



PORT OF
TILBURY
LONDON

PLANNING ACT 2008

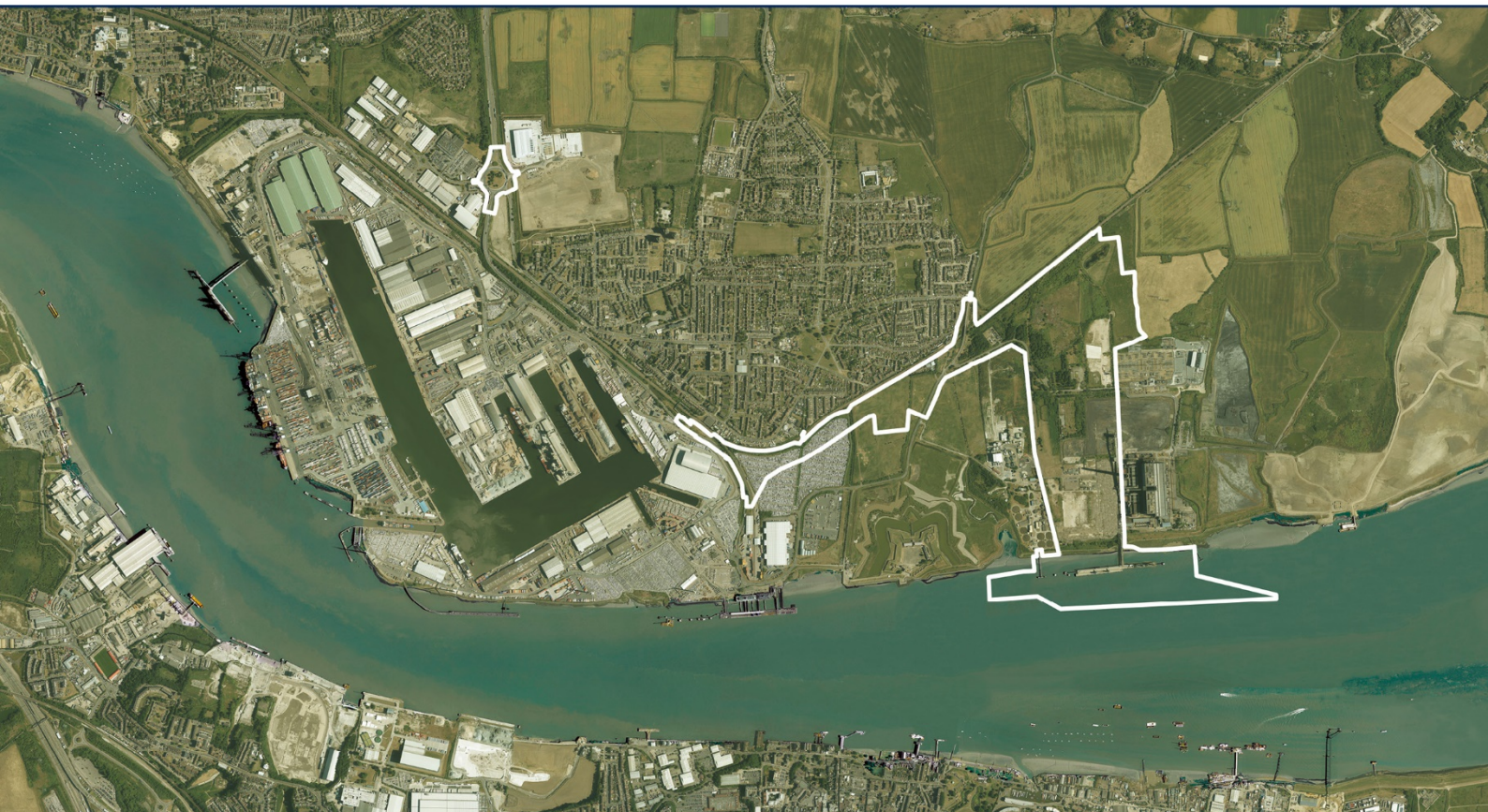
INFRASTRUCTURE PLANNING
(APPLICATIONS: PRESCRIBED FORMS AND PROCEDURE) REGULATIONS 2009

PROPOSED PORT TERMINAL AT
FORMER TILBURY POWER STATION

TILBURY2

LAND ADJACENT TO TILBURY POWER STATION ESSEX,
INVERTEBRATE SURVEY REPORT (NOVEMBER 2016). REPORT
BY COLIN PLANT ASSOCIATES (UK)

DOCUMENT REF: APPENDIX 10.K



TILBURY2

Commissioned by
Bioscan (UK) Ltd
The Old Parlour
Little Baldon Farm
Oxford
OX44 9PU

LAND ADJACENT TO TILBURY POWER STATION ESSEX

INVERTEBRATE SURVEY REPORT

Report number BS/29911/16

November 2016

Prepared by

Colin Plant Associates (UK)
Consultant Entomologists
14 West Road
Bishops Stortford
Hertfordshire
CM23 3QP

01279-507697
cpauk1@ntlworld.com

ACKNOWLEDGEMENTS

Colin Plant Associates (UK) are pleased to credit the input of the following personnel:

Field work for this project has been undertaken by

Marcel Ashby
Tristan Bantock
Colin W. Plant

Identification of samples has been undertaken by

Marcel Ashby
Tristan Bantock
Peter Chandler
Norman Heal
Edward Milner
Colin W. Plant

1 INTRODUCTION

1.1 Introductory comments

- 1.1.1 **Colin Plant Associates (UK)** were commissioned on 29th April 2016 by **Bioscan (UK) Ltd** to undertake an assessment of terrestrial invertebrate ecology on land adjacent to the Tilbury Power Station in South Essex (“the Tilbury2 site”).
- 1.1.2 An additional area of land, comprising the corridor of a proposed infrastructure route from the west into the Tilbury2 site was added to the area under examination during the autumn of 2016; this is referred to here as the “infrastructure corridor” and is indicated in Map 1. This present report incorporates data from both surveys to provide a single comprehensive report.
- 1.1.3 Terrestrial invertebrate species were sampled on a total of 8 dates across the year 2016 from mid May to mid October (Table 1). Invertebrates in the infrastructure corridor were sampled in the autumn period only across three separate dates (Table 1).

Table 1. Dates of sampling visits to the site at Tilbury

Date	Activity undertaken	
	Tilbury2 site	infrastructure corridor
12 th May	Initial walkover and sampling; establish traps	-
10 th June	Active sampling; service traps;	-
14 th July	Active sampling; service traps	-
16 th August	Active sampling; service traps	-
8 th September	Active sampling; aquatic sampling	-
27 th September	Active sampling; service traps; aquatic sampling	Initial walkover; active sampling; establish traps; aquatic sampling
5 th October	Active sampling; take up traps;	Active sampling; establish traps; aquatic sampling
14 th October	-	Active sampling; take up traps; aquatic sampling

- 1.1.4 All sampling visits were made on dates when weather conditions were appropriate to invertebrate recording. Overall, three different surveyors, each with a different area of taxonomic expertise, undertook the site visits, so that taxonomic coverage was comprehensive. Site visits lasted a sufficient number of hours to ensure that all areas of the site could be visited for a period of time that was long enough for effective sampling.
- 1.1.5 The Tilbury2 site was subdivided into three compartments. Two of these areas are indicated in Map 2 by the green shading and comprise the designated Local Wildlife Sites known as the “Lytag Brownfield” in the north and the smaller area of land surrounding the former ‘Tilbury Energy and Environment Centre’ (TEEC) in the south, i.e. the “Tilbury Centre”. Remaining areas within the red line area that are not shaded green in Map 2 form the third recording compartment (“the rest”).

1.2 Invertebrate sampling methodology

1.2.1 Terrestrial invertebrate sampling involved active sampling using various methods, 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.
- **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. Black or white trays are used depending upon which group of invertebrates has been targeted for search. Insects are collected from the tray using a pooter – a mouth-operated suction device.
- **Suction Sampling** consists of using a converted leaf-blower to collect samples from grass and other longer ground vegetation. The sample is then everted into a net bag and the invertebrates removed with a pooter. The advantage of suction sampling is that it catches species, which do not fly readily or which live in deep vegetation.

1.2.2 In addition, specific searching for selected species was undertaken. This included, in particular, searches for adult Hornet Robberfly (*Asilus crabroniformis*) in the horse-grazed areas in the northern sector of the Tilbury2 site and in suitable habitats along the infrastructure corridor. This specific task was undertaken in two stages. The larvae of this rare fly are alleged to be predatory upon the grubs of dung beetles within horse droppings and other herbivore faecal material and they have become rare because of modern animal husbandry practices that include treatment of grazing stock with vermicides; this renders the dung lethal to the beetles and hence there is no prey for the flies. Consequently, the first phase of the targeted searching involved sifting horse faeces to determine the presence or absence of dung beetles so that we were able to assess the potential of this microhabitat to support the fly.

1.2.3 We discovered that the horse dung at Tilbury supports a rich and diverse beetle fauna and it is likely that vermicides are not used – at least not on a regular basis. The micro-habitat is, therefore, potentially suitable for the robberfly and so we progressed to direct observational searching for adults in the grazed fields, at the field edge habitats and around herbivore droppings.

1.2.4 In addition to the various forms of active sampling, we also undertook passive sampling, using pitfall traps and a malaise trap. Passive sampling is usually effective because the traps operate 24 hours per day every day in the absence of the surveyor.

1.2.5 **Pitfall trapping.** Vending-machine cups or similar are placed in the ground with the rim flush with, or slightly below, the surface. A fluid is added, containing ethylene glycol, sodium chloride and formalin with a little detergent to reduce surface tension. Traps may be covered or uncovered and are typically left in position for a month at a time. Holes made in the sides of the cups a couple of centimetres below the rim permit flood or rain water to drain without the traps over-flowing and the catch becoming lost. Invertebrates simply fall into the traps.

1.2.6 **Malaise trapping.** A tent-like net is erected on poles, using guy ropes, in the habitat to be sampled. The two, long side walls of the tent are absent and a long central wall is present. Insects collide with the central net wall and are funnelled upwards to a catching chamber. Traps are usually left all year and catching chamber, which is charged with isopropyl alcohol (propan-2-ol), emptied fortnightly or monthly depending on site, habitat and weather.

- 1.2.7 Sampling of aquatic invertebrates was undertaken from the bank side using pond nets with a mesh diameter of one millimetre held on poles up to three metres in length. Within each discrete water body, care was taken to sample all visible submerged habitat zones, from open water to banks of submerged macrophytes and amongst the stems of emergent plants.
- 1.2.8 Attempts to obtain a large number of samples of aquatic invertebrates were thwarted to a considerable extent by environmental factors on this site. Many of the water bodies dried to varying degrees as the year progressed. In some ditches this had the effect of concentrating invertebrates in a small area of remaining water, but for this to happen other areas had to become dry and unavailable for sampling. The sampling undertaken is wholly representative of the aquatic habitats during 2016; in a different year, however, water levels might be higher and the results may be different.

1.3 Limitations placed on the survey

- 1.3.1 The consideration of any important factors that might have limited the efficacy of the survey to any significant manner is important with regard to the analysis of the resultant data.
- 1.3.2 In general, there were few if any limiting factors. A greater number of site visits, for example fortnightly rather than monthly, would inevitably increase the number of recorded species, however, this survey is not intended as an inventory exercise and it is necessary only to obtain a sample that is fully representative. Monthly visits, as made, are fully in harmony with various guidelines for invertebrate survey and were executed over a significant part of the calendar year. In this context, we regard the survey effort and coverage as wholly appropriate for assessment purposes.
- 1.3.3 The loss of the initial malaise trap sample should be mentioned. The malaise trap was damaged during the first month of operation and the early season sample was lost. However, whilst it is clearly likely that we have, as a consequence, failed to record a few species flying in May, these are likely to be very few. This is because the development of the seasons during 2016 was slow, with the month of May being atypically cold. Invertebrates normally active in May were, in quite a few cases, reported in June this particular year and so are unlikely to have been missed by this survey. In any event, active sampling using techniques such as beating and suction sampling, that find the inactive invertebrates (rather than depending on them flying), are considered very likely to have compensated for any omissions from early season malaise trapping.

2 RESULTS OF INVERTEBRATE SAMPLING

2.1 Overview

- 2.1.1 A full list of all recorded invertebrate species is presented as Appendix 1. A total of 789 species is listed. This includes 62 aquatic species (species for which at least one stage in their life cycle is spent wholly submerged in water), which are also listed separately at Appendix 3. The distribution of species across the whole of the survey area is as indicated in Table 2.

Table 2: Numerical distribution of recorded invertebrates in 2016

Compartment	Lytag Brownfield LoWS	Infrastructure corridor	Tilbury Centre LoWS	Rest of the site	Whole site
Number of invertebrates in 2016	501	178	351	536	789

- 2.1.2 The inventory is annotated with formal National Status codes where the species are scarcer than “nationally common”; these status codes are explained in Appendix 2.
- 2.1.3 The list is also annotated with the primary ecological associations of each species, where known. Although this is only a summary of some important features, it nevertheless allows species with differing primary habitat affinities to be immediately discerned.

2.2 Species of conservation interest

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

Priority Species/Species of Principal Importance (NERC Act Section 41) Species

- 2.2.2 Although superseded by the Post-2010 Biodiversity Framework, the UK Biodiversity Action Plan, and its list of Priority Species, remains an important reference source for conservation and was used to help draw up the current statutory lists of Priority species (Species of Principal Importance) in England, Scotland, Wales and Northern Ireland. For England and Wales these lists are underpinned by *The Natural Environment & Rural Communities Act (2006)*, with Section 41 requiring the drawing up and maintenance of a *List of Species of Principal Importance for Conservation of Biological Diversity in England* and Section 42 requiring a *List of Species of Principal Importance for Conservation of Biological Diversity in Wales*.
- 2.2.3 Seven such Species of Principal Importance for Conservation of Biological Diversity in England were recorded at the site during the present survey. These are as follows:

The plant hopper *Ribautodelphax imitans*. In the early 1990's this species was known in Britain only from old records from Dorset, but there are more recent records of it in numbers in the Lea Valley on the Middlesex/ Hertfordshire border area in 2000, and it was present at the former Tilbury power station in 2007. It has been recorded from calcareous grassland, and also occurs on other types of dry grassland. The grass *Festuca arundinacea* is a known foodplant in France and Greece. The continental subspecies does not occur in Britain, but tall fescue *Festuca arundinacea arundinacea*, of which there is a large amount at the former power station site, could be a host. Rather little else is known about this hopper species, which is present across the Lytag Brownfield.

The Brown-banded Carder Bee *Bombus humilis* was given national BAP status, and remains a Species of Principal Importance on the basis of major declines across Britain. The East Thames Corridor and parts of South Wales support the most important remaining metapopulations in the UK. Populations appear to operate at a landscape scale and in the East Thames Corridor this implies dependency upon the entire remaining meta-habitat of post-industrial sites. The availability of suitable forage (nectar and pollen) sources throughout the whole season from May to September is crucial. The queens require nectar early in the season to replenish diminished energy resources following hibernation. They then need pollen for stocking cells in newly established nests to enable the first workers to develop. Workers then require both nectar and pollen both for their own sustenance and to stock the developing nest. These resources need to be provided by an abundance of specific key plants all of which, significantly, have very long flowering seasons as well as long corolla tubes which correspond to the long tongues of the bumblebees. Important plant species used in early summer by queens include Fodder Vetch, Red Clover *Trifolium pratense* and Broad-leaved Everlasting-pea *Lathyrus latifolius*. Workers forage on the flowers of species such as bird's-foot trefoils *Lotus* spp., clovers, Black Horehound *Ballota nigra*, Lucerne *Medicago sativa* and Red Bartsia *Odontites verna*. Observations suggest that a small number of large patches of flowers are used more frequently and are much more important than a larger number of small patches.

Adult worker bees were noted at various points on the Lytag Brownfield and on adjacent land areas; its absence from the infrastructure corridor may only reflect the lack of early season survey in that area.

The Shrill Carder Bee *Bombus sylvarum* was formally listed in status category Nb and has only four or five remaining metapopulations in England and south Wales, and the East Thames Corridor region currently supports one of the most important of these. Bumblebee populations appear to operate at a landscape scale and it is probable that viable individual populations require minimum ranges of between ten to twenty sq. km of good matrix habitat within farmland; *B. sylvarum* seems to require much larger areas of good habitat than Brown-banded Carder Bee *B. humilis*. The queens require nectar resources early in the season after their long winter hibernation to build up their reserves. They then need pollen resources for stocking cells in newly established nests to enable the first workers to develop. Workers also require nectar and pollen resources both for their own sustenance and to stock the developing nest. It appears that large areas of fairly tall, open flower-rich grasslands providing areas of abundant forage are required to support populations of *Bombus sylvarum*. Large patches of flowers are used more frequently and are much more important than widely distributed resources. Availability of suitable nectar and pollen sources throughout the whole season from May to September is crucial. These resources need to be provided by an abundance of specific key forage sources, all of which significantly have very long flowering seasons as well as long corolla tubes which correspond to the long tongues of the bumblebees. Important plant species used in early summer by queens include Fodder Vetch, Red Clover and Broad-leaved Everlasting-pea. Workers forage on a more restricted range of flowers than the Brown-banded Carder Bee, and in south Essex species such as bird's-foot trefoils *Lotus* spp. (but especially *Lotus glaber*), Red Clover, Black Horehound (*Ballota nigra*) and Red Bartsia (*Odontites verna*) are the main resources. Worker castes of this bee were encountered occasionally on the Lytag Brownfield and on adjacent land areas.

