol for later identification.
- 2.4.3 They were located in sheltered, sunny areas across the survey area and were located within ecotones where two or more habitat types (e.g. bare ground and short sward grassland) meet and grade into one another.

## 2.5 Direct Observation / Spot-checking

- 2.5.1 Where nectar sources were present the sweep net was used to stalk insects visiting flowers. Large insects on the wing that could be easily identified (e.g. Lepidoptera) were recorded during the survey periods.

## 2.6 Beating

- 2.6.1 Invertebrates living on the foliage and branches (saproxylic and epiphyte assemblages) of bushes and tall herbage are collected by jarring the branches with a stick so the animals fall onto a collecting tray below. This technique is largely un-favoured during optimal weather as any large or active insects escape before capture and/or identification.

## 2.7 Sample Identification

- 2.7.1 Identification of the invertebrates collected was undertaken with a low powered dissecting microscope. Whilst this was adequate, some species were not identified to species level as certain small features could not be seen. In addition, identification keys for some groups only refer to males leaving the females unidentifiable. All specimens were retained and individually stored and labelled. The keys used to identify species are listed in the bibliography. The finalised species lists are shown in Annex 9E.1.

## 2.8 Sample Data Processing

- 2.8.1 The species list derived from sample identification was processed using the Natural England database resources ISIS (Invertebrate Species-habitat Information System) (Webb and Lott, 2006) and Pantheon (Webb et al., 2018).



- 2.8.2 The ISIS database was originally designed as an application for recognising invertebrate assemblage types in species lists collected at scales ranging from management compartment to landscape character area. The assemblage types were labelled in terms that relate to their favoured habitats in order to make them accessible to non-specialists. Two levels were recognised in the classification: broad assemblage types (BATs), a comprehensive series of assemblage types that were characterised by more widespread species; and specific assemblage types (SATs), characterised by ecologically restricted species and were generally only expressed in lists from sites with conservation value.
- 2.8.3 Pantheon is a database tool derived from ISIS and developed by Natural England and the Centre for Ecology & Hydrology to analyse invertebrate sample data. The analyses supported by Pantheon are designed to improve understanding of the resources and structures used by invertebrates within the sample locations and aid their conservation.

## 2.9 Limitations

- 2.9.1 Due to the previous land usage and substrate conditions, the use of pitfall trapping within the Survey Area was not selected as a survey technique due to limited information regarding the contamination status of the soils. It is also possible that ground breaking activities could cause sparking from tool use and therefore pose an explosion risk. Not using pitfall trapping as a survey technique misses many of the ground dwelling taxa that may be present on-site, particularly Carabid beetles and represents a constraint on the entomological assessment.
- 2.9.2 The weather conditions during the June visit were sub-optimal for sweep netting or direct observation of animals on the wing. In this instance beating vegetation over a tray, spot checking and water traps were utilised. The continued warm weather period into July made the survey site extremely dry, limiting the activity of species that may have been associated with the semi-permanent wet areas present within the survey area.
- 2.9.3 Identification of the invertebrates collected was undertaken with a low powered dissecting microscope. Whilst this was adequate, some species were not identified to species level as certain small features could not be seen. In addition, identification keys for some groups only refer to males leaving the females unidentifiable. Annex 9E.1 provides lists of all the invertebrates that were collected during the survey.
- 2.9.4 These constraints, whilst limiting the number and range of invertebrates encountered during the survey, did not prevent a robust evaluation of the nature conservation value of the invertebrate fauna of the study area from being undertaken.

### 3.0 SURVEY RESULTS

#### 3.1 Summary of Invertebrate Interest

3.1.1 The survey identified 169 species of invertebrate (Annex 9E.1), including representatives of the following groups: woodlice, damselflies, earwigs, bush-crickets, crickets, grasshoppers, leafhoppers, bugs, beetles, ants, wasps, bees, flies, caddisflies, moths, butterflies, spiders, and snails.

#### 3.2 Biodiversity Action Plan Species

3.2.1 Two UK Biodiversity Action Plan (BAP) Priority Species have been found by this survey (Table 9E.2). The cinnabar moth (*Tyria jacobaea*) and the Lackey (*Malacosoma neustria*), also a moth. These two species still widespread and common though are declining. Conservation action for these “research only” BAP species is focused on further research rather than protection of individual sites. Nevertheless, both of these BAP species have been added to Section 41 of the NERC Act, 2006 which lists species of principal importance for the purpose of conserving biodiversity.

3.2.2 Further information on these two species is provided below.

**Table 9E.2: S41 (BAP) Species Recorded**

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Lepidoptera	Erebidae	<i>Tyria jacobaea</i>	Cinnabar	S41 (Research only)
Lepidoptera	Lasiocampidae	<i>Malacosoma Neustria</i>	The Lackey	S41 (Research only)

#### 3.3 Key Species

3.3.1 Amongst the 169 species recorded by these surveys, 10 (5.91 %) have NERC Act Section 41 (S41), Nationally Scarce (NS), Nationally Rare (NR), Vulnerable (VU), Red Data Book (RDB) or Nationally Notable (Nb) conservation status (Table 9E.3). One is also data deficient to determine its conservation status. For the purposes of this report, these species will be referred to as “Key Species”. Table 9E.3 is ordered by conservation status category with the rarest/most threatened species listed first

3.3.2 For an explanation of the conservation status categories of invertebrates, see Annex 9E.2. This total of 10 Key Species includes the two S41 species (Cinnabar moth and The Lackey).

**Table 9E.3: Key Species Recorded in Survey Area**

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Araneae	Thomisidae	<i>Xysticus sabulosus</i>	A crab spider	Nationally scarce (NS)
Coleoptera	Carabidae	<i>Brachinus crepitans</i>	A bombardier beetle	NS
Coleoptera	Oedermeridae	<i>Oedemera virescens</i>	A false blister beetle	Nationally Rare (NR)

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Diptera	Dolichopodidae	<i>Dolichopus migrans</i>	A dolichopid fly	NR, Vulnerable (VU)
Diptera	Dolichopodidae	<i>Dolichopus agilis</i>	A dolichopid fly	NR, VU
Hymenoptera	Nomada	<i>Nomada fulvicornis</i>	Fork-jawed nomad bee	Red Data Book (RDB3)
Hymenoptera	Pompliidae	<i>Priocnemis schioedtei</i>	A spider hunting wasp	Nationally Notable (Nb)
Lepidoptera	Erebidae	<i>Tyria jacobaea</i>	Cinnabar	NERC S41 (Research only)
Lepidoptera	Lasiocampidae	<i>Malacosoma neustria</i>	The Lackey	NERC S41 (Research only)
Mollusca	Hygromiidae	<i>Ceruella virgata</i>	Vineyard snail	Data Deficient (DD)

- 3.3.3 For each of the Key Species recorded, a short account is provided below, describing the ecology and distribution of the species in Britain, followed by details of its occurrence during the current surveys. Species accounts typically make reference to “vice-counties”: a fixed set of 112 areas covering the whole of Britain which have been used by biological recorders since 1852. The Immingham site is within the vice-county of North Lincolnshire (VC 54).

#### **Xysticus sabulosus (Aranae: Thomsidae) NS**

- 3.3.4 This species has a patchy and very scattered distribution in England, Scotland and Wales. It is a Palearctic species widespread in western and central Europe. Typically found on heathland, and although under-recorded, this species has undergone a serious decline in the UK.
- 3.3.5 This species was identified from sweep netting during the July survey.

#### **Brachinus crepitans (Coleoptera: Carabidae, Brachinae) NS**

- 3.3.6 *Brachinus crepitans* is widespread but local in southern and eastern England and into South Wales. Most recent records are coastal. It occurs in short, dry grassland, usually on chalk or limestone, and also clay brick-pits, undercliffs, sea walls and stabilised shingle on the coast.
- 3.3.7 This species was found through refugia searching during the June survey.

#### **Oedemera virescens (Coleoptera: Oedermeridae) NR**

- 3.3.8 A species of false blister beetle that is known to visit a variety of flowers such as umbels, dandelions (*Taraxacum* spp. agg.) and hawthorn (*Crataegus monogyna*). The larvae have been raised from rotten wood, stems of herbaceous plants and have been recorded from ragwort stems.
- 3.3.9 This species was recorded from sweep netting during the July survey.

**Dolichopus migrans (Diptera: Dolichopodidae) NR**

- 3.3.10 A long legged fly of the genus Dolichopodidae, recorded from Suffolk, Norfolk, Lincolnshire and Yorkshire. This species requires dry grassland on sandy soil. Little is known about the biology of this species (Falk and Crossley, 2005).
- 3.3.11 This species was recorded from sweep netting during the July survey.

**Dolichopus agilis (Diptera: Dolichopodidae) NR, Vulnerable (VU)**

- 3.3.12 A long legged fly of the genus Dolichopodidae, widely distributed in England (Devon, Oxfordshire, Buckinghamshire, Norfolk, Cambridgeshire, Gloucestershire, Yorkshire), and in Wales (Carmarthenshire, Caernarvonshire). Recorded in a variety of habitats including lowland wet heath, *Phragmites* fen, calcareous valley fen, dry grassy heath and coastal sand dunes (Falk and Crossley, 2005). This is a possible new, though not unexpected, record of the species for Lincolnshire in the context that it is present in both Cambridgeshire and Yorkshire).
- 3.3.13 This species was captured through sweep netting during the July survey.

**Nomada fulvicornis (Hymenoptera: Aculeata, Nomada) RDB3, Rare**

- 3.3.14 A cleptoparasite (i.e. a species that lives off the food collected by another species) on various mining bee (*Andrena*) species and has been recorded from a variety of habitats including sandy soils, coastal cliffs and landslips and, more rarely, chalk grassland. This species has flight periods that are defined by the host species and can be univoltine (has one brood of offspring per year) or bivoltine (has two broods per year).
- 3.3.15 This species was recorded from sweep netting during the May survey.

**Procnemis schiodtei (Hymenoptera, Aculeata: Pompilidae) NS**

- 3.3.16 A spider hunting parasitoid wasp recorded from South Devon to east Kent, north to east Inverness-shire and Moray and the Channel Islands. Typically found in open situations on sandy soils but also on limestone grassland, along old hedges and earth exposures on road verges, and open areas in woodland on sandy soils.
- 3.3.17 This species was recorded from sweep netting during the July survey.