The Five-banded Digger Wasp *Cerceris quinquefasciata* is a medium-sized yellow and black wasp which nests gregariously in areas of bare sand in places exposed to the sun. It has been formally listed as Nationally Rare (RDB 3). It provisions its nest with adult weevils, and may occur in numbers at favourable sites. It was included in English Nature's "Species Recovery Programme" because of a severe decline in its modern distribution, thought to be due to the loss of open areas of sandy ground for nesting and flower-rich sandy grasslands for foraging. The main metapopulation currently appears to be in the East Thames Corridor, but there are indications that other important centres survive in the Colchester, Ipswich and Breckland areas as well as very locally in Oxfordshire and at scattered other locations in the south. This species is associated with sporadically disturbed land and the relatively unmanaged parts of heath edge or other sandy habitats. The restricted distribution is probably partly climatic, but also reliant on an abundant prey supply associated with grasslands and scrub containing a diverse flower-rich vegetation with areas of bare ground and uncut stems, seeds, flower heads and fruit heads that support the weevil prey species. Many sites where the wasp is currently known or from which it has recently been recorded are threatened or have already been lost to development, particularly post-industrial sites in the East Thames Corridor.

There is a strong population on the Lytag Brownfield, where it breeds, and on adjacent areas of land where it is often seen hunting. The presence of its specific parasite, the ruby-tailed wasp *Hedychrum niemelai*, indicates an established population dynamic at this site.

The Small Heath Butterfly *Coenonympha pamphilus* is a grassland species that although still common and widespread, has declined in recent years and which is formally regarded as being "Near Threatened". It was added to the UK BAP list at the end of 2007, and although there were disagreements over the need for this action, it has been automatically included in the Section 41 lists of the NERC Act. It appears to have declined more at inland sites than it has in coastal areas, though it remains present throughout at lower density than before. The presence of large numbers, indicating a thriving population, at an inland site is potentially more important than a similar discovery in a coastal locality, although that should not imply that coastal colonies are unimportant.

It is common on the Lytag Brownfield and the area surrounding that zone.

The fly *Dorycera graminum* is associated with grassland, but there is no consistent interpretation of habitat requirements. It has undergone a marked decline in numbers and range and a national review in the year 2000 showed that all but three British records were made in the East Thames Corridor and north Kent. The objectives and targets of the UK Biodiversity Action Plan stated that sites holding key populations of the species should be considered for notification as SSSIs, where this is necessary to secure their long-term protection and appropriate management. It also stated that where possible, all occupied sites are appropriately managed.

In recent years, the fly has proven to be widespread and numerically not uncommon on grassland sites along both sides of the estuary of the River Thames. However, away from here it remains extremely rare. It is common on the Lytag Brownfield and the area surrounding that zone; we did not find it on the Tilbury Centre land, though it is likely to be present here as well as elsewhere.

The Wall Brown butterfly *Lasiommata megera* has declined drastically in southern Britain and is now almost certainly extinct in many non-coastal counties. The decline in numbers has occurred in parallel with a significant range contraction away from inland areas to the coast and away from the south and east to the north and west; it is widely regarded as being climate-driven. Coastal colonies in the Thames Estuary still prevail, but are also in decline.

It is common in open, light scrub areas of the Lytag Brownfield and the area surrounding that zone.

Former UK Biodiversity Action Plan (UK BAP) “Research only” moth species

- 2.2.4 The original list of UK Biodiversity Action Plan Priority Species *of moths* was divided into two sections. In the first, 81 species were afforded the status of UK BAP Priority Species on the basis of genuine scarcity/rarity; none of these was recorded in the surveyed area nor is any likely to be present. The second section is a list of 69 species that in many instances remain common but which have declined in population by a significant amount in the past 25 years. These were defined as “not yet rare” and were flagged as UK BAP species “**for research only**”.
- 2.2.5 This “Research Only” list was incorporated into the lists drawn up pursuant to sections 41 and 42 of the NERC Act and these species now, therefore, have a certain amount of statutory interest. Many conservation bodies now specifically recommend that these species are excluded from an appraisal of Section 41 and Section 42 species (see, for example, Gwent Wildlife Trust, 2009).
- 2.2.6 Unfortunately, the species are not listed separately so that non-specialists are unable to discern them. At Tilbury, we have recorded two such “Research Only” moth species during the 2016 survey process (Table 3).

Table 3. “Research Only” moth species recorded in 2016

Species	English name	Caterpillar foodplant	
<i>Arctia caja</i>	Garden Tiger	herbaceous plants	Lytag Brownfield and adjacent area
<i>Tyria jacobaeae</i>	Cinnabar moth	Ragworts	Lytag Brownfield and adjacent area

- 2.2.7 It may be commented that whilst the Cinnabar Moth appears to remain common and not worthy of its formal status, the Garden Tiger Moth has genuinely crashed numerically and has contracted its range northwards; in the southern half of England, inland populations are now excessively rare and the moth has retreated to the coast, where a more constant microclimate persists.

Red Data Book Species

- 2.2.8 Twenty of the species recorded were listed in the British Red Data Book published in 1987 (Shirt, 1987). However, eleven of the twenty are now known to be significantly more widespread than they were at the date of their designation and their status has been revised. In the case of the aculeate Hymenoptera the status review remains pending and so we have revised the status codings in accordance with the recommendations of Archer (2014). For the Heteroptera, we have revised the codes in accordance with the datasheets on the JNCC website, accessed via <http://jncc.defra.gov.uk/page-3428>.
- 2.2.9 The presence of species that were formerly regarded as rare is of interest for the purpose of comparison with historical datasets and so these species are listed here, with comments.
- 2.2.10 Three were included in the category of Nationally Endangered species (RDB 1) as follows:

The tachinid fly *Cistogaster globosa* is known from extremely few localities in southern England; it is a distinctive species that is unlikely to be overlooked and so is probably genuinely rare. The RDB 1 status remains valid at 2016. It parasitises shield bugs, especially *Aelia acuminata*. The egg is laid on the dorsal surface of the host's abdomen and the grub feeds internally in the living bug before leaving its host to pupate in the ground. The fly appears to favour dry grassland where the host is usually found. Adult flies have been seen nectaring on Wild Carrot but other species of plant are also likely to be visited.

We found it only in open areas of the Lytag Brownfield where there is bare earth – often with a covering of lichens.

The Box Bug *Gonocerus acuteangulatus*. Historically very rare, this large bug was until very recently known only from Box Hill in Surrey, where it feeds on Box trees. However, it is evidently expanding its range and now occurs widely in the south-east of England and beyond. It is exploiting different foodplants, and has been found on hawthorn, buckthorn, yew and plum trees. It was found on the Lytag Brownfield, in the area of the Tilbury Centre and elsewhere at Tilbury and is evidently common here; the Red Data Book status has been revised and the species is now listed in category LC (Least Concern).

The tachinid fly *Gymnosoma nitens* is a parasite of the Nationally Scarce ground-dwelling shieldbug *Sciocoris cursitans*. This host species is especially associated with chalk grassland and calcareous sand, but also favours open habitat mosaics on previously developed land where these are base-rich. It is always found in unshaded situations on well-drained and friable soils with a rather open vegetation structure and usually with a component of bare ground. Inevitably, the fly is found under identical conditions. The host is phytophagous, but there appear to be no certainly identified food plants and it is probably polyphagous. The preferred habitat rests, in the majority of cases, on sites that are likely to be lost to development and the fly has, therefore, been awarded “Endangered” status. The main UK population is centred on the Thames Estuary area on the Essex side of the river. At Tilbury, it is restricted to suitable areas of the Lytag Brownfield only. The RDB 1 status remains valid at 2016.

- 2.2.11 Two of the Red Data Book entrants were included in category RDB 2 – Nationally Vulnerable. One still warrants that status – the other has become widespread and common since designation.

The Bee Wolf *Philanthus triangulum* was formerly included in the Nationally Vulnerable category (RDB 2) and once considered to be one of the greatest rarities in Britain, with colonies only in sandy habitats on the Isle of Wight and Suffolk. However, in the past 30 years it has undergone a significant expansion in range, and is now locally common in a steadily increasing number of sites as far north as Yorkshire. Although it is still formally listed in RDB category 2, it is regarded as ‘Widespread’ by Archer (2014) and is no longer treated as noteworthy. It is common on the Lytag Brownfield and adjacent land.

The mining bee *Andrena nigrospina* is a recent discovery; for many years it had been confused with *Andrena pilipes* and both were lumped together under a third name – *Andrena carbonaria*. There are very few modern records of *Andrena nigrospina*. The preferred habitat includes sandy areas of heathland, waste ground and sandpits, coastal grassland and landslips and it has also been found inland (the similar *A. pilipes* is coastal). Adults require patches of bare, sandy soil or short turf in warm, sunny situations for nesting. The RDB 1 status remains valid at 2016. The bee is also listed in the Essex Red Data Book as Endangered and is found in very few places of which the Lytag Brownfield is one. The presence of its specific cleptoparasite, *Nomada fulvicornis* (see below), indicates an established population dynamic at this site.

- 2.2.12 A further eleven species were included in the former RDB 3 category – Nationally Rare, now usually referred to as “near threatened”. However, 7 of these have increased and are now regarded as common, thus no longer supporting the original formal status. These are:

Toadflax Brocade Moth *Calophasia lunula* was until recent years confined to shingle beaches in Kent and Sussex where it flourished. In the past ten years, however, it has begun to colonise post-industrial sites in northern London and then elsewhere. It no longer holds the formal RDB status. The substrate conditions on many of these sites mirrors that provided by shingle on the south coast whilst micro-climate factors are also a consideration. The caterpillars feed on both the native, yellow-flowered toadflax and on the introduced Purple Toadflax, the latter being especially used in urban areas. At the Lytag Brownfield, the larvae are certainly using native plants, but are not yet found on the purple variety.

The Blue Carpenter Bee *Ceratina cyanea* was formerly listed as Red Data Book category 3 (RDB3) ('Near Threatened') being confined to southern England, where it was rediscovered during 1993 after nearly 100 years absence. More recently, several additional populations have been found in the south of England on various post-industrial and other ruderal sites and it has now spread further afield. Adults make nests in dead, broken bramble stems, and the presence of a certain amount of bramble scrub in open situations where dead stems are exposed to the sun is crucial to its survival. It is likely to prefer bramble growing in drought-stressed and mineral deficient situations. The bee collects pollen from a variety of flowers including yellow composites, knapweed and *Lotus*. It is present in all parts of the Tilbury area. Outside the East Thames Corridor it is present but still very rare and unexpected.

The plant bug *Chlamydatus evanescens* is a rather unassuming insect in terms of its size and appearance. It is associated with *Sedum* plants and presents something of a success story for wildlife conservation because it has very quickly gone from being a recent addition to the British invertebrate fauna to a species that rapidly colonises London's many "living roof" spaces whenever the host plant is present. We found it on the Lytag Brownfield, unsurprisingly on *Sedum* plants. It no longer holds the formal RDB status.

The ruby-tailed wasp *Hedychrum niemelai* is a cleptoparasite of the Five-banded Digger Wasp (*Cerceris quinquefasciata*), a Section 41 species. In the past the parasite was apparently locally common in southern England, from Cornwall to Norfolk, but now seems to be much rarer. The ecological needs of the parasite reflect those of its host. The RDB 3 status remains valid in 2016.

The mining bee *Lasioglossum leucopus* is found over a wide area of southern England and Wales and extends north into Scotland. It is found at both inland and coastal sites showing no particular preference for soil type. It is quite common on the Lytag Brownfield. Red Data Book status is currently unwarranted and it is no longer listed as Rare.

The mining bee *Lasioglossum pauperatum* is recorded from southern counties as far north as Essex and as far west as Devon, but with very few recent records except in south Essex near the Thames where it seems to be reasonably widespread. The RDB 3 status remains valid in 2016. It is presumed to nest in light soils in sunny situations. Pollen sources are unknown, but flower visits include *Senecio* and *Crepis*. It is frequent at the Lytag Brownfield.

The plant bug *Lygus pratensis* (also formerly RDB3) has apparently always been a polyphagous species in Europe, found in weedy places, but in Britain it has long been regarded as an indicator of quality ancient woodland. In the last few years, however, this bug has been widely recorded away from woodland in the south of England. It is unclear if the scattered old colonies have expanded or if there has been a wave of immigration from the continent, but either way the Red Data Book status is currently unwarranted.

The cuckoo bee *Nomada fulvicornis* was formerly widely distributed in southern England, but it is today very scarce and has important population strongholds in Essex, along the East Thames Corridor and near Colchester. The RDB 3 status remains valid in 2016. It is a host-specific next parasite of the mining bee *Andrena nigrospina* – a Nationally Vulnerable species. At Tilbury we recorded it in 2016 on land just south of the Lytag Brownfield.

The weevil *Smicronyx reichi* is very local and recently recorded from a very few counties of southern England. It is a tiny blackish red phytophagous weevil associated with Common Centaury *Centaureum erythraea*, Yellow-wort *Blackstonia perfoliata* and possibly Autumn Gentian *Gentianella amara*; as a consequence of this, scrub invasion tends to drive it out of some sites. It is found mainly on calcareous grassland or base-rich post-industrial substrates in the Thames Estuary area and is no longer listed as Rare. It was found frequently at the Lytag Brownfield land immediately adjoining area in 2016.

The tachinid fly *Gymnosoma rotundatum* is confined to very few sites on chalk downland in the south-east (mainly Kent) and on base-rich substrates of post-industrial sites in the Thames Estuary area. It is a host-specific, internal parasite of the green shield bug *Palomena prasina*. It is common on the Lytag Brownfield, but very rare away from the East Thames Corridor and its RDB 3 status remains valid in 2016.

The sphecid wasp *Diodontus insidiosus* an aphid predator that nests in holes excavated in bare ground. It is confined to the south of England where it frequents heathlands in most places and post-industrial sites in the East Thames Corridor. It is very local in distribution. At Tilbury it probably utilises bare patches of PFA and other substrates across the Lytag Brownfield but our observations suggest that individuals breeding on the off-site Ash Fields, a short distance away, are commuting between there and the Lytag Brownfield. This is unsurprising as it represents typical behaviour for many aculeate species. The RDB 3 status remains valid in 2016.

- 2.2.13 The remaining four Red Data Book taxa were included within the “indeterminate” category (RDB K) as there were insufficient data for a more adequate placement. Of these, two remain in the Red Data category, but the other two have proven to be under-recorded and are now known to be rather more frequent in occurrence. The species are:

Isochnus sequensi is a small beetle whose larvae feed internally in leaves of poplars and willows, creating highly visible ‘mines’. It was formerly confused with another species, but it is now realised that it also feeds on willows and that many records on that tree were overlooked. It is now regarded as common. Mined leaves are evident near the Tilbury Centre in both host plants.

Olibrus flavicornis is a small black smut or flower beetle of the family Phalacridae, found in grassland and coastal sites, but also on brownfield habitats particularly in the Thames Gateway. It is associated with Autumn Hawkbit *Leontodon autumnalis* and larvae probably develop in the flower head of while the adults feed on pollen. The adults are usually seen in June and July. This species was considered rare when the Coleoptera Review was published in 1992, since there were no records post-1950, but since then it has been recorded in the Thames Gateway, particularly on brownfield sites. There are unpublished captures from Sussex in the 1990s, but it is rare or absent elsewhere. It remains listed under Priority Species and Species of Conservation Concern within the London BAP.

It was found throughout the whole of the Tilbury area.

The picture-winged fly *Tephritis divisa* was recorded new to Britain from Sussex in August 2004, swept off bristly ox-tongue. It can be easily misidentified as the more common *Tephritis cometa*. It is a native of southern Europe. The larvae develop in the flower heads of *Helminthotheca echinoides* and possibly species of *Picris*. It appears to be spreading and it is now regarded as a common species. We recorded it on the land near the Tilbury Centre.

The picture-winged fly *Tephritis matricariae* has only been recorded from Kent and Essex. It was first found in Essex at Belton Hills in 2001, with further records from an old sand pit at Hunts Hill in Havering during 2002 and Canvey Northwick in 2003. A single female from Kirby-le-Soken during 2003 is the first record for North Essex and it was recorded at Elsenham in 2008. It is widespread from the Mediterranean area up to central Germany, but almost absent more in the north. Its host plants are probably *Crepis vesicaria* ssp. *taraxacifolia* and *C. capillaris*. The RDB 3 status remains valid in 2016. Small numbers were found in several parts of the Tilbury survey area.

Nationally Scarce Species

- 2.2.13 A total of 58 species recorded during the survey have been designated as “Nationally Scarce” in past reviews. Some of the major groups of insects affected have since been re-examined and the formal status codes changed; others await formal alteration and therefore retain the official status for the time being. Of the 58 species, 11 were originally included in the former Nationally Notable Na category (see Appendix 2): They are listed below, together with comments where the status no longer applies.