**Tyria jacobaeae (Lepidoptera: Erebidae) The Cinnabar, S41**

- 3.3.18 Joint Nature Conservation Committee (JNCC) Criteria 3: common and widespread, but rapidly declining moths on which research is needed; Declined by 83 % over the last 35 years (JNCC). Resembling no other British species, except perhaps the burnets (*Zygaenidae*), this is a fairly common moth in much of Britain. It is generally nocturnal, but is quite often disturbed during the day from long grass, low herb sward etc. At night, it is attracted to light. A colour form is found occasionally, with the red markings replaced with a yellowish tint. The distinctive larvae, with their yellow and black hoops, generally feed gregariously on ragwort (*Senecio jacobaeae*) and other related plants. The flight period is May through July (Kimber, 2018).
- 3.3.19 This species was observed regularly during the June and July visits.

**Malacosoma Neustria (Lepidoptera: Lasiocampidae) The Lackey, S41**

- 3.3.20 JNCC Criteria 3: common and widespread, but rapidly declining moths on which research is needed; Declined by 90 % over the last 35 years (JNCC). The adults of this species are relatively dull in coloration, but the caterpillars have orange, white and blue stripes on a dark brown ground colour. The larvae feed gregariously in a web of silk, on hawthorn, blackthorn (*Prunus spinosa*) and other trees and shrubs. Occurring mainly in the southern half of Britain, the flight period is July to August.
- 3.3.21 Aggregations of the larvae of this species were recorded on scrub species during the May survey (Plate 1).



Plate 1: Larvae of The Lackey observed during May 2018 on blackthorn scrub

**Cernuella virgata (Mollusca: Hygromiidae) Data Deficient (DD)**

- 3.3.22 A small, air breathing gastropod. Usually found clustered on tall vegetation or partially buried in sand or soil in dry grasslands or coastal dunes.

**3.4 ISIS Results**

- 3.4.1 Of these 120 species, two BATs were well represented (i.e., represented by 15 species or more). Seven further BATs fell below the Rarity scores required for favourable condition and are not discussed further. The two favourable BATs are shown in Table 9E.4 below.

**Table 9E.4: BATs Represented in the Survey Area. The ISIS scores and the number of species on which each score is based.**

BAT Code	BAT Name	No. of Species	ISIS Rarity Score	ISIS Rarity Score 'favourable condition threshold'	Favourable condition reached?
F1	unshaded early successional mosaic	28	153	160	No
F2	grassland and scrub matrix	26	161	160	Yes

### 3.5 Pantheon Results

- 3.5.1 The list of 169 species (or aggregates where required) was entered into Pantheon from the three surveys combined. Of the 169 species, 14 were not matched, so Pantheon processed a list of 155 taxa.
- 3.5.2 Pantheon covers 155 of the 169 species processed. Within this species dataset, three broad biotypes were well represented, with one broad biotype represented by a single species.
- 3.5.3 These four broad biotypes are shown in Table 9E.5. This table includes the number of species associated with each broad biotope, the percentage of the national assemblage for the biotope this represents, and the Species Quality Index (SQI).

**Table 9E.5: The Broad Biotypes represented in the survey area**

Broad Biotope	No. of Species	% Representation of UK species	SQI <sup>1</sup>	No. of S41 or Key species
Open habitats	95	2	131	8
Wetland	22	<1	159	1
Tree-associated	16	<1	100	1
Coastal	1	<1	100*	

\*represented by a single species

- 3.5.4 Within the 155 species covered by the Pantheon analysis, six SATs were represented. These are species that are considered stenotopic as able to tolerate only a restricted range of specific habitat types or ecological conditions. These habitats can be considered highly important to invertebrates within the site. However, only one of these SATs was

<sup>1</sup> A measure of the number of rare species in a sample, divided by the total number of species in the sample.

represented by 15 or more species which is a minimum requirement for calculating a reliable SQI.

- 3.5.5 The SAT types represented in the survey area, including the number of stenotopic species, the SQI, and an indication of whether Favourable Condition Criteria for the habitat type has been met is shown in Table 9E.6 below.

**Table 9E.6: Specific Assemblage Types**

Broad Biotope	Habitat	Specific Assemblage Type (SAT)	Code	No. of Species	SQI	Favourable condition criteria met?
Open habitat	Grassland	Flower rich resource	F002	22	114	Favourable
Open habitats	Short sward and bare ground	Bare sand and chalk	F111	10	290**	Unfavourable
Open habitats	Scrub	Scrub edge	F001	7	100**	Unfavourable
Tree-associated	Decaying wood	Bark and sapwood decay	A212	5	100**	Unfavourable
Open habitats	Short sward and bare ground	Open short sward	F112	3	100**	Unfavourable
Tree-associated	Decaying wood	Heartwood decay	A211	1	100**	Unfavourable

\*\*calculated from <15 species

## 4.0 CONCLUSIONS AND EVALUATION

- 4.1.1 A total of 169 species of invertebrate were identified from the Survey Area, representing a wide range of invertebrate taxonomic groups. Despite the species recorded not being well represented by ground dwelling taxa, or species that are active at night, this does provide a robust dataset upon which to make an assessment of the importance of the site for invertebrate conservation.
- 4.1.2 Two species listed under S41 of the NERC Act, 2006 were recorded in the Survey Area; both of these species are moths and are listed as 'Research Only' due to documented decline. However, both of these species should be taken into account in assessing the impact of the Proposed Development and mitigation required.
- 4.1.3 Ten Key species were found, comprising 5.91 % of the 169 species recorded across the survey dates. The figure of 5.91 % is close to the mean of 5.06% for occurrence of Key Species in contemporary studies of invertebrates for conservation evaluation (Telfer, 2017).
- 4.1.4 Three Rare Key Species were found, comprising 1.77 % of the 169 species identified. This figure is high compared to occurrence of Key Species in contemporary studies of invertebrates for conservation evaluation. This high percentage of Rare Key Species is not consistent with the percentage of Key Species and supports the assessment as a site of conservation importance at a County level (Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the administrative District)
- 4.1.5 ISIS and Pantheon offer methods of assessing the importance of a site in the national context. The Survey Area supported a narrow range of invertebrate assemblages with two ISIS BATs being well represented. These two BATs yielded high Rarity scores indicating that the habitat types supporting these two BATs are in favourable condition. The high scoring habitats included unshaded early successional mosaic and grassland and scrub matrix, the remaining habitats fell below the below the threshold values for favourable condition.
- 4.1.6 Pantheon has superseded ISIS; the results generated by the database are more difficult to put into context using Pantheon which has superseded ISIS. Although the Pantheon SQI value for the broad biotope of open habitats (131) is low in comparison to the ISIS Species Rarity scores, it does support ISIS in identifying the open habitats represented by unshaded early successional mosaic and grassland and scrub matrix as Important for nature conservation at the County level.
- 4.1.7 The Proposed Development area is assessed to be a site of nature conservation importance for invertebrates at the County level. This is strongly supported by the Key Species analysis and by the numbers of Key Species and Section 41 (research only species). This evaluation is moderately supported by both ISIS and Pantheon analysis.



## 5.0 REFERENCES

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## Annex 9E.1 Species List

The species of conservation significance for a site assessment such as this (the “Key Species”) are highlighted in red text in the list below.

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Arachnidae	Lycosidae	<i>Alopecosa pulverulenta</i>	a wolf spider	None
Arachnidae	Lycosidae	<i>Pardosa hortensis</i>	a wolf spider	None
Arachnidae	Lycosidae	<i>Pardosa nigriceps</i>	a wolf spider	None
Arachnidae	Philodromidae	<i>Tibellus maritimus</i>	A running crab spider	None
Arachnidae	Thomisidae	<i>Xysticus erraticus</i>	A crab spider	None
Arachnidae	Thomisidae	<i>Xysticus sabulosus</i>	A crab spider	NS
Coleoptera	Alticini	<i>Altica lythri</i>	A flea beetle	None
Coleoptera	Cantharidae	<i>Rhagonycha fulva</i>	Hogweed bonking beetle	LC
Coleoptera	Carabidae	<i>Notiophilus biguttatus</i>	A ground beetle	None
Coleoptera	Carabidae (Brachninae)	<i>Brachinus crepitans</i>	A bombardier beetle	NS
Coleoptera	Carabidae (Pterostichini)	<i>Abax parallelepipedus</i>	A ground beetle	None
Coleoptera	Chrysomelidae	<i>Cassida viridis</i>	Green tortoise beetle	None
Coleoptera	Coccinellidae	<i>Coccinella septempunctata</i>	7 spot ladybird	None
Coleoptera	Coccinellidae	<i>Subcoccinella vigintiquatuorpunctata</i>	24 spot ladybird	None
Coleoptera	Curculonidae	<i>Archarius salivarius</i>	Willow gall weevil	None
Coleoptera	Curculonidae	<i>Hypera rumicis</i>	A weevil	None
Coleoptera	Curculonidae	<i>Sitona lineatus</i>	Pea leaf weevil	None
Coleoptera	Elatidae	<i>Athous haemorrhoidalis</i>	Click beetle	None
Coleoptera	Malachiidae	<i>Malachius bipustulatus</i>	The malachite beetle	LC
Coleoptera	Nitidulidae	<i>Meligethes aeneus</i>	Brassica pollen beetle	None
Coleoptera	Oedermeridae	<i>Oedemera lurida</i>	False blister beetle	LC
Coleoptera	Oedermeridae	<i>Oedemera nobilis</i>	thick-legged flower beetle	LC
Coleoptera	Oedermeridae	<i>Oedemera virescens</i>	A flower beetle	NR, LC
Coleoptera	Scraptidae	<i>Anaspis pulicaria</i>	Tumbling flower beetle	LC
Coleoptera	Tenebrionidae	<i>Lagria hirta</i>	a beetle	LC
Crustacea	Isopoda	<i>Oniscus asellus</i>	Common woodlouse	None