The wasp *Argogorytes fargeii* hunts cuckoo spit bugs in grassland and bramble patches, but is extremely local and has a specific requirement for open, sparsely-vegetated vertical or near vertical banks in direct sunlight in which to nest, within a few tens of metres of bramble patches within which it hunts. It is abundant on the off-site Ash Fields which is probably the nesting area, but it hunts the land at the southern part of the Lytag Brownfield. Nationally Scarce Status maintained.

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, including the Thames Estuary in particular, and is also found at many inland sites. It seems to have become fairly prevalent on a number of open mosaic habitats on previously developed land, especially where these also contain damp ditches. Its status has been reduced, formally, to LC (Least Concern) - see Appendix 2. It is widespread across the site.

Gorytes laticinctus is associated with rough vegetation, such as brambles, in open situations. Heathland, scrub, coastal dunes, coastal landslips soft-rock cliffs and quarries and occasionally gardens all feature in the records. Adults visit umbelliferous flowers such as wild parsnip, wild carrot, hogweed and water dropwort. The nesting tunnel is some 10 centimetres long and with three of four side tunnels is excavated in soft ground and stocked with froghoppers for the developing grubs to feed upon. It was recorded in the southern part of the Lytag Brownfield. Nationally Scarce Status maintained.

The yellow-faced bee *Hylaeus cornutus* is largely confined to the south-central and south-eastern counties of England. Alongside the River Thames it is found in post-industrial habitats and disused mineral extraction sites where Wild Carrot *Daucus carota* or other white umbellifers grow in quantity. There is a close association with these flowers, especially Wild Carrot, from which the bee

collects pollen to provision its cells. Nest chambers are constructed in hollow plant stems, especially those of bramble, but these may be some distance away from feeding areas so that in most cases a mosaic of grassland and scrub habitat is essential to support this bee. The southern area and the Tilbury Centre land support this species. Nationally Scarce Status no longer applicable.

Lasioglossum pauxillum is a solitary bee that was until recently an extremely local species with post-1970 records known for only around twenty sites, mostly in Kent and Sussex, but also sparingly in South Hampshire and South Essex. The years since the late 1990s, however, have seen the species become much more frequent, and it is much more often encountered – though it is still confined primarily to the south-east. Although the status codes for aculeates have yet to be revised formally, the status code applied to this species will be reduced to LC (Least Concern) in a forthcoming review. We recorded it on the Lytag Brownfield.

The weevil *Melanobaris laticollis* is almost always found at coastal sites and is only rarely noted inland. It is associated with hedge mustard (*Sisymbrium officinale*), but may also use other Cruciferae if this plant is absent; the larvae feed internally, tunnelling through the rootstock and the base of the stem. We recorded it in the land around the Tilbury Centre and to the south of the Lytag Brownfield in 2016, but it is probably also on the Lytag Brownfield itself. Nationally Scarce Status maintained.

The cuckoo bee *Nomada fucata*, like the bird, it replaces a host egg with its own. It is a specific parasite of the mining bee *Andrena flavipes*, which nests in the ground in tunnels which it excavates itself. Once it has located a suitable prey item this is stung to paralyse it and then carried to the nest burrow where an egg is laid upon it. The cuckoo bee enters the host nest and places its own egg on the paralysed but fully alive prey insect; in due course the egg hatches and the cuckoo bee feeds on the fresh food supply. In recent years, *Nomada fucata* has become widespread and common. Although the status codes for aculeates have yet to be revised formally, the status code applied to this species should be reduced to LC (Least Concern) - see Appendix 2.

The water beetle *Noterus clavicornis* affects still water habitats and is more or less expected in freshwater ponds and ditches at sites in Essex. Away from here, on the other hand, it seems more local and may have unknown microclimate requirements. It is not uncommon in the freshwater ditches at Tilbury. Nationally Scarce Status no longer applicable.

Platynaspis luteorubra is one of the two myrmecophilous (associated with ants) ladybirds in Britain and is found only to the south-east of a line between the Severn and the Wash, with the Home Counties and the Thames Corridor supporting the larger part of the British population at present. The larvae live underground in nests of the common black ant *Lasius niger*, where they feed on subterranean aphids. It was found across most of the Tilbury area. Nationally Scarce Status maintained.

The weevil *Rhinocyllus conicus* is known as the Thistle-head Weevil because its larvae feed internally in the flowers of thistles – affecting both *Cirsium* and *Carduus* species in that group. It is widespread, but apparently very localised, in the southern coastal counties of Britain; sparse reports from inland counties are unconfirmed and may be incorrect. It was found throughout the Tilbury area in 2016. Nationally Scarce Status maintained.

The Cuckoo Bee *Sphcodes rubicundus* is a small black and red bee that is a nest parasite (cleptoparasite) on mining bees in the genus *Andrena*, especially *Andrena labialis*. Females are very difficult to distinguish from related species, so that the status and distribution are unclear. However, whilst it appears to be widespread in the Thames Estuary area, it is thinly scattered and numerically rare away from here. It was found in the area just south of the Lytag Brownfield. Nationally Scarce Status no longer applicable.

- 2.2.15 A further 29 species are included in the former Nationally Notable Nb category (see Appendix 2); these are tabulated below (Table 3) along with their primary ecological associations. Five recorded species (*Forficula lesnei*, *Hylaeus signatus*, *Lasioglossum malachurum*, *Metrioptera roeselii* and *Sympetrum sanguineum*) formerly listed in this category are excluded because that designation has been removed.

Table 4. Summary of Nationally Scarce (category Nb) species recorded in 2016

Species	Main ecological association	Where found in 2016			
		Lytag Brownfield	Infrastructure Corridor	Tilbury Centre	The Rest
<i>Andrena bimaculata</i>	ground-nesting species	+			+
<i>Asiraca clavicornis</i>	dry grassland			+	+
<i>Ballus chalybeius</i>	woodland	+			
<i>Bembecia ichneumoniformis</i>	Lotus, Anthyllis and Hippocrepis	+			+
<i>Beris clavipes</i>	moss and detritus around pond margins	+		+	+
<i>Berytinus hirticornis</i>	grassland species	+			+
<i>Calathus ambiguus</i>	sandy sites				+
<i>Cercyon nigriceps</i>	associated with animal dung		+		
<i>Ceutorhynchus constrictus</i>	Alliaria petiolata		+		+
<i>Dasypoda hirtipes</i>	requires pollen of yellow flowering Compositae - especially ragwort	+			+
<i>Demetrias imperialis</i>	Tall wetland vegetation	+		+	+
<i>Euleioptilus carphodactyla</i>	Ploughman's Spikenard	+		+	
<i>Eurygaster maura</i>	calcareous grasslands	+			
<i>Helochares lividus</i>	freshwater ponds and ditches		+		
<i>Hippodamia variegata</i>	ruderal or sandy habitats	+			+
<i>Lasioglossum puncticolle</i>	requires pollen from Wild Carrot	+	+	+	+
<i>Lixus scabricollis</i>	Coastal - on <i>Plantago maritimus</i>				+
<i>Longitarsus ballotae</i>	Black Horehound (<i>Ballota nigra</i>)		+	+	+
<i>Longitarsus dorsalis</i>	Ragworts (<i>Senecio</i> species) -	+		+	+
<i>Megachile leachella</i>	sandy places on the coast	+		+	+
<i>Meligethes rotundicollis</i>	ecology is currently unclear				+
<i>Ocyrops fortunatarum</i>	dry grassy sites				+
<i>Ophonus azureus</i>	coastal clay and inland chalk sites				+
<i>Orthochaetes setiger</i>	polyphagous - the larva making leaf mines				+
<i>Phyllotreta cruciferae</i>	various Brassicaceae	+		+	+

Species	Main ecological association	Where found in 2016			
		Lyttag Brownfield	Infrastructure Corridor	Tilbury Centre	The Rest
<i>Podagrica fuscicornis</i>	mallow (Malva species)				+
<i>Protopion varipes</i>	various clovers	+		+	+
<i>Raglius alboacuminatus</i>	Black Horehound (Ballota nigra)		+		+
<i>Rhantus frontalis</i>	freshwater ponds etc		+		
<i>Sphecodes crassus</i>	Cleptoparasite of halictid bees	+			
<i>Tiphia minuta</i>	a parasite of dung beetle larvae	+			+

2.2.16 The remaining ten species of Nationally Scarce status were included in the former Nationally Notable N (Diptera) category (see Appendix 2). The status of hoverflies was revised by Ball & Morris (2014); others in the list are currently under review and the report is awaiting publication. These are summarised in Table 5.

Table 5. Summary of Nationally Scarce (category N) Diptera recorded in 2016

Species	Main ecological association	Where found in 2016			
		Lyttag Brownfield	Infrastructure	Tilbury Centre	The Rest
<i>Lipara rufitarsis</i>	larvae cause galls on reeds	+		+	+
<i>Merzomyia westermanni</i>	various ragwort species	+			+
<i>Micropeza lateralis</i>	rough herbage/edge habitats – rarely far from water	+			
<i>Pherbellia dorsata</i>	predator of water snails	+			
<i>Pipizella virens</i>	probably associated with root aphids of Umbelliferae	+		+	+
<i>Sciapus laetus</i>	coastal dunes and grassland				+
<i>Trypeta zoë</i>	larva mines leaves of mugwort	+			
<i>Actia lamia</i>	parasite of <i>Epiblema</i> moths			+	
<i>Chorisops nagatomii</i>	saprophagous larvae	+			+
<i>Triglyphus primus</i>	larva feeds on root aphids associated with Umbelliferae				+

Nationally Local Species

2.2.9 A total of 95 of the recorded species are listed formally as Nationally Local (see Appendix 2). These are listed, together with their primary associations, in Table 6, below.

Table 6. List of Nationally Local invertebrates recorded at the site during the present survey

Species	Main ecological association	Where found in 2016			
		Lytag Brownfield	Infrastructure Corridor	Tilbury Centre	The Rest
<i>Agalenatea redii</i>	lower than 1 metre in heather and gorse, and also in rough grassland				+
<i>Agenioideus cinctellus</i>	nests in various habitats including unstable clay undercliff				+
<i>Agrypnus murinus</i>	sandy places - the larvae feeding in grass roots				+
<i>Amara tibialis</i>	open, sandy areas, especially costal dunes			+	+
<i>Ammophila sabulosa</i>	nests in a burrow in sand substrate				+
<i>Anaceratagallia ribauti</i>	on the ground amongst grasses in dry places - common in the south-east		+		+
<i>Andrena barbilabris</i>	dry, sandy sites with bare sand - especially coastal landslips and dunes	+			+
<i>Andrena dorsata</i>	dry, friable ground in which it nests	+			+
<i>Andrena flavipes</i>	nests colonially, usually tunnelling into in a vertical face, in dry sandy sites	+			+
<i>Anthophora bimaculata</i>	excavates nest burrow in relatively hard vertical faces	+		+	+
<i>Aphthona euphorbiae</i>	widely polyphagous				+
<i>Arge pagana</i>	host plant associations are currently unclear	+		+	+
<i>Aspidapion aeneum</i>	larva feeds inside the stems of <i>Malva sylvestris</i>		+	+	+
<i>Atholus duodecimstriatus</i>	saprophagous - in compost, dung etc		+		
<i>Bembidion femoratum</i>	on the ground in damp sites				+
<i>Campiglossa misella</i>	Mugwort	+			
<i>Ceraleptus lividus</i>	dry habitats - dunes, sandy areas, post-industrial and similar	+			
<i>Cerceris ruficornis</i>	nests in bare ground and provisions the larva with weevils				+
<i>Cerceris rybyensis</i>	ground-nesting, in sandy habitats	+		+	+
<i>Ceroxys urticae</i>	decaying litter at the edge of brackish or eutrophic water bodies	+		+	+
<i>Ceutorhynchus turbatus</i>	<i>Cardaria draba</i> and <i>Lepidum campestre</i>				+
<i>Chaetophora spinosa</i>	little is known of the ecology of this species				+
<i>Chorthippus albomarginatus</i>	grasslands - has spread inland from coastal stations	+			+
<i>Chrysolina banksi</i>	Black Horehound (<i>Ballota nigra</i>)	+		+	+
<i>Chrysopa commata</i>	dry grassland	+			
<i>Chrysotoxum festivum</i>	grassland with open scrub - feeding on root aphids	+			+
<i>Chrysotoxum verralli</i>	grassland with associated scrub	+			+
<i>Coccinella undecimpunctata</i>	coastal and heathland habitats		+		+
<i>Coelioxys conoidea</i>	Cleptoparasite of <i>Megachile maritima</i>	+			
<i>Conops quadrifasciatus</i>	Parasitic on bumble bee <i>Bombus lucorum</i>	+			+
<i>Cordylepherus</i>	a common grassland species	+		+	+

Species	Main ecological association	Where found in 2016			
		Lytag Brownfield	Infrastructure Corridor	Tilbury Centre	The Rest
<i>viridis</i>					
<i>Coremacera marginata</i>	dry habitats, especially grasslands	+		+	+
<i>Cryptocephalus fulvus</i>	possibly on sheep's-sorrel, but adults are found on a variety of flowers	+			+
<i>Cylindroiulus caeruleocinctus</i>	calcareous ground - especially if disturbed	+			+
<i>Dasytes aeratus</i>	usually at flowers	+			+
<i>Diplapion confluens</i>	<i>Matricaria</i> & <i>Tripleurospermum</i> , in the rootstock				+
<i>Dolichopus wahlbergi</i>	larvae require damp habitat	+		+	+
<i>Episinus angulatus</i>	prefers marshland or tall grassland		+		
<i>Episyron rufipes</i>	mainly coastal, affecting dunes, landslips etc but also inland				+
<i>Epitrix pubescens</i>	associated with Woody Nightshade		+	+	+
<i>Eupeodes latifasciatus</i>	Damp grassland	+			+
<i>Evagetes crassicornis</i>	cleptoparasite of other pompilids in sandy habitats				+
<i>Formica cunicularia</i>	under stones, dry turf on banks etc on various soil types, but shade-intolerant	+			+
<i>Gorytes quadrifasciatus</i>	a ground nesting species that preys on the hopper <i>Philaenus spumarius</i>				+
<i>Harpalus attenuatus</i>	Phytophagous species of sandy grasslands				+
<i>Harpalus rubripes</i>	mainly on dry sandy soils and arable land				+
<i>Hedychridium roseum</i>	nest parasite of sphecid wasps in sandy soil				+
<i>Helophilus hybridus</i>	larvae feed in wet organic matter, possibly in association with <i>Typha</i>	+		+	
<i>Herina frondescentiae</i>	damp grassland	+		+	
<i>Hoplia philanthus</i>	a saprophagous species	+			
<i>Hygrotus impressopunctatus</i>	freshwater ponds etc		+		
<i>Hylaeus pectoralis</i>	nects in the galls of the fly <i>Lipara lucens</i> on reeds in the dry parts of reed beds	+			
<i>Kalama tricornis</i>	Dry ruderal habitats and sand dunes				+
<i>Kissister minimus</i>	carrion			+	+
<i>Laccophilus minutus</i>	freshwater ponds etc		+		
<i>Lasioglossum punctatissimum</i>	nects in bare ground	+			+
<i>Leiodes rufipennis</i>	possibly detritivorous				+
<i>Mangora acalypha</i>	scrub and bushes	+			
<i>Margarinotus purpurascens</i>	carrion				+
<i>Megachile versicolor</i>	nects in plant stems or other cavities	+			+
<i>Melanargia galathea</i>	tall calcareous grassland	+		+	+
<i>Melitta leporina</i>	nects in sandy ground	+			+
<i>Micropeza corrigiolata</i>	Larva feeds in root nodules of <i>Pisum sativum</i> , <i>Trifolium pratense</i> and <i>Medicago sativa</i>	+			+

Species	Main ecological association	Where found in 2016			
		Lytag Brownfield	Infrastructure Corridor	Tilbury Centre	The Rest
<i>Myrmica sabuleti</i>	nests under stones in calcareous grassland	+			+
<i>Nemotelus notatus</i>	brackish wetlands in coastal areas	+			+
<i>Neoscona adianta</i>	rough grassland and heathland.	+			
<i>Notiophilus substriatus</i>	open, usually dry habitats especially				+
<i>Oedemera lurida</i>	a common grassland species	+		+	+
<i>Onthophagus coenobita</i>	a saprophagous species		+		
<i>Oplodontha viridula</i>	marshes and pond margins	+			+
<i>Othius laeviusculus</i>	amongst mosses and leaf litter etc				+
<i>Otiorhynchus ovatus</i>	amongst the roots of various plants in dry places	+		+	
<i>Oxycera trilineata</i>	larvae in mosses in the edge of water bodies - preferring moving water	+			+
<i>Phasia pusilla</i>	Parasite of plant bugs in Europe but British hosts unknown.			+	
<i>Physocephala rufipes</i>	parasitic fly on various species of bee	+			+
<i>Platystethus alutaceus</i>	ecology unclear				+
<i>Pseudovadonia livida</i>	larvae feed in dead wood of deciduous and coniferous trees				+
<i>Psylliodes chrysocephala</i>	various Cruciferae	+			+
<i>Pterostichus macer</i>	Clay soils (often in the cracks), coastal marshes and also under bark				+
<i>Rhopalus subrufus</i>	St John's Wort (<i>Hypericum perforatum</i>)	+			+
<i>Romualdius angustisetulus</i>	low plants in sandy or chalky places	+			
<i>Sepedon sphegea</i>	predatory on water snails	+			
<i>Sicus ferrugineus</i>	parasitic fly on bumble bees	+		+	+
<i>Sitona humeralis</i>	various legumes	+	+	+	+
<i>Sphecodes monilicornis</i>	Cleptoparasite of halictid mining bees.				+
<i>Sphenella marginata</i>	on various ragwort species	+			+
<i>Stenus cicindeloides</i>	usually in marshy places		+	+	
<i>Tachysphex pompiliformis</i>	ground-nesting predator of grasshopper nymphs	+			+
<i>Taeniapion urticarium</i>	nettles - larvae feed inside stem nodes		+	+	
<i>Tephritis cometa</i>	larvae gall the flowers of creeping thistle			+	
<i>Tephritis formosa</i>	larvae gall the flowers of sow thistle.			+	
<i>Thecophora atra</i>	a parasite of solitary bees	+		+	+
<i>Trixagus carinifrons</i>	leaf litter, moss and under bark		+		
<i>Tychius junceus</i>	<i>Medicago lupulina</i>	+			+
<i>Xanthogramma pedisequum</i>	larvae feed in ants nests	+		+	+

3 ANALYSIS OF RESULTS

3.1 General comments

- 3.1.1 It is clear that, on the basis of number of species, the site supports a significant level of invertebrate biodiversity. The data are now analysed in a number of ways that allow the results to be considered in the wider context of overall ecological significance.

3.2 Species Quality Index

- 3.2.1 In order to provide a “rough and ready” indication of site quality, an Invertebrate Index can be calculated. Using this method, invertebrates recorded are scored according to their national status as follows:

Table 7. Scores allocated to each status category

RDB species	100 points
Notable - Na species	50 points
Notable - Nb species	40 points
Notable - N species	40 points
Local species	20 points
Common species	no score

- 3.2.2 These scores are derived from Ball (1986) – see references in Section 5, below. Adding together the scores in each category provides the overall **Invertebrate Index**.
- 3.2.3 Biodiversity Action Plan species and latterly Section 41 species were designated after the inception of this scoring system in 1986. We have derived their scores from their national status code, where applicable. Species in the list of BAP(R) moths, are afforded 20 points as if they were “Local” species (or a higher score based on status code if such code has been applied).

Table 8: Allocation of invertebrate scores and calculation of Species Quality Index

Category	Score per unit	Valid units	Total score
S.41 species	listed below	0	listed below
BAP(R) moths	20	2	40
RDB species	100	16	1600
Notable - Na species	50	5	250
Notable - Nb species	40	29	1160
Notable - N species	40	10	400
Local species	20	95	1900
Common species	0	632	0
All species	-	789	5350

- 3.2.4 Inevitably, raised recording effort at a site will increase the number of species recorded and the Invertebrate Index alone is therefore of limited value unless all the sites in a comparison are thoroughly and equally recorded. In order to calibrate species lists against recording effort in order to provide a repeatable measure of the overall conservation value of a species assemblage, a **Species Quality Index (SQI)** may be calculated through simple division of the Invertebrate Index gained from a site by the number of species recorded at that site. In this way, SQI is effectively the average number of points which each recorded species is worth.

- 3.2.5 The invertebrate Index value is 5350 and this is derived from a total of 789 species. Thus, the SQI value of the site is 6.78. This is a high value. Direct numerical comparison with the SQI value obtained during a survey of the same area in 2008 is not wholly practical, since the status codes of many species recorded in that earlier work have been altered. However, though the formal status may have changed, the species inventory is, within the bounds of expected variation, essentially unaltered; consequently, the Lytag Brownfield retains the same high level of importance as an invertebrate site that was demonstrated in 2008.

3.3 Invertebrate Species-habitats Information System

- 3.3.1 Assessment of the overall conservation value of a species assemblage based on rarity is important, but in itself it imparts little detail about what habitat components or combined assemblages are likely to be important for maintaining the greater part of the recorded value. In addition, some sites may have immensely diverse invertebrate assemblages but few rare species within these; while these might return modest SQI values compared with sites with rare species, they may be of equal, if different, ecological value. It is therefore important to undertake a further assessment that also takes into account the micro and macro habitat associations of all of the common species. We have undertaken this using the Invertebrate Species-habitats Information System (ISIS).
- 3.3.2 ISIS is a tool introduced by Natural England to undertake common standards monitoring. It is intended to monitor the condition of sites based on the invertebrate assemblages present and, with caution, can be used to evaluate their conservation importance.
- 3.3.3 The ISIS assemblage types are defined by lists of characteristic species that are generally found together in nature. Broad assemblage types (BATs) are a comprehensive series of assemblage types that are characterised by more widespread species. Specific assemblage types (SATs) are characterised by stenotopic (ecologically restricted) species of intrinsic nature conservation value.
- 3.3.4 In plain English this means that instead of approaching site assessment from a “questioning” viewpoint (e.g. “How important is habitat x at this site?”), the software instead looks at *all* of the recorded species, including even the most common, then looks up their various habitat requirements (which may be multiple for some species) and provides an output that enables conclusions such as “for this group of species to be here then the following habitat type *must* be present”. In this way, micro-habitats or important habitat interfaces that may otherwise have been overlooked by a surveyor might be identified so that they can be searched for and mapped.
- 3.3.5 The ISIS system also provides a simplistic grading of the condition of such habitats, with the highest category being determined on the basis of “if all of these species are actually here then this particular habitat *must* actually be in an ideal (favourable) condition”.
- 3.3.6 Using all of the 789 recorded invertebrate species in the analysis, ISIS has determined that the primary *Broad* Assemblage Types of terrestrial invertebrates present at the site are those indicated in Table 9, below.
- 3.3.7 Where the invertebrate assemblage recorded indicates that the associated habitat type is in ideal condition this is flagged as “Favourable”; it can be seen that three of the invertebrate assemblage types recorded here are indicated by ISIS to be in such condition.
- 3.3.8 At a more habitat specific level, the dominant *Specific* Assemblage Types identified as present within the species inventory are identified in Table 10, below.

3.3.9 At this more detailed level, five of the invertebrate assemblage types recorded here are indicated by ISIS to be in Favourable condition.

Table 9: Recorded *Broad* Assemblage Types present at the site

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness
F2	grassland & scrub matrix	18	138	-	234
F1	unshaded early successional mosaic	12	199	favourable	159
W2	mineral marsh & open water	5	130	-	60
W3	permanent wet mire	2	193	favourable	29
A1	arboreal canopy	1	194	favourable	18
A2	wood decay	1	253	favourable	17
W1	flowing water	1	130	-	10
F3	shaded field & ground layer	1	143	-	7
M3	saltmarsh, estuary & mud flat	1	243	favourable	7
M2	sandy shore	0	400	favourable	1

Table 10: Recorded *Specific* Assemblage Types present at the site

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F002	rich flower resource	52	favourable	22	
W211	open water on disturbed mineral sediments	5	-	13	130
F006	dung	11	favourable	11	
F112	open short sward	20	favourable	10	199
A215	epiphyte fauna	2	-	10	253
F001	scrub edge	15	favourable	8	
F111	bare sand & chalk	23	favourable	5	199
W314	reedfen and pools	5	-	4	193
W221	litter-rich fluctuating marsh	1	-	3	130
A212	bark & sapwood decay	11	-	2	253
M311	saltmarsh and transitional brackish marsh	2	-	2	243
F003	scrub-heath & moorland	5	-	1	
A211	heartwood decay	1	-	1	253

3.4 Overall ranking of site value

- 3.4.1 Current Guidelines for Ecological Impact Assessment in the United Kingdom (CIEEM, 2016) advise that assessments of impact should be made by reference to value assigned at a relevant geographical scale (e.g. international, national, regional, district) so that the legal and policy consequences of any significant impact can be clearly conveyed and understood.
- 3.4.2 *Colin Plant Associates* put forward provisional invertebrate assessment criteria to CIEEM several years go; these can be found on the CIEEM website. They have been used by invertebrate specialists and at present form the only finite guidelines available for these taxa. They are presented in Table 10, below, which has been modified to accommodate the provisions of the NERC Act of 2006 – in particular the creation of “Species of Principal Importance for Conservation of Biological Diversity in England” (SPICs).
- 3.4.3 Within each of the geographical categorisations, the level of importance in value terms may be further qualified (e.g. by use of the terms Moderate, High or Very High). The application of Moderate, High or Very High significance at each geographical level is based on a wide number of factors and does not sit well with a table of pre-defined rules. Additionally, within a site of particular geographical significance, different component parts may have differing levels of actual significance. The allocation of the level of significance should always be performed by, or subsequently approved by, a qualified entomologist.

Table 10. Provisional criteria for site assessment based on the invertebrate fauna

Significance	Description	Minimum qualifying criteria
International	European important site	Internationally important invertebrate populations present or containing any species protected under European legislation or containing habitats that are threatened or rare at the European level (including, but not exclusively so, habitats listed on the EU <i>Habitats & Species Directive</i>)
National	UK important site	Achieving SSSI invertebrate criteria (NCC, 1989) or supporting sustainable populations of species that are listed as Critically Endangered or supporting sustainable populations of species listed in the <i>European Union Habitats and Species Directive</i> or supporting sustainable populations of species listed in and generally held to fairly belong within Red Data Book category 1 (Endangered) or supporting sustainable populations of any species protected under the UK Wildlife and Countryside Act, as amended or containing important invertebrate habitats that are actively threatened nationally (Great Britain)
Regional (for border sites, both regions must be taken into account)	Site with populations of invertebrates or invertebrate habitats considered scarce, rare or threatened in the region	Habitat that is scarce or threatened in the region, or which is well-represented in the region but is are or absent outside the region, and which has, or is reasonably expected to have, an assemblage of invertebrates that includes a combination of Nationally Rare Red Data book category 3) and Nationally Scarce (former Nationally Notable categories) species amounting to at Least ten such species in total or supporting sustainable populations of at least six “SPICs” (excluding “research only” moths)

Significance	Description	Minimum qualifying criteria
County (for border sites, both counties must be taken into account)	Site with populations of invertebrates or with invertebrate habitats considered scarce, rare or threatened in the county in question	Habitat that is scarce or threatened in the county and either contains or is reasonably expected to contain an assemblage of invertebrates including a combination of Nationally Rare Red Data book category 3) and Nationally Scarce (former Nationally Notable categories) species amounting at least five such species in total provided that these species warrant now that status which was allocated several years earlier. or which has viable populations of at least five species regarded as Regionally Scarce by the county records centres and/or field club or which has viable populations of at least five “SPICs” .
District (e.g., Unitary Authority, City, or Borough)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the administrative District	A rather vague definition of habitats falling below county significance level, but which may be of greater significance than merely Local. They include sites for which Nationally Scarce species in the range from 1 to 4 examples are reasonably expected, but not yet necessarily recorded, sites that have 1 to 4 “SPICs” and sites that have an outstanding assemblage of “Research Only” Section 41 moths.
Local	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the affected and neighbouring Parishes (except Scotland, where the local area may best be defined as being within a radius of 5 kilometres	Habitats or species unique or of some other significance within the local area
Low significance	—	Although almost no area is completely without significance these are the areas with nothing more than expected “background” populations of common species and the occasional Nationally Scarce.

- 3.4.4 On the basis of these assessment criteria, the site undoubtedly qualifies as one of Regional value (Thames Estuary area). This is not a surprising result. Within that geographical frame the level of importance is considered to be *Very High*. Any high magnitude impact will thus be significant at that geographic level.
- 3.4.5 Within the present survey area, this interest is focused on the Lytag Brownfield. However there is a clear indication of multiple habitat requirements on the part of many species, especially solitary bees, and it should be understood, implicitly, that the Lytag Brownfield forms a small part only of the landscape-level habitat continuum that affects the whole of the Tilbury area of the River Thames Estuary.
- 3.4.6 Within the immediate vicinity, the Lytag Brownfield combines with adjoining land to the south and east to form part of a wider habitat mosaic. Within this mosaic there are, without question, some areas of rather low intrinsic invertebrate interest, but this is over-ridden by the contribution made to the whole – particularly through the maintenance of open space.

4 DISCUSSION

- 4.1 The results of the 2016 survey demonstrate that the surveyed area is, overall, of high intrinsic importance to invertebrate ecology. This is not a surprising result, because earlier surveys of this and adjacent areas by various parties have produced similar results and identical conclusions. The Site is a part of the wider area of interest that has become known as the East Thames Corridor, within which there is an outstanding community of invertebrates that is of profound national value.
- 4.2 More detailed comparison with the results of a survey conducted on the Lytag Brownfield nine years ago shows that whilst there are small changes to the actual composition of the species list, the overall inventory is more or less unchanged. This can be stated with some confidence for the following reasons.
- 4.3 First, it is a well-known phenomenon that the same observer visiting the same site, at the same time of day on the same date in two successive years will be more likely than not to obtain two species lists that differ in some regard – they will demonstrate a high degree of overlap, but there will also be a small percentage of both “losses” and “gains”. These artificial changes merely reflect variations in weather, time of day, air temperature and, inevitably, observer-based factors such as eyesight, reaction time with a hand net and others!
- 4.4 Over lengthier time gaps, however, the differences in species list composition may increase as habitats mature or are otherwise altered and at some point the artificial changes will be overtaken by real changes, that are of ecological significance because they reflect a real change in habitat structure. Although there does not appear to be any published work that places a numerical value on the length of time between such comparisons, it is fairly obvious that the interval between the 2007 and 2016 Lytag lists, some nine years apart, provides scope for some habitat changes to have occurred and, therefore, be reflected in the species inventory. It is this aspect of the study that is most significant in the present discussion because, overall, the changes in the invertebrate fauna are minimal.
- 4.5 This is perhaps not so unexpected when the survey area is a mosaic of habitats rather than a single habitat unit. Nevertheless, there is very little difference, and perhaps none of ecological consequence, between the 2008 and 2016 species lists and as a consequence, identical summary conclusions can be drawn from both works.
- 4.6 At a finer grain of analysis, the main area of interest is without question centred upon the Lytag Brownfield LoWS. However, it is also clear that there is significant interaction between here and other land areas, with the most obvious being demonstrated by the fauna of solitary bees that are known to breed further east on the off-site Ash Fields but which are clearly foraging on the Lytag Brownfield.
- 4.7 The whole of the surveyed area forms a single habitat mosaic. Within this mosaic, the various habitat components may differ yet, with the obvious exception of the made areas such as those currently in use as a storage area for cars, still contribute to the overall interest. This is demonstrated by the rather monotonous bramble invaded rank grassland that dominates much of the Tilbury Centre land. Although patches of similar habitat are indeed evident in the northern part of the Lytag Brownfield, none is as that near the Tilbury Centre and although in this micro-habitat zone the fauna may be restricted it nevertheless complements the wider area.
- 4.8 The failure to encounter the Hornet Robber-fly (*Asilus crabroniformis*) should be mentioned, because there appears to be the potential for this species to soon become extinct in south-east England. Despite the presence of suitable habitat conditions and an ISIS output of favourable for dung fauna, strongly suggesting an absence of widespread ivermectin use, no examples of this very rare species were encountered. Current research questions the supposition that this species is a predator of dung beetle larvae, although an association of some kind with herbivore dung is not in question. We examined the dung of horses and discovered that this supports a rich coprophagous

invertebrate fauna; routine treatment of these horses here for intestinal parasites is clearly not undertaken. The dung is, consequently, not a hostile environment for the robber fly. However, whilst we did not find it, we know from other sites where it is consistently present that even stable populations are cyclic and difficult to detect in some years. In consideration of its past records from the area, it should thus be assumed to be still present for impact assessment purposes. .

- 4.9 The infrastructure route land was omitted from the spring and summer survey sessions. A visual assessment of the habitat here suggests that it may not, in isolation, support as rich an invertebrate fauna as the Lytag Brownfield. On the other hand, it is a part of the wider habitat mosaic of which it is considered an important component because it provides physical continuity of open and “green” land through which insects can move. In particular, several of the recorded species have an undoubted dependency upon the conditions offered by the significantly larger area of open grazed grassland and grazing marsh represented here. In that context, this land, while intrinsically much poorer, nevertheless contributes significantly to the overall invertebrate interest of the wider undeveloped area around Tilbury. Examples of important species in this context include, in particular, the Shrill Carder Bee (*Bombus sylvarum*).
- 4.10 The aquatic invertebrate interest of the wider survey area appears to be more limited. Many of the ditches on the Lytag Brownfield dried, at least partially, during the summer of 2016 and so although they contained water the following the autumn the yield of aquatic insects was rather limited.
- 4.11 It is probable that the aquatic invertebrate habitats on the wider site are in the process of becoming degraded through lack of management. Given that there is a known reservoir of noteworthy aquatic insects present in this general area of the East Thames Corridor it is considered desirable to halt this degradation by appropriate positive management.