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Dermaptera	Forficulidae	<i>Forficula auricularia</i>	Earwig	None
Diptera	Asilidae	<i>Leptogaster cylindrica</i>	Striped slender robberfly	None
Diptera	Asilidae	<i>Leptogaster murina</i>	A robberfly	None
Diptera	Calliphoridae	<i>Calliphora vicina</i>	Common bluebottle	None
Diptera	Calliphoridae	<i>Calliphora vomitoria</i>	Orange-bearded bluebottle	None
Diptera	Calliphoridae	<i>Cynomya mortuorum</i>	Yellow-faced blowfly	None
Diptera	Calliphoridae	<i>Lucilla caesar</i>	Common Greenbottle	None
Diptera	calliphoridae	<i>Pollenia angustigena</i>	Narrow-cheeked Clusterfly	None
Diptera	Calliphoridae	<i>Protocalliphora azurea</i>	Bird Blowfly	None
Diptera	Calliphoridae	<i>Protophormia terraenovae</i>	Blackbottle	None
Diptera	Culexidae	<i>Culex pipiens</i>	Common house mosquito	None
Diptera	Dolichopodidae	<i>Campsicnemus curvipes</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Campsicnemus loripes</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Chrysotus cilipes</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Dolichopus agilis</i>	A dolichopid fly	NR, VU
Diptera	Dolichopodidae	<i>Dolichopus migrans</i>	A dolichopid fly	NR, VU
Diptera	Dolichopodidae	<i>Dolichopus plumipes</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Dolichopus trivialis</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Dolichopus unguatus</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Hercostomus germanus</i>	A dolichopid fly	None
Diptera	Dolichopodidae	<i>Scellus notatus</i>	A dolichopid fly	None
Diptera	Empididae	<i>Empis livida</i>	A dance fly	None
Diptera	Empididae	<i>Empis stercorea</i>	A dance fly	None
Diptera	Empididae	<i>Empis tessellata</i>	a dance fly	None
Diptera	Limoniidae	<i>Chioneinae</i>	No further key available	None
Diptera	Limoniidae	<i>Hexatoma</i>	No further key available	None
Diptera	Mecoptera	<i>Panorpis communis</i>	Common Scorpionfly	None
Diptera	Muscidae	<i>Helina evecata</i>	A muscid fly	None
Diptera	Muscidae	<i>Hydrotaea ignava</i>	A muscid fly	None
Diptera	Muscidae	<i>Morelia aenescens</i>	A muscid fly	None
Diptera	Muscidae	<i>Musca domestica</i>	common housefly	None

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Diptera	Rhagionidae	<i>Chrysopilus asiliformis</i>	Little snipefly	None
Diptera	Rhagionidae	<i>Rhagio tringarius</i>	Marsh snipefly	None
Diptera	Sarcophagidae	<i>Brachicoma devia</i>	A fleshfly	None
Diptera	Scatophagidae	<i>Norellisoma spinimanum</i>	A dung fly	None
Diptera	Stratiomyidae	<i>Chloromyia formosa</i>	The green centurion	None
Diptera	Syrphidae	<i>Chrysotoxum festivum</i>	A hoverfly	None
Diptera	Syrphidae	<i>Criorhina asilica</i>	A hoverfly	Pre 1994 - Vulnerable
Diptera	Syrphidae	<i>Episyrphus balteatus</i>	Marmalade fly	None
Diptera	Syrphidae	<i>Eristalinus aeneus</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eristalinus sepulchralis</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eristalis arbustorum</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eristalis intricarius</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eristalis nemorum</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eristalis pertinax</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eristalis tenax</i>	A hoverfly	None
Diptera	Syrphidae	<i>Eupeodes latifasciatus</i>	A hoverfly	None
Diptera	Syrphidae	<i>Sphaerophoria rueppellii</i>	A hoverfly	None
Diptera	Syrphidae	<i>Syrphus vitripennis</i>	A hoverfly	None
Diptera	Tachinidae	<i>Dufouria chalybeata</i>	A tachinid fly	None
Diptera	Tachinidae	<i>Exorista glossatorum</i>	A tachinid fly	None
Diptera	Tachinidae	<i>Exorista rustica</i>	A tachinid fly	None
Diptera	Tachinidae	<i>Gymnochaeta viridis</i>	A tachinid fly	None
Diptera	Therevidae	<i>Acrosathe annulata</i>	A stiletto fly	LC
Diptera	Therevidae	<i>Thereva nobilitata</i>	Common stiletto fly	None
Diptera	Tipulidae	<i>Tipula fascipennis</i>	A crane fly	None
Diptera	Ulidiidae	<i>Herina lugubris</i>	A picture wing fly	None
Diptera	Ulidiidae	<i>Melieria crassipennis</i>	A picture wing fly	None
Hemiptera	Cercopidae	<i>Philaenus spumarius</i>	Froghopper	None
Hemiptera	Coreidae	<i>Bathysolen nubilis</i>	A squash bug	None
Hemiptera	Miridae	<i>Apolygus spinolae</i>	A mirid bug	None
Heteroptera	Miridae	<i>Closterotomus norwegicus</i>	A mirid bug	None
Heteroptera	Miridae	<i>Leptopterna dolabrata</i>	Meadow plant bug	None