5 REFERENCES USED IN THE CREATION OF THIS REPORT AND ITS APPENDICES

Author(s)	Year published	Title and publisher
Anon	2014	A review of the Orthoptera (Grasshoppers and crickets) and allied species of Great Britain. Orthoptera, Dictyoptera, Dermaptera, Phasmida. Species Status No.21
Archer, M.	2014.	<i>Archer's status values for solitary wasps and bees.</i>
Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. & Jeffcoate, S.,	2001	<i>The Millennium Atlas of Butterflies in Britain and Ireland.</i> Oxford University Press
Ball, S.G.	1986	<i>Terrestrial and freshwater invertebrates with Red Data Book, Notable or habitat indicator status.</i> Invertebrate Site Register internal report number 66. NCC.
Ball, S.G. & Morris, R. K. A.	2014	A review of the scarce and threatened flies of Great Britain. Part 6: Syrphidae. <i>Species Status 9</i> : 1-130 Joint Nature Conservation Committee, Peterborough.
Bratton, J. H.	1991	<i>British Red Data Books: 3. Invertebrates other than insects.</i> NCC
Brooks, S. J.,	1993	Guidelines for invertebrate site surveys. <i>British Wildlife 4</i> : 283-286.
Drake, C. M., Lott, D.A., Alexander, K. N. A. and Webb, J.	2007	<i>Surveying terrestrial and freshwater invertebrates for conservation evaluation.</i> Natural England Research Report 5.
English Nature	2005	Organising surveys to determine site quality for invertebrates
Falk, S.	1991a	<i>A review of the scarce and threatened bees, wasps and ants of Great Britain (part 1).</i> Research & Survey in Nature Conservation, number 35 . NCC.
Falk, S.	1991b	<i>A review of the scarce and threatened flies of Great Britain (part 1).</i> Research & Survey in Nature Conservation, number 39 . NCC.
Foster, G. N.	2010	<i>A review of the scarce and threatened Coleoptera of Great Britain Part 3: Water beetles of Great Britain.</i> NCC.
Hill, L., Randle, A., Fox, R. & Parsons, M.	2010	<i>Provisional Atlas of the UK's Larger Moths.</i> Butterfly Conservation.
Hyman, P.S. & Parsons, M.S.	1992	<i>A review of the scarce and threatened Coleoptera of Great Britain Part 1.</i> UK Nature Conservation, number 3 . JNCC.

Author(s)	Year published	Title and publisher
Hyman, P.S. & Parsons, M.S.	1994	<i>A review of the scarce and threatened Coleoptera of Great Britain Part 2.</i> UK Nature Conservation, number 12 . JNCC.
Kirby, P.	1992a	<i>A review of the scarce and threatened Hemiptera of Great Britain</i> UK Nature Conservation, number 2 . JNCC.
Kirby, P.,	1992b	<i>Habitat management for invertebrates: a practical handbook.</i> JNCC.
NCC,	1989	<i>Guidelines for the selection of biological SSSIs.</i> Peterborough.
Parsons, M. S.	1993	<i>A review of the scarce and threatened pyralid moths of Great Britain</i> UK Nature Conservation, number 11. JNCC.
Parsons, M. S., Hoare, D, Davis, T & Green, D.	2005	The distribution of the UK Biodiversity Action Plan Priority Moth Species, 1999 – 2004. <i>Atropos</i> , number 25: 5 – 20.
Shirt, D. B. (ed.)	1987	<i>British Red Data Books: 2. Insects.</i> NCC
Usher, M. B.	1986	<i>Wildlife Conservation Evaluation.</i> Chapman & Hall.
UK Biodiversity Group	1999	<i>Tranche 2 action plans. Volume iv - invertebrates.</i> English Nature.

APPENDICES

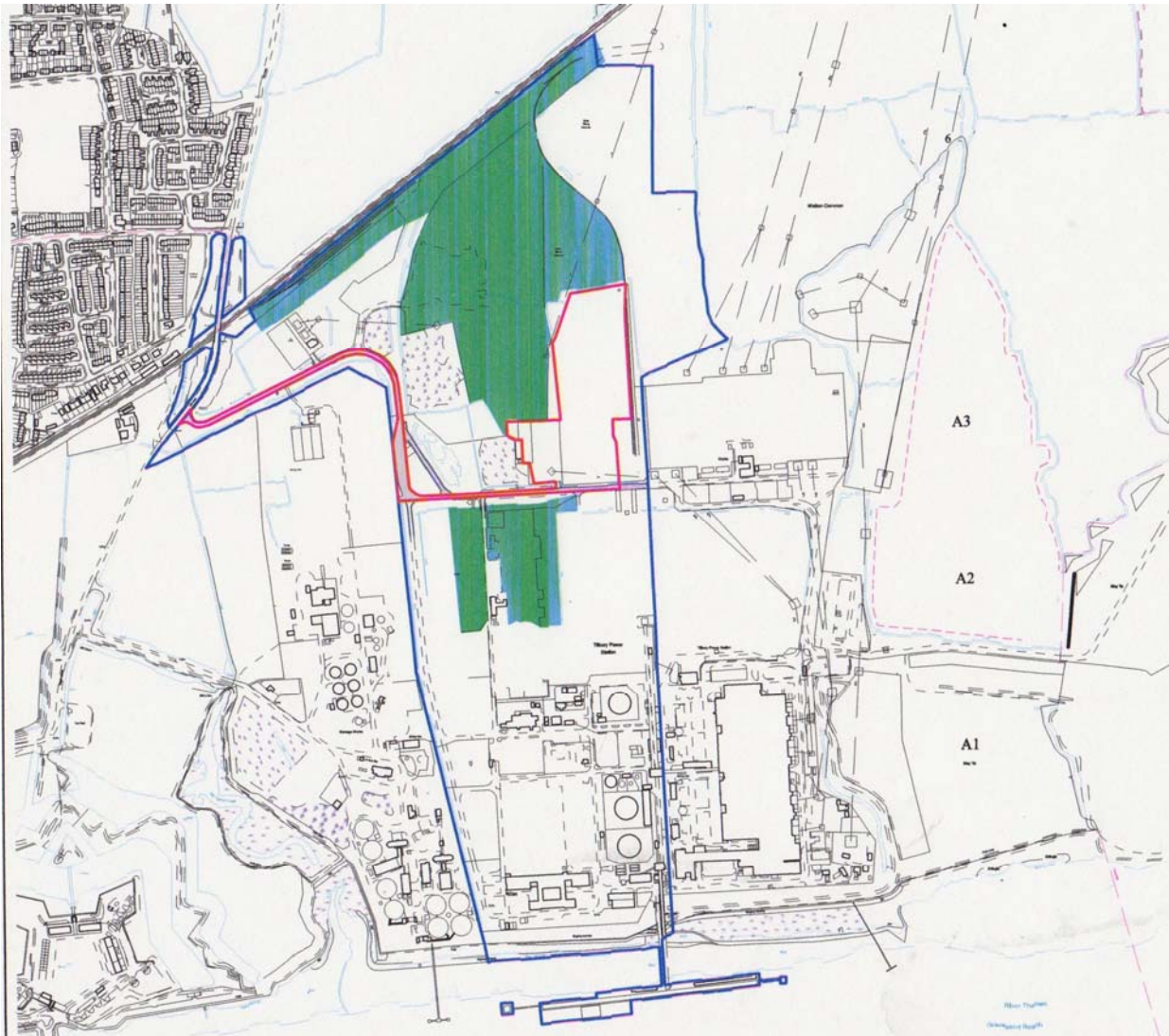
Map 1. The 2016 survey area

The blue cross-hatched compartment is the western infrastructure corridor (the “western section”). In this report, only that section that falls outside the red-shaded area is included in our designation of “western area”. Refer to Map 2 for detail of the red shaded area.



Map 2. Survey area compartments.

The larger green area in the north is the “Lytag Brownfield”; the smaller green area in the south is the land around the Tilbury Centre. Remaining areas within the blue line ownership boundary are those labelled as “The rest” in the species lists.



APPENDIX 1: COMPOSITE LIST OF ALL INVERTEBRATE SPECIES RECORDED

National status codes are explained in Appendix 2.

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
ANNELIDA	LEECHES						
Glossiphoniidae							
<i>Glossiphonia complanata</i>			ubiquitous parasite of molluscs and occasionally oligochaete worms		+		
ARACHNIDA: ARANEA	SPIDERS						
Araneidae							
<i>Agalenatea redii</i>		Local	lower than 1 metre in heather and gorse, and also in rough grassland				+
<i>Mangora acalypha</i>		Local	Gorse and Heather in heathland and woodland in southern Britain	+			
<i>Neoscona adianta</i>		Local	rough grassland and heathland.	+			
Dysderidae							
<i>Dysdera crocata</i>			predatory on woodlice, at night				+
Philodromidae							
<i>Tibellus oblongus</i>			prefers taller herbage, in either wet or dry habitats	+	+		
Pisauridae							
<i>Pisaura mirabilis</i>			more or less ubiquitous, but likes tall vegetation	+	+		
Salticidae							
<i>Ballus chalybeius</i>		NS(Nb)	woodland, especially on oak	+			
<i>Salticus scenicus</i>			usually +s on vertical surfaces such as walls or trees	+			
Tetragnathidae							
<i>Pachygnatha degeeri</i>			low vegetation		+		
Theridiidae							
<i>Episinus angulatus</i>		Local	prefers marshland or tall grassland but also in other habitats		+		
Thomisidae							
<i>Misumena vatia</i>			edge habitat species - between grassland and scrub	+	+		
ARACHNIDA:	HARVESTMEN						

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
OPILODONTES							
Phalangidae							
<i>Phalangium opilio</i>			under stones or other objects		+		+
COLEOPTERA	BEETLES						
Apionidae	Seed weevils						
<i>Apion frumentarium</i>			broad-leaved docks				+
<i>Aspidapion aeneum</i>		Local	larva feeds inside the stems of <i>Malva sylvestris</i>		+	+	+
<i>Aspidapion radiolus</i>			various species of Malvaceae		+	+	+
<i>Betulapion simile</i>			Associated with birch foliage	+			
<i>Catapion seniculus</i>			in the stems of <i>Trifolium</i> and probably <i>Medicago</i>		+		
<i>Ceratapion onopordi</i>			thistles, burdocks, knapweeds and other Compositae	+	+		+
<i>Diplapion confluens</i>		Local	<i>Matricaria</i> & <i>Tripleurospermum</i> , in the rootstock				+
<i>Eutrichapion ervi</i>			<i>Lathyrus pratensis</i> , and also on <i>Vicia</i> vetches	+			+
<i>Holotrichapion aethiops</i>			larva makes galls in the stems of vetches	+		+	+
<i>Holotrichapion pisi</i>			seed heads of <i>Medicago</i>				+
<i>Ischneroapion loti</i>			<i>Lotus corniculatus</i> and <i>L. tenuis</i> , the larvae galling the seeds	+		+	+
<i>Omphalapion hookerorum</i>			Mayweeds, usually in ruderal habitats				+
<i>Oxystoma pomonae</i>			vetches - both <i>Vicia</i> and <i>Lathyrus</i>	+			+
<i>Perapion curtirostre</i>			<i>Rumex</i> , <i>Acetosa</i> and <i>Acetosella</i> species	+			+
<i>Perapion hydrolapathi</i>			dock plants - in the stems				+
<i>Protapion trifolii</i>			various clovers; widespread and common			+	+
<i>Protapion varipes</i>		NS(Nb)	various clovers	+		+	+
<i>Stenopterapion tenue</i>			larva feeds within stems of <i>Medicago</i> species	+			+
<i>Taeniapion urticarium</i>		Local	nettles - larvae		+	+	

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			feed inside stem nodes				
Byrrhidae							
<i>Chaetophora spinosa</i>		Local	little is known of the ecology of this species				+
<i>Simplocaria semistriata</i>			mostly in open habitats				+
Byturidae							
<i>Byturus tomentosus</i>	the raspberry beetle		Brambles and raspberries	+		+	+
Cantharidae	soldier beetles						
<i>Cantharis rustica</i>			lowland grassland - but always in association with scrub	+		+	+
<i>Rhagonycha fulva</i>			tall, rank vegetation in lowland areas	+		+	+
<i>Rhagonycha limbata</i>			dry grasslands			+	+
Carabidae	ground beetles						
<i>Agonum (Anchomenus) dorsalis</i>			grasslands, arable and garden sites - especially on chalky soils				+
<i>Amara aenea</i>			Phytophagous species of gardens and other open, dry and sunny habitats			+	+
<i>Amara familiaris</i>			Phytophagous species of gardens and other open, dry and sunny habitats	+			
<i>Amara tibialis</i>		Local	open, sandy areas, especially coastal dunes			+	+
<i>Bembidion femoratum</i>		Local	on the ground in damp sites				+
<i>Bembidion guttula</i>			found most habitats that are not excessively dry		+		
<i>Bembidion illigeri (quadriguttatum)</i>			open habitats, especially with bare ground		+		
<i>Bembidion lunulatum</i>			coastal, and in damp inland areas		+		+
<i>Bembidion properans</i>			open ground in sunny situations, amongst litter, in tussocks, etc	+			+
<i>Bembidion tetracolum</i>			ubiquitous in sites that are not excessively dry				+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Calathus ambiguus</i>		NS(Nb)	sandy sites, under stones, wood, leaf-roses, etc				+
<i>Calathus cinctus</i>			Has been confused with <i>C. melanocephalus</i> so that its ecology is uncertain in Britain				+
<i>Curtonotus convexuscula</i>			coastal - usually at the strand line				+
<i>Demetrias atricapillus</i>			amongst leaf litter and in grasslands	+	+		+
<i>Demetrias imperialis</i>		NS(Nb)	Tall wetland vegetation, especially reeds	+		+	+
<i>Harpalus (Haploharpalus) attenuatus</i>		Local	Phytophagous species of sandy grasslands				+
<i>Harpalus affinis</i>			a species typically of dry grasslands			+	+
<i>Harpalus rubripes</i>		Local	mainly on dry sandy soils and arable land				+
<i>Harpalus rufipes</i>			ubiquitous			+	+
<i>Microlestes minutulus</i>			known from scattered localities in south-east Britain		+		
<i>Nebria brevicollis</i>			ubiquitous late summer and autumn species		+	+	+
<i>Nebria salina</i>			less productive habitats such as dunes, heaths and uplands				+
<i>Notiophilus substriatus</i>		Local	open, usually dry habitats especially if there is minimal vegetation				+
<i>Ophonus azureus</i>		NS(Nb)	coastal clay and inland chalk sites				+
<i>Paradromius linearis</i>			dry tussocky grassland and coastal dunes	+			+
<i>Philorhizus melanocephalus</i>			Dry grassland and dunes; in the west it is coastal				+
<i>Pterostichus macer</i>		Local	Clay soils (often in the cracks), coastal marshes and also under bark				+
<i>Pterostichus madidus</i>			ubiquitous			+	+
<i>Pterostichus melanarius</i>			ubiquitous			+	+
<i>Syntomus foveatus</i>			prefers sparsely-	+	+		+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			vegetated sandy soils (heaths & coastal dunes)				
<i>Trechus quadristriatus</i>			ubiquitous in most open habitats during autumn		+		
Cerambycidae	longhorn beetles						
<i>Grammoptera ruficornis</i>			larvae in twigs and small branches; adults at flowers	+			
<i>Pseudovadonia (Anoplodera) livida</i>		Local	larvae feed in dead wood of deciduous and coniferous trees				+
Chrysomelidae	leaf beetles						
<i>Altica lythri</i>			Associated with various willow-herbs (Onagraceae)	+	+		+
<i>Altica palustris</i>			widespread on many plant species				+
<i>Aphthona euphorbiae</i>		Local	widely polyphagous				+
<i>Bruchidius imbricornis</i>			On Goat's Rue. Found new to Britain in Essex in 2012 - status unclear	+	+	+	+
<i>Bruchus brachialis</i>			a very recent discovery (arrival?) in Britain	+			+
<i>Bruchus loti</i>			Larvae on seeds of Lotus, Lathyrus & Vicia; adults at various flowers	+			+
<i>Cassida rubiginosa</i>			various thistles, burdock and other Asteraceae	+		+	+
<i>Chaetocnema concinna</i>			Feeds on a variety of both Polygonaceae and Chenopodiaceae				+
<i>Chaetocnema hortensis</i>			feeds on various grasses	+	+	+	+
<i>Chrysolina banksi</i>		Local	Black Horehound (Ballota nigra)	+		+	+
<i>Cryptocephalus fulvus</i>		Local	possibly on sheep's-sorrel, but adults are found on a variety of flowers	+			+
<i>Epitrix pubescens</i>		Local	associated with Woody Nightshade		+	+	+
<i>Lochmaea crataegi</i>			Hawthorn - larvae	+		+	