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Hymenoptera	Andrenidae	<i>Andrena clarkella</i>	Clarke's mining bee	None
Hymenoptera	Andrenidae	<i>Andrena bicolor</i>	Gwynne's Mining Bee	None
Hymenoptera	Andrenidae	<i>Andrena chrysoseles</i>	Hawthorn mining bee	None
Hymenoptera	Andrenidae	<i>Andrena fulva</i>	Tawny Mining bee	None
Hymenoptera	Andrenidae	<i>Andrena haemorrhoa</i>	Early mining bee	None
Hymenoptera	Andrenidae	<i>Andrena minutula</i>	Common mini-mining bee	None
Hymenoptera	Andrenidae	<i>Andrena subopaca</i>	Impunctate Mini-mining bee	None
Hymenoptera	Apidae	<i>Apis mellifera</i>	Honeybee	None
Hymenoptera	Apidae	<i>Bombus lucorum</i>	White-tailed bumblebee	None
Hymenoptera	Apidae	<i>Bombus lapidarius</i>	Red-tailed bumblebee	None
Hymenoptera	Apidae	<i>Bombus pascuorum</i>	Common carder bee	None
Hymenoptera	Apidae	<i>Bombus terrestris</i>	Buff tailed bumblebee	None
Hymenoptera	Apidae	<i>Nomada fabriciana</i>	Fabricius' Nomad Bee	None
Hymenoptera	Apidae	<i>Nomada flava</i>	Flavus Nomad bee	None
Hymenoptera	Apidae	<i>Nomada flavoguttata</i>	Little Nomad Bee	None
Hymenoptera	Apidae	<i>Nomada goodiana</i>	Gooden's Nomad bee	None
Hymenoptera	Apidae	<i>Nomada fulvicornis</i>	Fork-Jawed Nomad Bee	RDB3
Hymenoptera	Apidae	<i>Bombus hortorum</i>	Garden bumblebee	None
Hymenoptera	Coelioxys	<i>Coelioxys elongata</i>	Dull-vented Sharp-tail bee	None
Hymenoptera	Crabronidae	<i>Crossocerus quadrimaculatus</i>	A square headed wasp	None
Hymenoptera	Crabronidae	<i>Crossocerus tarsatus</i>	A square headed wasp	None
Hymenoptera	Crabronidae	<i>Crossocerus wesmaeli</i>	A square headed wasp	None
Hymenoptera	Formicidae	<i>Mimumesa dahlbomi</i>	A spider hunting wasp	None
Hymenoptera	Formicidae	<i>Lasius flavus</i>	Yellow meadow ant	None
Hymenoptera	Formicidae	<i>Lasius niger</i>	black garden ant	None
Hymenoptera	Halictidae	<i>Myrmica scabrinodis</i>	Bronze Furrow bee	None
Hymenoptera	Halictidae	<i>Halictus tumulorum</i>	Orange-legged Furrow bee	None
Hymenoptera	Halictidae	<i>Halictus rubicundus</i>	Common furrow bee	None
Hymenoptera	Halictidae	<i>Lasioglossum calceatum</i>	Geoffroy's Blood Bee	None
Hymenoptera	Ichneumonidae	<i>Sphecodes geoffrellus</i>	A ichneumonid wasp	None

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Hymenoptera	Ichneumonidae	<i>Alomya debellator</i>	A ichneumonid wasp	None
Hymenoptera	Ichneumonidae	<i>Amblyteles armatorius</i>	A ichneumonid wasp	None
Hymenoptera	Ichneumonidae	<i>Apechthis compunctor</i>	An ichneumonid wasp	None
Hymenoptera	Megachilidae	<i>Orthopelma mediator</i>	Patchwork leafcutter bee	None
Hymenoptera	Megachilidae	<i>Megachile centuncularis</i>	Leaf cutter bee	None
Hymenoptera	Pompliidae	<i>Megachile circumcincta</i>	A spider hunting wasp	None
Hymenoptera	Pompliidae	<i>Anoplius nigerrimus</i>	Leaden spider wasp	None
Hymenoptera	Pompliidae	<i>Pompilus cinereus</i>	A spider hunting wasp	None
Hymenoptera	Tenthredinidae	<i>Priocnemis schioedtei</i>	A spider hunting wasp	Nb
Hymenoptera	Tenthredopsis	<i>Ametastegia glabrata</i>	Dock sawfly	None
Hymenoptera	Vespidae	<i>Tenthredo atra</i>	A sawfly	None
Hymenoptera	Vespidae	<i>Dolichovespula sylvestris</i>	The tree wasp	None
Hymenoptera	Vespidae	<i>Vespula germanica</i>	German wasp	None
Hymenoptera		<i>Vespula vulgaris</i>	Common wasp	None
Lepidoptera	Choreutidae	<i>Arge pagana</i>	Large rose sawfly	None
Lepidoptera	Crambidae	<i>Anthophila fabriciana</i>	Nettle-tap	None
Lepidoptera	Crambidae	<i>Crambus lathionellus</i>	Hook-face grass-veneer	None
Lepidoptera	Erebidae	<i>Crambus perlella</i>	Satin grass-veneer	None
Lepidoptera	Erebidae	<i>Euproctis chrysorrhoea</i>	Brown-tailed moth (larvae)	None
Lepidoptera	Geometridae	<i>Tyria jacobaeae</i>	Cinnabar	S41 – LBAP
Lepidoptera	Hesperiidae	<i>Petrophora chlorosata</i>	Brown silver-line	LC
Lepidoptera	Hesperiidae	<i>Ochlodes sylvanus</i>	Large skipper	LC
Lepidoptera	Lasiocampidae	<i>Thymelicus sylvestris</i>	Small skipper	None
Lepidoptera	Lasiocampidae	<i>Euthrix potatoria</i>	Drinker (Larvae)	None
Lepidoptera	Lycaenidae	<i>Malacosoma neustria</i>	The Lackey (larvae)	S41 - LBAP
Lepidoptera	Lycaenidae	<i>Lycaena phlaeas</i>	Small copper	LC
Lepidoptera	Noctuidae	<i>Polyommatus icarus</i>	Common blue	None
Lepidoptera	Nymphalidae	<i>Autographa gamma</i>	The silver-y	LC
Lepidoptera	Nymphalidae	<i>Aphantopus hyperantus</i>	Ringlet	None
Lepidoptera	Nymphalidae	<i>Maniola jurtina</i>	Meadow brown	LC
Lepidoptera	Pieridae	<i>Pyronia tithonus</i>	Gatekeeper	LC
Lepidoptera	Pieridae	<i>Pieris brassicae</i>	Green veined white	LC