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			mine the berries. Occasionally on Blackthorn or Rowan				
<i>Longitarsus ballotae</i>		NS(Nb)	Black Horehound (<i>Ballota nigra</i>)		+	+	+
<i>Longitarsus dorsalis</i>		NS(Nb)	Ragworts (<i>Senecio</i> species) - a southern species	+		+	+
<i>Longitarsus flavicornis</i>			ragworts	+	+	+	+
<i>Longitarsus gracilis</i>			on ragwort		+	+	+
<i>Longitarsus pratensis</i>			various plantains, causing 'shot hole' pattern on the leaves as they eat	+			+
<i>Phyllotreta atra</i>			various Brassicaceae	+	+	+	+
<i>Phyllotreta consobrina</i>			various Brassicaceae		+		+
<i>Phyllotreta cruciferae</i>		NS(Nb)	various Brassicaceae - mainly at coastal sites	+		+	+
<i>Phyllotreta nigripes</i>			various Brassicaceae	+		+	+
<i>Phyllotreta undulata</i>			various Brassicaceae			+	+
<i>Podagrica fuscicornis</i>		NS(Nb)	mallow (<i>Malva</i> species)				+
<i>Psylliodes chrysocephala</i>		Local	various Cruciferae	+			+
<i>Sphaeroderma testaceum</i>			mainly on thistles	+			+
Coccinellidae	ladybirds						
<i>Adalia bipunctata</i>	2-spot ladybird		predatory on other insects	+		+	+
<i>Adalia decempunctata</i>	10-spot ladybird		predatory on other insects	+		+	+
<i>Coccinella septempunctata</i>	7-spot ladybird		predatory on other insects	+		+	+
<i>Coccinella undecimpunctata</i>	11-spot ladybird	Local	coastal and heathland habitats, but often wanders from here to other places		+		+
<i>Hippodamia variegata</i>	variegated ladybird	NS(Nb)	ruderal or sandy habitats	+			+
<i>Nephus redtenbacheri</i>	a ladybird		low vegetation in undisturbed habitats				+
<i>Platynaspis luteorubra</i>		NS(Na)	larvae are aphidiphagous in nests of the ant <i>Lasius niger</i>	+			+
<i>Propylea quattuordecimpunctata</i>	14-spot ladybird		predatory on other insects	+		+	+
<i>Psyllobora</i>	22-spot ladybird		feeds on mildews	+	+	+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>vigintiduopunctata</i>							
<i>Rhyzobius litura</i>			predatory on other insects	+	+	+	+
<i>Rhyzobius lophanthae</i>			predatory on scale insects	+			
<i>Subcoccinella vigintiquattuorpunctata</i>	24-spot ladybird		predatory on other insects	+	+	+	+
<i>Tytthaspis sedecimpunctata</i>	16-spot ladybird		predatory on other insects	+	+	+	+
Corylophidae							
<i>Sericoderus brevicornis</i>					+		
Cryptophagidae							
<i>Cryptophagus denticulatus</i>				+			
<i>Ephistemus globulus</i>					+		
Curculionidae	true weevils						
<i>Amalus scortillum</i>			on Polygonum aviculare in waste places, field margins etc		+		
<i>Anthonomus pedicularis</i>			larvae develop in hawthorn berries	+		+	+
<i>Anthonomus rubi</i>			flowers of brambles and raspberries	+		+	+
<i>Barypeithes pellucidus</i>			amongst litter in woodland, occasionally in dry grassland				+
<i>Ceutorhynchus constrictus</i>		NS(Nb)	Alliaria petiolata - in the seed pods		+		+
<i>Ceutorhynchus contractus</i>			various Cruciferae			+	+
<i>Ceutorhynchus obstrictus</i>			various Cruciferae				+
<i>Ceutorhynchus pallidactylus</i>			ecology unclear			+	+
<i>Ceutorhynchus turbatus</i>		Local	Cardaria draba and Lepidum campestre				+
<i>Ceutorhynchus typhae</i>			on seeds of Brassicaceae. Formerly called Ceutorhynchus floralis			+	+
<i>Hypera plantaginis</i>			Lotus species, in grasslands, verges, post-industrial sites and elsewhere	+		+	
<i>Hypera postica</i>			Medicago, Melilotus and Trifolium - on the foliage	+			+
<i>Hypera rumicis</i>			Rumex species (docks) - on the foliage			+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Isochnus sequensi</i>		RDB K	larvae mine the leaves of poplar and willow trees			+	
<i>Lixus scabricollis</i>		NS(Nb)	Coastal - on <i>Plantago maritimus</i> and <i>P. coronopus</i>				+
<i>Lymantor coryli</i>			under the bark of various tree species	+			+
<i>Mecinus pascuorum</i>			larva on ripening seeds of <i>Plantago lanceolata</i>	+			+
<i>Melanobaris laticollis</i>		NS(Na)	associated with hedge mustard usually in coastal sites			+	+
<i>Nedus quadrimaculatus</i>			nettles - feeding on the flowers	+		+	+
<i>Orthochaetes setiger</i>		NS(Nb)	polyphagous - the larva making leaf mines				+
<i>Otiorhynchus ovatus</i>		Local	amongst the roots of various plants in dry places	+		+	
<i>Pachyrhinus lethierryi</i>			Cupressaceous trees - discovered new to Britain in 2006	+		+	
<i>Parathelcus pollinarius</i>			Nettles	+			+
<i>Phyllobius roboretanus</i>			nettle - feeding on the leaves and flowers	+		+	+
<i>Polydrusus cervinus</i>			trees and shrubs - feeding on the leaves	+		+	+
<i>Rhinocyllus conicus</i>		NS(Na)	associated with seed heads of thistles	+		+	+
<i>Rhinoncus pericarpus</i>			knotgrass and docks - mainly in damp places			+	+
<i>Rhinusa antirrhini</i>			feeds in the flowers of toadflax	+			+
<i>Romualdius (Trachyphloeus) angustisetulus</i>		Local	low plants in sandy or chalky places	+			
<i>Sitona cylindricollis</i>			on various Papilioniceae in dry places				+
<i>Sitona hispidulus</i>			larvae feed in the root nodules of clover and other legumes			+	+
<i>Sitona humeralis</i>		Local	various legumes	+	+	+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Sitona lepidus</i>			larvae feed in root nodules of legumes, especially clovers	+		+	+
<i>Sitona lineatus</i>			various legumes	+	+	+	+
<i>Sitona suturalis</i>			Lathyrus and Vicia in ruderal habitats	+		+	+
<i>Smicronyx reichi</i>		R RDB3	on flowers in calcareous grassland	+			+
<i>Trachyploeus angustisetulus</i>			polyphagous on disturbed coastal; habitats				+
<i>Trichosirocalus troglodytes</i>			Plantains, usually in grassy places	+		+	+
<i>Tychius junceus</i>		Local	Medicago lupulina	+			+
<i>Tychius picirostris</i>			various Leguminosae			+	+
Dasytidae	flower beetles						
<i>Dasytes aeratus</i>		Local		+			+
Dryopidae							
<i>Dryops luridus</i>			in the marginal mud zone of freshwater habitats		+		
Dytiscidae	diving beetles						
<i>Agabus bipustulatus</i>			freshwater ponds etc		+		
<i>Colymbetes fuscus</i>			freshwater ponds etc		+		
<i>Dytiscus circumflexus</i>			brackish waters		+		
<i>Hydroporus angustatus</i>			fens and ponds		+		
<i>Hydroporus palustris</i>			freshwater ponds etc		+		
<i>Hygrotus (Coelambus) impressopunctatus</i>		Local	freshwater ponds etc		+		
<i>Hygrotus inaequalis</i>			ponds, bays of lakes, usually in shallow water		+		
<i>Hyphydrus ovatus</i>			freshwater ponds or slow running water, always with vegetation		+		
<i>Laccophilus minutus</i>		Local	freshwater ponds etc		+		
<i>Rhantus frontalis</i>		NS(Nb)	freshwater ponds etc		+		
<i>Rhantus suturalis</i>			a water beetle		+		
Elateridae	click beetles						
<i>Agriotes acuminatus</i>			larvae feed on grass roots	+		+	+
<i>Agriotes lineatus</i>			larvae feed on grass roots, often in damp areas			+	+
<i>Agriotes sputator</i>			larvae feed on				+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			grass roots				
<i>Agrypnus murinus</i>		Local	sandy places - the larvae feeding in grass roots				+
<i>Kibunea minuta</i>			a species of dry grasslands	+			+
Erirhinidae							
<i>Stenopelmus rufinasus</i>					+		
Halipidae							
<i>Halipus lineatocollis</i>			mostly in slow running waters		+		
<i>Halipus ruficollis</i>			ponds ditches and similar static water bodies		+		
Helophoridae							
<i>Helophorus rufipes</i>			a more or less ubiquitous water beetle				+
Histeridae							
<i>Atholus duodecimstriatus</i>		Local	saprophagous - in compost, dung etc		+		
<i>Kissister minimus</i>		Local	carrion			+	+
<i>Paralister (Margarinotus) purpurascens</i>		Local	carrion				+
Hydrophilidae							
<i>Anacaena limbata</i>			mud and decaying vegetation at water's edge		+		
<i>Cercyon impressus</i>			associated with animal dung		+		
<i>Cercyon melanocephalus</i>			in animal dung		+		
<i>Cercyon nigriceps</i>		NS(Nb)			+		
<i>Cercyon quisquilius</i>			associations not known		+		
<i>Cercyon sternalis</i>			fen litter		+		
<i>Cryptopleurum minutum</i>			found in vegetable litter, moss and dung		+		
<i>Helochaeres lividus</i>		NS(Nb)	freshwater ponds and ditches		+		
<i>Megasternum concinnum</i>			organic mud and wet (liquid) decaying vegetation	+			
<i>Sphaeridium bipustulatus</i>			feeds in fresh herbivore dung, often arriving during its production !		+		
<i>Sphaeridium marginatum</i>			in animal dung		+		
Hygrobiidae							
<i>Hygrobia hermanni</i>			silt ponds, detritus ponds etc		+		
Kateretidae							

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Brachypterus pulicarius</i>			flowers of toadflax and garden snapdragons, feeding on the pollen	+			+
<i>Brachypterus glaber</i>			Nettles	+		+	+
<i>Brachypterus urticae</i>			Nettles	+		+	+
Latridiidae							
<i>Cartodere bifasciatus</i>			litter, compost, tussocks etc - more or less ubiquitous	+	+	+	+
<i>Cartodere nodifer</i>			leaf litter, vegetable detritus - more or less ubiquitous	+	+	+	+
<i>Corticaria impressa</i>			amongst plant litter	+	+	+	+
<i>Corticaria longicornis</i>					+	+	+
<i>Corticaria gibbosa</i>			amongst plant litter	+		+	+
Leiodidae							
<i>Leiodes rufipennis</i>		Local					+
<i>Ptomaphagus subvillosus</i>			feeds in carrion and perhaps decaying litter, also in flood refuse			+	+
Malachiidae							
<i>Cordylepherus viridis</i>		Local	a common grassland species	+		+	+
<i>Malachius bipustulatus</i>			grasslands	+		+	+
Nitidulidae	pollen beetles						
<i>Epuraea aestiva</i>			Found at flowers, sap runs and fungi but larval biology unknown	+			
<i>Epuraea melanocephala</i>				+			+
<i>Meligethes aeneus</i>			various flowers	+		+	+
<i>Meligethes carinulatus</i>			Lotus corniculatus in many habitat types	+			
<i>Meligethes flavimanus</i>			various flowers	+		+	
<i>Meligethes rotundicollis</i>		NS(Nb)	Mainly found in the south. The ecology of this beetle is currently unclear				+
<i>Soronia grisea</i>			ecology unknown, found at flowers and sap runs	+			
Noteridae							
<i>Noterus clavicornis</i>		NS(Na)	still waters		+		
Oedemeridae							
<i>Oedemera lurida</i>		Local	a common grassland species	+		+	+
<i>Oedemera nobilis</i>			a common	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			grassland species				
Phalacridae							
<i>Olibrus flavicornis</i>		RDB K	Larva develops in flower of Autumn Hawkbit Leontodon autumnalis	+		+	+
Rhynchitidae							
<i>Tatianaerhynchites aequatus</i>			rosaceous shrubs - the larvae feeding in the fruits	+		+	+
Salpingidae							
<i>Salpinga planirostris</i>				+		+	
Scarabaeidae	dung beetles						
<i>Aphodius fimetarius</i>			larvae in herbivore dung		+		
<i>Aphodius foetens</i>					+		
<i>Aphodius foetidus</i>			larvae in herbivore dung		+		
<i>Aphodius rufipes</i>			larvae in herbivore dung		+		
<i>Aphodius sphacelatus</i>					+		
<i>Hoplia philanthus</i>		Local	a saprophagous species	+			
<i>Onthophagus coenobita</i>		Local	a saprophagous species		+		
<i>Onthophagus joannae</i>			a saprophagous species	+			+
Scraptiidae							
<i>Anaspis (Nassipa) rufilabris</i>			larvae feed in oak and other twigs and branches; adults at blossoms			+	+
<i>Anaspis frontalis</i>			larvae in twigs of oak and other trees; adults at hawthorn blossom	+		+	+
<i>Anaspis maculata</i>			larvae in dead branches and twigs	+		+	+
Staphylinidae	rove beetles						
<i>Acrolocha sulcula</i>			in horse dung, vegetable refuse etc		+		
<i>Aleochara bipustulata</i>			dung, carrion, leaf litter, etc		+		
<i>Alianta incana</i>			a detritus associate		+		
<i>Aloconota gregaria</i>			plant litter - ubiquitous			+	+
<i>Anotylus inustus</i>			leaf litter, carrion, dung and similar		+		+
<i>Anotylus rugosus</i>			a detritus-feeding rove beetle, often in flood refuse etc			+	+
<i>Anotylus sculpturatus</i>			grass tussocks, litter, dung etc		+	+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Astenus immaculatus</i>					+		
<i>Astenus lyonessius</i>			in dry, often early successional, habitats	+	+		
<i>Atheta (Mocyta) fungi</i>			a detritus-feeding rove beetle		+	+	
<i>Atheta (Mocyta) orbata</i>			ecology unknown - probably amongst decaying vegetation		+		
<i>Atheta (Mycetota) laticollis</i>			a detritus-feeding rove beetle		+		
<i>Carpelimus corticinus</i>			ecology obscure		+		
<i>Carpelimus erichsoni</i>					+		
<i>Carpelimus incongruus</i>							+
<i>Chaetida longicornis</i>					+		
<i>Gabrius breviventer</i>			in tussocks, litter etc usually in damp habitats		+		
<i>Gyrophypnus fracticornis</i>			a detritus-feeder		+	+	
<i>Lesteva sicula ssp. heeri</i>			mostly found in damp habitats		+		
<i>Liogluta microptera</i>			ecology unclear		+		
<i>Megalinus (Xantholinus) glabratus</i>			usually amongst leaf litter		+		
<i>Ocypus fortunatarum</i>		NS(Nb)	dry grassy sites				+
<i>Omalium excavatum</i>					+		
<i>Ontholestes tessellatus</i>				+			
<i>Othius laeviusculus</i>		Local	amongst mosses and leaf litter etc				+
<i>Philonthus marginatus</i>			rotting vegetation etc		+	+	
<i>Philonthus spinipes</i>			ecology unclear - first recorded in Britain in 1997		+		
<i>Philonthus splendens</i>					+		
<i>Philonthus tenuicornis</i>			probably detritivorous		+		
<i>Platystethus alutaceus</i>		Local	ecology unclear				+
<i>Platystethus nitens</i>					+		
<i>Quedius cinctus</i>			leaf litter, carrion, dung and similar		+		
<i>Quedius levicollis</i> (= <i>tristis</i>)			leaf litter, carrion, dung and similar		+	+	
<i>Quedius semiobscurus</i>			ecology unclear - usually on drier soils in open situations		+	+	
<i>Quedius simplicifrons</i>			in open environments on dryer soils			+	+
<i>Sepedophilus nigripennis</i>			grass tussocks, leaf litter, mosses and similar places	+	+		
<i>Stenus aceris</i>			predatory in both	+	+	+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			wet and dry habitats				
<i>Stenus brunnipes</i>			leaf litter, flood debris, tussocks etc	+	+	+	+
<i>Stenus cicindeloides</i>		Local	usually in marshy places		+	+	
<i>Stenus impressus</i>			amongst mosses, leaf litter and similar, especially if damp		+	+	
<i>Stenus propinquus</i>						+	+
<i>Stenus pusillus</i>			ecology unclear		+	+	
<i>Stenus subaeneus</i>			marshy places		+		
<i>Tachyporus hypnorum</i>			leaf litter, grass tussocks and similar micro-habitats	+	+	+	+
<i>Tachyporus nitidulus</i>			leaf litter, grass tussocks and similar micro-habitats		+	+	
<i>Tachyporus pallidus</i>			moss, leaf litter, etc		+		
<i>Tachyporus solutus</i>			leaf litter, carrion, dung and similar			+	+
<i>Xantholinus longiventris</i>			leaf litter, grass tussocks and similar micro-habitats - very common			+	+
Tenebrionidae	darkling beetles						
<i>Isomira murina</i>			dry sandy and post-industrial habitat, railway banks, heaths etc	+			+
<i>Lagria hirta</i>			dry sandy habitats and also in many urban brownfield sites	+			+
Throscidae							
<i>Trixagus carinifrons</i>		Local	leaf litter, moss and under bark		+		
CRUSTACEA: AMPHIPODA	SHRIMPS AND ALLIES						
Gammaridae							
<i>Gammarus pulex</i>			most freshwater habitats		+		
CRUSTACEA: ISOPODA	WOODLICE & SLATERS						
Armadillidiidae							
<i>Armadillidium vulgare</i>			under stones etc	+			+
Asellidae							
<i>Asellus aquaticus</i>	freshwater hoglouse		most freshwater habitats		+		
Oniscidae							