Order	Family	Species (Scientific Name)	Species (Common Name)	Status
Lepidoptera	Pieridae	<i>Pieris napi</i>	Small white	LC
Lepidoptera	Pterophoridae	<i>Pieris rapae</i>	Large white	None
Lepidoptera	Tortricidae	<i>Pterophorus pentadactyla</i>	White Plume	None
Mollusca	Helicidae	<i>Tortrix viridana</i>	Green oak tortrix	None
Mollusca	Helicidae	<i>Candidula intersecta</i>	Wrinkled snail	None
Mollusca	Helicidae	<i>Cepaea nemoralis</i>	Brown-lipped snail	None
Mollusca	Helicidae	<i>Ceriuella virgata</i>	Vineyard snail	DD
Mollusca	Helicidae	<i>Helix aspersa</i>	Garden snail	None
Odonata	Damsel	<i>Trichia striolata</i>	Strawberry snail	LC
Odonata	Damsel	<i>Enallagma cyathigerum</i>	Common blue damselfly	LC
Orthoptera	Acrididae	<i>Ischnura elegans</i>	Blue tailed damsel fly	None
Orthoptera	Acrididae	<i>Merioptera roeselii</i>	Roesel's bush-cricket	None
Orthoptera	Phaneropteridae	<i>Omocestus viridulus</i>	Common green grasshopper	None
Orthoptera	Tetrigidae	<i>Leptophyes punctatissima</i>	Speckled bush cricket	None
Trichoptera	Caddis fly	<i>Tetrix undulata</i>	Common ground-hopper	LC

## Annex 9E.2 British Conservation Status Categories - Definitions

### Status Categories and Criteria Version 1 (Shirt, 1987)

These status categories and criteria were introduced for British insects by Shirt (1987) and received some modifications by later authors (e.g. Hyman and Parsons (1992)).

#### **Red Data Book Category EXTINCT**

Species which were formerly native to Britain but have not been recorded since 1900.

#### **Red Data Book Category 1, Endangered**

Species in danger of extinction and whose survival is unlikely if causal factors continue to operate. Endangered species either (a) occur as only a single population within one 10-km square, or (b) only occur in especially vulnerable habitats, or (c) have been declining rapidly or continuously for twenty years or more to the point where they occur in five or fewer 10-km squares, or (d) may already have become extinct.

#### **Red Data Book Category 2, Vulnerable**

Species which are likely to move into the Endangered category in the near future if causal factors continue to operate. Vulnerable species are declining throughout their range or occupy vulnerable habitats.

#### **Red Data Book Category 3, Rare**

Species which occur in small populations and although not currently either Endangered or Vulnerable are at risk. Rare species exist in 15 or fewer 10km squares, or are more widespread than this but dependent on small areas of especially vulnerable habitat.

#### **Red Data Book Category I, Indeterminate**

Species considered to be either Endangered, Vulnerable or Rare but with insufficient information to say which. NB. Best written as 'RDBi' rather than 'RDBI' as the latter is easily confused with 'RDB1' (Endangered).

#### **Red Data Book Category K, Insufficiently Known**

Species suspected to merit either Endangered, Vulnerable, Rare or Indeterminate status but lacking sufficient information. Species included in this category may have only recently been discovered in Britain, or may be very poorly recorded for a variety of reasons.

#### **Nationally Scarce Category A, Na**

Species which do not fall within Red Data Book categories but which are nonetheless uncommon in Great Britain and thought to occur in 30 or fewer (typically between 16 and 30) 10-km squares of the National Grid, or for less well-recorded groups, in seven or fewer vice-counties.

#### **Nationally Scarce Category B, Nb**



Species which do not fall within Red Data Book categories but which are nonetheless uncommon in Great Britain and thought to occur in between 31 and 100 10-km squares of the National Grid, or for less well-recorded groups, between eight and twenty vice-counties.

### **Nationally Scarce, N**

Species which do not fall within Red Data Book categories but which are nonetheless uncommon in Great Britain. This status category has been used where information has not been sufficient to allocate a species to either Na or Nb. These species are thought to occur in between 16 and 100 10 km squares of the National Grid.

### Status Categories and Criteria Version 2 (IUCN, 2001)

These later status categories and criteria are based on IUCN Red List Categories and Criteria version 3.1 (IUCN, 2001) and have been applied to British butterflies, dragonflies and a few other invertebrate groups.

### **Critically Endangered (CR)**

A taxon is Critically Endangered when the best available evidence indicates that it is facing an extremely high risk of extinction in the wild.

### **Endangered (EN)**

A taxon is Endangered when the best available evidence indicates that it is facing a very high risk of extinction in the wild.

### **Vulnerable (VU)**

A taxon is Vulnerable when the best available evidence indicates that it is facing a high risk of extinction in the wild.

N.B.: Species belonging to the above three categories may be collectively referred to as Threatened.

### **Data Deficient (DD)**

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

The DD category effectively replaces the Indeterminate (RDBi) and Insufficiently Known (RDBK) categories of the earlier version.

### **Near Threatened (NT)**

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

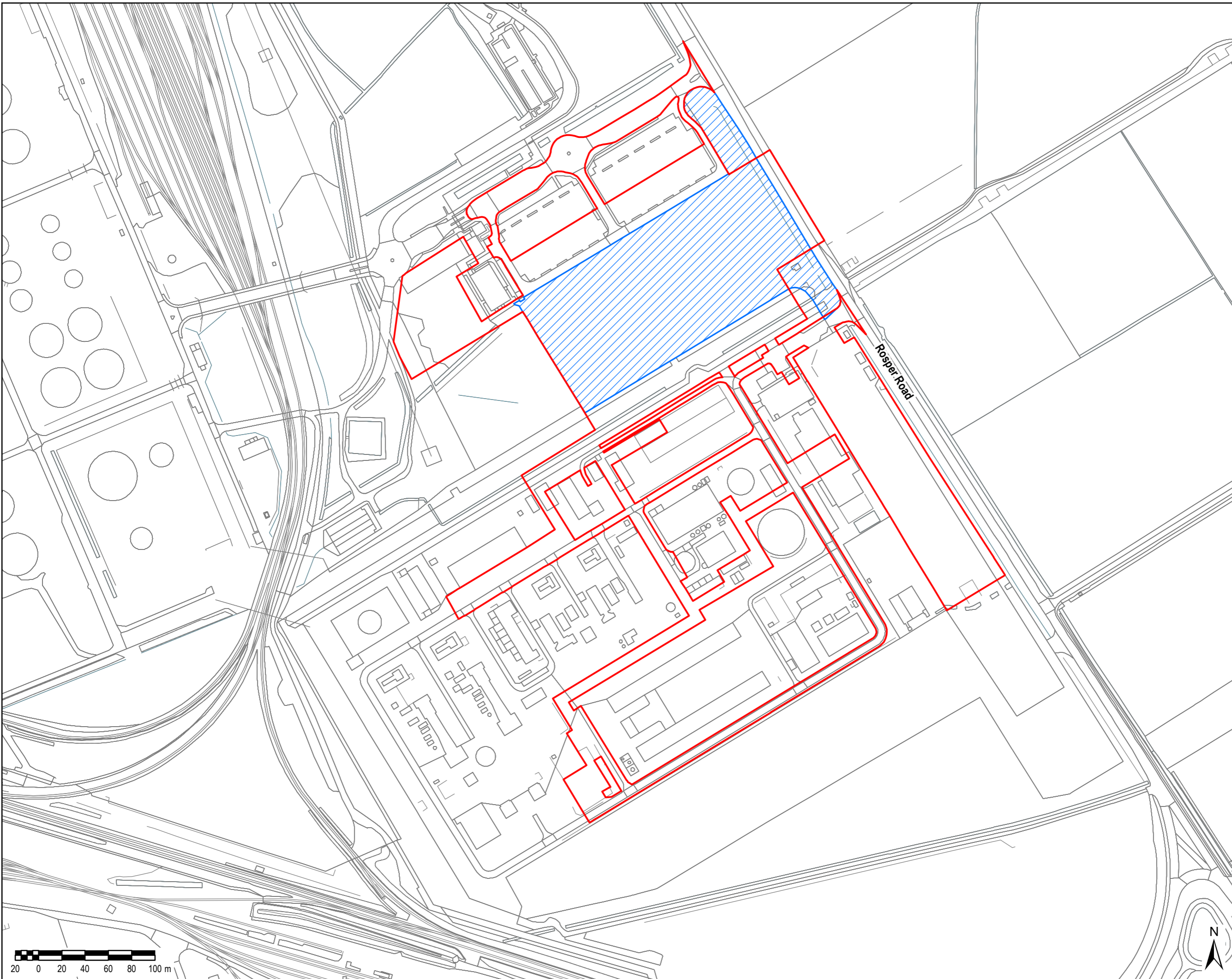
### **Least Concern (LC)**

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.





## Figure 9E.1 Terrestrial Invertebrate Survey Area

File Name: \\ba-wip-04.scottwilson.co.uk\4400 - Management Services\004 - Information Systems\60547702 Immingham Gas Pipeline\02 Maps\Power Plant Site\OCGT Full ES 2019\Ecology\PEA Appendix to the ES\Figure 9F.1 Terrestrial Invertebrate Survey Locations.mxd



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**LEGEND**

-  Proposed Development
-  Terrestrial Invertebrate Survey Area

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Purpose of Issue  
**DRAFT ENVIRONMENTAL STATEMENT**

Client  
**VPI IMMINGHAM B LTD**

Project Title  
**PROPOSED 299MW OCGT POWER STATION**

Drawing Title  
**TERRESTRIAL INVERTEBRATE SURVEY LOCATIONS  
FIGURE 9E.1**

Drawn JW	Checked BB	Approved MS	Date 21/03/2019
AECOM Internal Project No. 60547702		Scale @ A3 1:3,000	

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