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Oniscus asellus</i>			damp, but not wet, habitats everywhere	+		+	+
Philosciidae							
<i>Philoscia muscorum</i>			under stones etc	+	+	+	+
Platyarthridae							
<i>Platyarthrus hoffmanseggii</i>			lives inside the nests of ants, usually <i>Lasius niger</i>	+			+
Porcellionidae							
<i>Porcellio scaber</i>			under stones etc	+		+	+
DERMAPTERA	EARWIGS						
Forficulidae							
<i>Forficula auricularia</i>	common earwig		generalist species	+	+	+	+
<i>Forficula lesnei</i>		NS(Nb)	bushes on coastal grazing marshes	+	+	+	+
DIPTERA	TRUE FLIES						
Agromyzidae	leaf-mining flies						
<i>Agromyza alnibetulae</i>			larva mines the leaves of birch trees	+		+	+
<i>Agromyza dipsaci</i>			larva mines leaves of teasel			+	+
<i>Agromyza nana</i>			Larva mines in Trifolium, Medicago and Melilotus				+
<i>Agromyza pseudoreptans</i>			larvae mine the leaves of stinging nettle	+		+	+
<i>Agromyza reptans</i>			larva makes mines in nettle leaves			+	+
<i>Agromyza vicifoliae</i>			larva makes mines in leaves of vetches	+			+
<i>Amauromyza chenopodivora</i>			larva makes mines in leaves of Chenopodium and Atriplex	+			
<i>Amauromyza labiatarum</i>			mines leaves of Lamium album and other labiates	+		+	+
<i>Calycomyza artemisiae</i>			larva mines leaves of Mugwort	+			+
<i>Chromatomyia horticola</i>			mines the leaves of many plant species	+		+	+
<i>Chromatomyia syngenesiae</i>			larva mines leaves of various plant species	+		+	+
<i>Phytomyza conyzae</i>			mines leaves of Ploughman's Spikenard	+			+
<i>Phytomyza ranunculi</i>			larva mines the leaves of Creeping	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			Buttercup				
<i>Phytomyza tussilaginis</i>			mines leaves of coltsfoot	+		+	
Anthomyiidae							
<i>Pegomya bicolor</i>			larva mines the leaves of docks and sorrels			+	+
<i>Pegomya solennis</i>			larva mines the leaves of dock plants			+	+
Asilidae	robber flies						
<i>Dioctria baumhaueri</i>			predatory - mainly in edge habitats	+		+	+
<i>Dioctria linearis</i>			predatory - mainly in edge habitats	+		+	+
<i>Dioctria rufipes</i>			predatory - mainly in edge habitats	+		+	+
<i>Leptogaster cylindrica</i>			grassland predator	+		+	+
<i>Machimus atricapillus</i>			grassland predator	+		+	+
Bibionidae							
<i>Dilophus febrilis</i>			feeds in the roots of various plants	+		+	+
Calliphoridae	blow flies						
<i>Melanomya nana</i>			larvae parasitise terrestrial woodlice	+			
<i>Pollenia angustigena</i>			larval ecology unclear	+			
<i>Pollenia rudis</i>			larvae are internal parasites of earthworms	+			
Cecidomyiidae	gall midges						
<i>Dasineura urticae</i>			forms stem galls on nettles	+		+	+
<i>Iteomyia caprea</i>			larva causes gall in willow leaves	+			+
Chironomidae							
<i>unidentified larval stages</i>					+		
Chloropidae							
<i>Lipara lucens</i>			forms a cigar-shaped gall on reed stems	+		+	+
<i>Lipara rufitarsis</i>		NS(N)	larvae cause galls on reeds	+		+	+
Conopidae							
<i>Conops quadrifasciatus</i>		Local	Parasitic on bumble bee <i>Bombus lucorum</i> - wherever the host bee is found	+			+
<i>Physocephala rufipes</i>		Local	parasitic fly on various species of bee	+			+
<i>Sicus ferrugineus</i>		Local	parasitic fly on bumble bees	+		+	+
<i>Thecophora atra</i>		Local	a parasite of	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			solitary bees				
Dixiidae							
<i>Dixella attica</i>					+		
Dolichopodidae	dance flies						
<i>Chrysotus gramineus</i>			very common predatory grassland species	+		+	+
<i>Dolichopus festivus</i>			larvae require damp habitat	+		+	+
<i>Dolichopus griseipennis</i>			damp grassland and scrub	+		+	+
<i>Dolichopus nubilus</i>			most abundant in saltmarsh	+			+
<i>Dolichopus pennatus</i>			larvae require damp places	+		+	+
<i>Dolichopus trivialis</i>			larvae require damp habitat	+		+	+
<i>Dolichopus unguatus</i>			larvae require damp habitat	+		+	+
<i>Dolichopus wahlbergi</i>		Local	larvae require damp habitat	+		+	+
<i>Poecilobothrus nobilitatus</i>			aquatic larvae	+		+	+
<i>Rhaphium appendiculatum</i>			associated with wet habitats	+		+	+
<i>Sciapus laetus</i>		NS(N)	coastal dunes and grassland				+
<i>Sciapus platypterus</i>			predatory in woodland and scrub, the larvae under bark				+
Empididae	assassin flies						
<i>Empis (Kritempis) livida</i>			predatory on other flies	+		+	+
<i>Empis (Pachymeria) femorata</i>			predatory on other flies			+	+
<i>Empis (Pachymeria) tessellata</i>			predatory on other flies	+		+	+
Fanniidae	lesser house flies						
<i>Fannia armata</i>			decaying organic matter				+
<i>Fannia canicularis</i>			larvae feed in animal dung				+
<i>Fannia hamata</i>			ecology unclear				+
<i>Fannia serena</i>			decaying organic matter				+
<i>Fannia similis</i>			decaying organic matter				+
Hybotidae							
<i>Platypalpus annulipes</i>			predatory species usually amongst scrub			+	
<i>Platypalpus pallidiventris</i>			predatory in trees and bushes			+	
Lauxaniidae							

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Minettia fasciata</i> (= <i>rivosa sensu Collin</i>)			saprophagous in shady, usually damp, places			+	+
Limoniidae	crane flies (part)						
<i>Rhipidia (Limonia) duplicata</i>			various habitats, including woodland and grassland, the larvae feeding in animal dung			+	+
<i>Rhipidia (Limonia) maculata</i>			larvae feed in herbivore dung			+	
Lonchopteridae							
<i>Lonchoptera bifurcata</i>			a more or less ubiquitous species in edge habitats	+		+	+
<i>Lonchoptera lutea</i>			ubiquitous species in edge habitats, saprophagous larvae	+		+	+
Micropezidae							
<i>Micropeza corrigiolata</i>		Local	Larva feeds in root nodules of <i>Pisum sativum</i> , <i>Trifolium pratense</i> and <i>Medicago sativa</i>	+			+
<i>Micropeza lateralis</i>		NS(N)	rough herbage/edge habitats - rarely far from water	+			
Opomyzidae							
<i>Geomyza balachowskyi</i>			larvae feed inside the stems of grasses	+			+
<i>Geomyza tripunctata</i>			larvae feed inside the stems of grasses	+		+	+
<i>Opomyza florum</i>			larvae feed internally inside grass stems	+		+	+
<i>Opomyza germinationis</i>			larvae feed inside the stems of grasses	+		+	+
<i>Opomyza petrei</i>			larvae feed inside the stems of grasses	+		+	+
Pallopteridae							
<i>Palloptera saltuum</i>			predatory on the larvae of stem mining insects	+			+
<i>Palloptera umbellatarum</i>			larvae feed inside stems of false oat-grass	+			+
<i>Palloptera ustulata</i>			larva develops under bark	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
Ptychopteridae							
<i>Ptychoptera albimana</i>			damp habitats, including seepages and rot holes	+		+	+
<i>Ptychoptera contaminata</i>			Wetland habitats	+		+	+
Rhagionidae	snipe flies						
<i>Chrysopilus asiliformis</i>			damp habitats	+		+	+
<i>Chrysopilus cristatus</i>			damp habitats	+		+	+
<i>Rhagio lineola</i>			woodland and scrub - especially at the edges	+		+	+
<i>Rhagio scolopaceus</i>			woodland edge and other wooded areas - in clearings and at edges	+			+
Scathophagidae	dung flies						
<i>Norellisoma spinimana</i>			larvae mine the stems of docks				+
<i>Scathophaga litorea</i>			animal dung				
<i>Scathophaga lutaria</i>			animal dung				
<i>Scathophaga stercoraria</i>			animal dung				
Sciomyzidae	snail-killing flies						
<i>Coremacera marginata</i>		Local	dry habitats, especially grasslands	+		+	+
<i>Ilione albiseta</i>			predatory on water snails in non-acidic wetland habitats	+		+	
<i>Limnia unguicornis</i>			predatory on water snails	+			
<i>Pherbellia dorsata</i>		NS(N)	predator of water snails	+			
<i>Sepedon spegea</i>		Local	predatory on water snails	+			
<i>Tetanocera hyalipennis</i>			sallow and alder carr, preying on aquatic snails	+			
Sepsidae	lesser dung flies						
<i>Nemopoda nitidula</i>			shade-loving species, larvae in dung and carrion		+		
<i>Sepsis cynipsea</i>			Larvae feed in animal dung		+		
<i>Sepsis fulgens</i>			the most ubiquitous member of this group, feeding in mammal dung		+		
<i>Sepsis violacea</i>			animal dung		+		
Stratiomyidae	soldierflies						
<i>Beris clavipes</i>		NS(Nb)	larvae feed in moss and detritus around pond margins	+		+	+
<i>Beris geniculata</i>			woodland edge	+		+	

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			habitats, the larvae are saprophytic				
<i>Beris vallata</i>			saprophagous larvae	+		+	+
<i>Chloromyia formosa</i>			ubiquitous	+		+	+
<i>Chorisops nagatomii</i>		NS (N)	saprophagous larvae	+			+
<i>Chorisops tibialis</i>			saprophagous larvae	+		+	+
<i>Microchrysa cyaneiventris</i>			saprophagous larvae	+		+	+
<i>Microchrysa polita</i>			larvae require decomposing organic matter	+		+	+
<i>Nemotelus notatus</i>		Local	brackish wetlands in coastal areas	+			+
<i>Oplodontha viridula</i>		Local	marshes and pond margins	+			+
<i>Oxycera trilineata</i>		Local	larvae in mosses in the edge of water bodies - preferring moving water	+			+
<i>Pachygaster atra</i>			woodland edge & scrubland species - larvae under dead bark of trees	+		+	+
<i>Pachygaster leachii</i>			woodland edge & scrubland species - larvae under dead bark of trees	+		+	+
<i>Sargus bipunctatus</i>			associated with the scrub/grassland interface	+		+	+
Syrphidae	hoverflies						
<i>Anasimyia contracta</i>			emergent vegetation, perhaps requiring Typha	+			
<i>Anasimyia lineata</i>			emergent vegetation, perhaps requiring Typha or Glyceria				
<i>Cheilosia bergenstammi</i>			larvae feed in the stems and roots of ragwort on dry chalky or sandy sites or in ruderal areas	+			+
<i>Cheilosia pagana</i>			larvae are thought to feed in the roots of Anthriscus sylvestris	+		+	+
<i>Cheilosia proxima</i>			larvae feed in the roots of Cirsium species of thistle,	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			especially <i>Cirsium palustre</i>				
<i>Chrysotoxum bicinctum</i>			grassland species - associated with ants' nests	+		+	+
<i>Chrysotoxum festivum</i>		Local	grassland with open scrub - the larvae feeding on root aphids	+			+
<i>Chrysotoxum verralli</i>		Local	grassland with associated scrub	+			+
<i>Epistrophe eligans</i>			mainly at edge habitats	+		+	+
<i>Episyrphus balteatus</i>			ubiquitous species, partly immigrant, and a predator of aphids	+		+	+
<i>Eristalinus sepulchralis</i>			breeds in seepages, run-off from dung heaps, eutrophic ditches etc	+			+
<i>Eristalis arbustorum</i>			Larvae require damp habitats but adults are more or less ubiquitous	+		+	+
<i>Eristalis intricarius</i>			larvae feed in wet organic matter, especially in margins of water bodies	+			+
<i>Eristalis lineata</i> (= <i>horticola</i>)			damp habitats, especially margins of ponds and woodland streams			+	+
<i>Eristalis pertinax</i>			Larvae require damp habitats but adults are more or less ubiquitous	+		+	+
<i>Eristalis tenax</i>			Larvae require damp habitats but adults are more or less ubiquitous	+		+	+
<i>Eupeodes corollae</i>			Grassland	+		+	+
<i>Eupeodes latifasciatus</i>		Local	Damp grassland	+			+
<i>Eupeodes luniger</i>			Grassland	+		+	+
<i>Helophilus hybridus</i>		Local	larvae feed in wet organic matter, possibly in association with <i>Typha</i>	+		+	
<i>Helophilus pendulus</i>			Larvae require damp habitats but adults are more or less ubiquitous	+		+	+
<i>Helophilus trivittatus</i>			open wetlands,	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			river margins and saltmarshes				
<i>Melanostoma mellinum</i>			Grassland	+		+	+
<i>Melanostoma scalare</i>			Grassland	+		+	+
<i>Myathropa florea</i>			larvae are semi-aquatic	+		+	+
<i>Neoascia podagrica</i>			edge-habitat species	+		+	+
<i>Neoascia tenur</i>			reeds and similar emergent vegetation	+		+	+
<i>Paragus haemorrhous</i>			bare or sparsely vegetated, dry sandy ground	+			+
<i>Pipizella viduata</i>			Larvae feed on root aphids on Umbelliferae	+		+	+
<i>Pipizella virens</i>		NS(N)	probably associated with root aphids of Umbelliferae	+		+	+
<i>Platycheirus albimanus</i>			ubiquitous - larvae prey on aphids	+		+	+
<i>Platycheirus clypeatus</i>			Damp habitats	+		+	+
<i>Platycheirus fulviventris</i>			larvae feed on the aphid Hyalopterus pruni on monocotyledonous plants in wetlands	+		+	+
<i>Platycheirus granditarsus</i>			wetland sites	+		+	+
<i>Platycheirus peltatus</i>			aphid predator	+		+	+
<i>Platycheirus scutatus</i>			an edge-habitat species	+		+	+
<i>Sphaerophoria rueppellii</i>			coastal grasslands	+		+	+
<i>Sphaerophoria scripta</i>			Grassland - larvae prey on aphids	+		+	+
<i>Syritta pipiens</i>			larvae in decaying vegetation; adults at flowers	+		+	+
<i>Syrphus vitripennis</i>			larvae are aphid predators on trees and bushes	+		+	+
<i>Triglyphus primus</i>		NS (N)	larva feeds on root aphids associated with Umbelliferae				+
<i>Tropidia scita</i>			reed beds in wetland areas			+	+
<i>Volucella bombylans</i>			inquiline in nests of bumble bees	+			+
<i>Volucella pellucens</i>			inquiline in nests of social wasps/hornet	+		+	+
<i>Volucella zonaria</i>		NS(N)	inquiline in nests of social	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			wasps/hornet				
<i>Xanthogramma pedisequum</i>		Local	larvae feed in ants nests	+		+	+
<i>Xylota segnis</i>			Damp, dead wood				+
Tabanidae	horseflies						
<i>Haematopota pluvialis</i>			damp habitats - adult females are blood sucking horseflies	+		+	+
<i>Tabanus autumnalis</i>			damp habitats - adult females are blood sucking horseflies	+		+	+
Tachinidae	parasitic flies						
<i>Actia lamia</i>		NS (N)	parasite of Epiblema moths (Tortricidae)			+	
<i>Cistogaster globosa</i>		E RDB1	parasite of the shield bug Aelia acuminata	+			
<i>Eriothrix rufomaculata</i>			larva parasitises moth larvae	+		+	+
<i>Gymnosoma nitens</i>		E RDB1	Parasite of plant bugs - ruderal sites and chalk downland	+			
<i>Gymnosoma rotundatum</i>		pRDB 3	larvae are internal parasites of shield bugs	+			
<i>Lydella grisescens</i>			Parasite of moth caterpillars	+		+	
<i>Lypha dubia</i>			larva parasitises tree-feeding caterpillars of moths			+	
<i>Macquartia grisea</i>			parasitic in the larvae of chrysomelid leaf beetles	+			
<i>Nowickia ferox</i>			parasitic on larvae of noctuid moths			+	
<i>Pales pavida</i>			Parasite of moth caterpillars	+			
<i>Phasia pusilla</i>		Local	Parasite of plant bugs in Europe but British hosts unknown.			+	
<i>Phryxe vulgaris</i>			larvae are parasites of moth caterpillars	+		+	+
<i>Siphona geniculata</i>			parasitoid of crane flies			+	
<i>Sturmia bella</i>			parasite of Small Tortoiseshell and other nymphalid	+			

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			butterflies				
Tephritidae	picture-winged flies						
<i>Campiglossa (Paroxyna) misella</i>		Local	Mugwort	+			
<i>Euleia heraclei</i>			larvae feed in the seed heads of white-flowering Umbelliferae	+		+	+
<i>Merzomyia westermanni</i>		NS(N)	various ragwort species	+			+
<i>Sphenella marginata</i>		Local	on various ragwort species, in late summer and autumn	+			+
<i>Tephritis cometa</i>		Local	larvae gall the flowers of creeping thistle			+	
<i>Tephritis divisa</i>		RDB K	a recent arrival (2004) - larvae develop in flowerheads of <i>Picris echioides</i>			+	
<i>Tephritis formosa</i>		Local	larvae gall the flowers of sow thistle.			+	
<i>Tephritis matricariae</i>		RDBK	larva galls flowers of mayweeds and allies	+			
<i>Tephritis neesi</i>			larvae gall the flowers of <i>Leucanthemum</i> species	+		+	
<i>Terellia (Ceratocera) tussilaginis</i>			larvae feed in the seed heads of burdock plants			+	
<i>Terellia ruficauda</i>			larvae gall the flowers of thistles			+	
<i>Trypeta zoë</i>		NS(N)	larva mines leaves of mugwort	+			
<i>Urophora cardui</i>			larvae gall the flowers of thistles	+		+	+
<i>Xyphosia miliaria</i>			larvae gall the flowers of thistles - ubiquitous			+	+
Therevidae							
<i>Thereva nobilitata</i>			biology uncertain	+			+
Tipulidae	crane flies (part)						
<i>Nephrotoma appendiculata</i>			open grassland	+			+
<i>Nephrotoma flavescens</i>			grassland and other usually open habitats	+			
<i>Tipula oleracea</i>			ubiquitous, larvae feeding on roots of	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			grasses				
<i>Tipula paludosa</i>			ubiquitous, larvae feeding on roots of grasses	+		+	+
Ulidiidae							
<i>Ceroxys urticae</i>		Local	decaying litter at the edge of brackish or eutrophic water bodies	+		+	+
<i>Dorycera graminum</i>		S 41	ecology unclear. Also listed in Red Data Book category 2	+			+
<i>Herina frondescens</i>		Local	damp grassland	+		+	
<i>Otites guttata</i>				+			+
EPHEMEROPTERA	MAYFLIES						
Baetidae							
<i>Cloeon dipterum</i>			Running and still water - on submerged plants		+		
HETEROPTERA	TRUE BUGS						
Acanthosomatidae							
<i>Cyphostethus tristriatus</i>			formerly confined to juniper but now on Cupressaceae and extending range	+			
Anthocoridae							
<i>Anthocoris nemoralis</i>			trees and shrubs	+		+	+
<i>Anthocoris nemorum</i>			low vegetation	+		+	+
<i>Buchananiella continua</i>					+		
<i>Cardiastethus fasciventris</i>			Gorse and sometimes other plants	+			
<i>Orius niger</i>			low vegetation on a variety of dry sites		+		+
<i>Orius vicina</i>			predatory amongst low growing vegetation	+			+
Berytinidae							
<i>Berytinus hirticornis</i>		NS(Nb)	grassland species, probably a predator of aphids	+			+
<i>Berytinus minor</i>			clovers and trefoils, especially if slightly damp	+			
<i>Berytinus signoreti</i>			associated with grassland on chalky or sandy soils	+			
Coreidae							
<i>Ceraleptus lividus</i>		Local	dry habitats - dunes, sandy areas,	+			

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			post-industrial and similar				
<i>Coreus marginatus</i>			Develops on a variety of Polygonaceae in open habitats	+		+	+
<i>Coriomeris denticulatus</i>			various legumes	+			+
<i>Gonocerus acuteangulatus</i>		E RDB1	Now widespread on many plants, such as hawthorns, Buckthorn, Yew and others	+		+	+
<i>Syromastus rhombeus</i>			feeds on Polygonum species in ruderal and other open sites	+		+	+
Corixidae	water boatmen						
<i>Corixa panzeri</i>			freshwater ponds etc		+		
<i>Corixa punctata</i>			freshwater ponds etc		+		
<i>Cymatia coleoptrata</i>			still and slow-flowing freshwater bodies		+		
<i>Hesperocorixa linnaei</i>			freshwater ponds etc		+		
<i>Hesperocorixa sahlbergi</i>			freshwater ponds etc with very dense submerged vegetation		+		
<i>Sigara dorsalis</i>			most still and slow-flowing waters that are not too eutrophic		+		
<i>Sigara lateralis</i>			freshwater ponds etc thriving in those polluted by animal dung		+		
<i>Sigara selecta</i>			saline and brackish still waters in coastal areas		+		
Gerridae	pond skaters						
<i>Gerris lateralis</i>			predatory on the surface film of still and slow waters		+		
Hydrometridae							
<i>Hydrometra stagnorum</i>	Water Measurer		On the surface film of still or slow-flowing waters	+	+		
Lygaeidae							
<i>Chilacis typhae</i>			Reed-mace (Typha) - in the flower heads		+	+	+
<i>Drymus sylvaticus</i>			amongst vegetation litter,	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			moss etc in many habitats				
<i>Heterogaster urticae</i>			Nettles	+	+	+	+
<i>Ischnodemus sabuleti</i>			associated with reeds (Phragmites)	+		+	+
<i>Kleidocerys resedae</i>			trees and shrubs generally	+		+	+
<i>Megalonotus chiragra</i>			dry habitats, post-industrial, sand dunes, dry grassland etc	+			+
<i>Nysius huttoni</i>			Recent arrival in Britain	+	+		+
<i>Peritrechus geniculatus</i>			ground bug of dry open soils, mainly southern	+			+
<i>Raglius alboacuminatus</i>		NS(Nb)	Black Horehound (Ballota nigra)		+		+
<i>Scolopostethus affinis</i>			usually on nettles		+	+	+
<i>Scolopostethus thomsoni</i>			usually on nettles	+		+	+
Miridae							
<i>Adelphocoris lineolatus</i>			leguminous plants	+			+
<i>Chlamydatus evanescens</i>		R RDB3	on Sedum plants, mostly on post-industrial sites	+			
<i>Chlamydatus pullatus</i>							+
<i>Dicyphus globulifer</i>			campion plants	+		+	
<i>Liocoris tripustulatus</i>			stinging nettle	+		+	+
<i>Lygus maritimus</i>			Chenopodiaceae - in coastal sites and inland ruderal sites		+		+
<i>Lygus pratensis</i>		R RDB3	was an ancient woodland species but has now spread to other habitats	+		+	+
<i>Lygus rugulipennis</i>			polyphagous - especially common in ruderal communities	+		+	+
<i>Megaloceraea recticornis</i>			grass feeding plant bug of a wide range of habitats	+			
<i>Miris striatus</i>			associated with oak	+		+	+
<i>Notostira elongata</i>			grasslands	+		+	+
<i>Phytocoris varipes</i>			dry, open grasslands are preferred. Partly vegetarian and partly a predator	+		+	+
<i>Pinalitus cervinus</i>			associated with trees - especially lime but also hazel, ash and ivy	+		+	+
<i>Plagiognathus</i>			polyphagous, but	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>arbustorum</i>			usually associated with stinging nettles				
<i>Stenodema calcarata</i>			grasslands	+	+	+	+
<i>Stenodema laevigata</i>			grasslands	+		+	+
<i>Stenotus binotatus</i>			grasslands	+		+	+
Nabidae	assassin bugs						
<i>Himacerus apterus</i>			a tree-dwelling species	+		+	
<i>Himacerus mirmicoides</i>			ground dwelling predator of dry, open areas	+	+		
<i>Nabis ferus</i>			dry sites, especially ruderal grassland		+		
<i>Nabis limbatus</i>			marshy places	+			
<i>Nabis rugosus</i>			common predator amongst long grass and herbs	+			
Naucoridae	saucer bugs						
<i>Ilyocoris cimicoides</i>			Aquatic species - weedy ponds, canals etc		+		
Notonectidae	water boatmen						
<i>Notonecta glauca</i>			Aquatic species - weedy ponds, canals etc		+		
Pentatomidae	shield bugs						
<i>Aelia acuminata</i>			Thistles	+			+
<i>Dolycoris baccarum</i>			polyphagous species of dry habitats	+		+	+
<i>Eurydema oleracea</i>			feeds on cruciferous plants	+		+	+
<i>Eysarcoris venutissimus</i>			probably polyphagous	+		+	+
<i>Neottiglossa pusilla</i>			medium to tall grasses in open, sunny and sometimes damp places	+		+	+
<i>Palomena prasina</i>			trees and shrubs	+		+	+
<i>Podops inuncta</i>			dry places, especially ruderal sites. A markedly southern species				+
Piesmatidae							
<i>Parapiesma quadratum</i>			Overseas a pest of Sugar Beet, but not so in GB, where it is confined to the coast				+
Pleidae							
<i>Plea minutissima</i>			freshwater species - weedy ponds,		+		

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			canals etc				
Rhopalidae							
<i>Myrmis miriformis</i>			grasslands - a grass feeding species	+		+	
<i>Rhopalus subrufus</i>		Local	St John's Wort (Hypericum perforatum)	+			+
Saldidae	shore bugs						
<i>Chartoscirta cincta</i>			reeds and other tall vegetation at the water's edge	+	+	+	
<i>Saldula saltatoria</i>			predatory species of most damp habitats	+	+		
Scutelleridae							
<i>Eurygaster maura</i>		NS(Nb)	calcareous grasslands	+			
<i>Eurygaster testudinaria</i>			rushes, sedges and other tall vegetation in damp places	+			
Tingidae							
<i>Acalyptus parvula</i>			amongst moss in dry situations	+			+
<i>Kalama tricornis</i>		Local	Dry ruderal habitats and sand dunes				+
<i>Physatocheila dumetorum</i>			hawthorn	+		+	+
<i>Tingis ampliata</i>			creeping thistle	+		+	+
HOMOPTERA: AUCHENORHYNCHA	PLANT HOPPERS						
Aphrophoridae							
<i>Aphrophora alni</i>			larvae feed under froth on a wide range of trees and shrubs	+		+	+
<i>Neophilaenus campestris</i>			dry, open grassland	+		+	+
<i>Neophilaenus lineatus</i>			grasslands	+		+	
<i>Philaenus spumarius</i>			larvae feed under froth on a wide range of herbaceous plants	+		+	+
Cicadellidae							
<i>Anaceratagallia ribauti</i>		Local	on the ground amongst grasses in dry places - common in the south-east		+		+
<i>Anoscopus albifrons</i>			grasses, at or near ground level				+
<i>Aphrodes makarovi</i>			on nettles, thistles and other plants in grasslands	+	+	+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Arthaleus pascuellus</i>			grasses	+			
<i>Balclutha punctata</i>			widespread on grasses etc - overwinters in conifer trees	+			
<i>Doratula stylata</i>			open grassland, sandy or calcareous	+			
<i>Edwardsiana crataegi</i>			associated with hawthorns	+		+	
<i>Empoasca decipiens</i>			Usually on nettles	+		+	
<i>Eupteryx melissae</i>			polyphagous - but preferring various labiates		+		
<i>Eupteryx notata</i>			Thyme, Self-heal and other plants in chak grassland	+			
<i>Eupteryx urticae</i>			Usually on nettles	+		+	
<i>Euscelis incisus</i>			grasses			+	+
<i>Liguropia juniperi</i>			ornamental cypress trees - first noted in Britain in 2008	+			
<i>Macustus griseus</i>			grasses	+			
<i>Megophthalmus scanicus</i>			associated with Fabaceae (clovers, trefoils, medics etc) in grassland	+			
<i>Mocydia crocea</i>			grasses	+	+	+	+
<i>Mocydopsis attenuata</i>			grasses on base-rich substrates - chalk, post-industrial etc	+			+
<i>Psammotettix confinis</i>			grasses, including on post-industrial sites	+	+		
<i>Zyginidia scutellaris</i>			grasses	+	+		
Cixiidae							
<i>Cixius nervosus</i>			most frequent in woodlands	+		+	
<i>Tachycixius pilosus</i>			grasses	+		+	
Delphacidae							
<i>Asiraca clavicornis</i>		NS(Nb)	dry grassland - residing amongst the bases of plants by the soil			+	+
<i>Eurysa lineata</i>			associated with grasses in open, well-drained sites	+			+
<i>Hyledelphax elegantulus</i>			open, dry grassland with Deschampsia cespitosa in the sward	+			
<i>Javesella dubia</i>			grasses, especially in woodland	+		+	

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Javesella pellucida</i>			grasses in a range of habitats	+		+	+
<i>Ribautodelphax imitans</i>		BAP	ecology unknown	+			
<i>Stenocranus minutus</i>			grasses in a range of habitats	+		+	+
HOMOPTERA: PSYLLLOIDEA	PLANT LICE						
Psyllidae							
<i>Cacopsylla peregrina</i>			associated with hawthorns	+		+	+
<i>Psylla crataegi</i>			hawthorns	+		+	+
Triozidae							
<i>Trioxa urticae</i>			stinging nettle	+		+	+
HYMENOPTERA: ACULEATA	BEEES, WASPS AND ANTS						
Apidae	bees						
<i>Andrena barbilabris</i>		Local	dry, sandy sites with bare sand - especially coastal landslips and dunes	+			+
<i>Andrena bimaculata</i>		NS(Nb)	ground-nesting species	+			+
<i>Andrena dorsata</i>		Local	dry, friable ground in which it nests	+			+
<i>Andrena flavipes</i>		Local	nests colonially, usually tunnelling into in a vertical face, in dry sandy sites	+			+
<i>Andrena labialis</i>			found in a wide range of habitats	+			+
<i>Andrena minutula</i>			disturbed sites, nesting in burrows in the ground	+			+
<i>Andrena nigrospina</i>		RDB2	Essex Endangered species	+			+
<i>Andrena niveata</i>				+			+
<i>Anthophora bimaculata</i>		Local	excavates nest burrow in relatively hard vertical faces	+		+	+
<i>Bombus hortorum</i>			a bumble bee			+	
<i>Bombus humilis</i>	Brown-banded Carder Bee	S41	costal grasslands and similar	+			+
<i>Bombus lapidarius</i>	red-tailed bumble bee		ubiquitous	+		+	+
<i>Bombus lucorum</i>	white-tailed bumble bee		ubiquitous	+		+	+
<i>Bombus pascuorum</i>	common carder bee		ubiquitous	+		+	+
<i>Bombus pratorum</i>	a bumble bee		ubiquitous	+		+	+
<i>Bombus sylvarum</i>	shrill carder bee	S 41	expansive, open grassland habitats, mainly coastal	+			+
<i>Bombus sylvestris</i>	a cuckoo bee		nest parasite of			+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			<i>Bombus pratorum</i>				
<i>Bombus terrestris</i>	buff-tailed bumble bee		ubiquitous	+			+
<i>Bombus vestalis</i>			cuckoo bee - nest parasite of <i>Bombus terrestris</i>			+	+
<i>Ceratina cyanea</i>	blue carpenter bee	R RDB3	nests in dead, dry, broken stems, especially bramble close to the ground	+		+	+
<i>Coelioxys conoidea</i> (= <i>vectis</i>)		Local	Cleptoparasite of <i>Megachile maritima</i>	+			
<i>Dasypoda hirtipes</i>		NS(Nb)	requires pollen of yellow flowering Compositae - especially ragwort	+			+
<i>Halictus tumulorum</i>			ground-nesting solitary bee in a range of habitats	+		+	+
<i>Hylaeus brevicornis</i>			nests in hollow plant stems, such as docks, etc	+			
<i>Hylaeus communis</i>			nests inside dead stems of bramble, dock etc			+	
<i>Hylaeus cornutus</i>		NS(Na)	nests in stems of herbaceous plants			+	+
<i>Hylaeus pectoralis</i>		Local	nests in the galls of the fly <i>Lipara lucens</i> on reeds in the dry parts of reed beds	+			
<i>Hylaeus signatus</i>		NS(Nb)	requires pollen from <i>Reseda</i> - nests in hollow plant stems			+	+
<i>Lasioglossum calceatum</i>			nests in burrows on steep sandy banks	+			+
<i>Lasioglossum leucopus</i>		R RDB3	excavates nest burrow in level ground - preferring ruderal sites	+			
<i>Lasioglossum leucozonium</i>			found in a wide range of habitats	+			+
<i>Lasioglossum malachurum</i>		NS(Nb)	ground nesting species - prefers soils with a clay component	+			+
<i>Lasioglossum minutissimum</i>			excavates nest burrows in level ground			+	+
<i>Lasioglossum morio</i>			excavates nest burrows in level	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			ground				
<i>Lasioglossum parvulum</i>			a ground-nesting solitary bee				+
<i>Lasioglossum pauperatum</i>		R RDB3	restricted to southern counties between Devon and Essex	+			+
<i>Lasioglossum pauxillum</i>		NS(Na)	found in a wide range of habitats, it nests in light soil	+			
<i>Lasioglossum punctatissimum</i>		Local	nests in bare ground	+			+
<i>Lasioglossum puncticolle</i>		NS(Nb)	requires pollen from Wild Carrot - nests in the ground	+	+	+	+
<i>Lasioglossum smeathmanellum</i>			excavates nest burrows in level ground	+			+
<i>Lasioglossum villosulum</i>			nests in sandy soils	+			+
<i>Megachile leachella</i>		NS(Nb)	sandy places on the coast - Wash to Harlech - nesting in the ground	+		+	+
<i>Megachile maritima</i>			sandy places on the coast - nesting in the ground	+			+
<i>Megachile versicolor</i>		Local	nests in plant stems or other cavities	+			+
<i>Melitta leporina</i>		Local	nests in sandy ground	+			+
<i>Nomada fabriciana</i>			nest parasite of Andrena bees - especially Andrena bicolor	+		+	+
<i>Nomada flava</i>			nest parasite of Andrena scotica	+		+	+
<i>Nomada flavoguttata</i>			nest parasite of small-sized Andrena species of bee	+		+	+
<i>Nomada fucata</i>		NS(Na)	cleptoparasitic on the bee Andrena flavipes	+			+
<i>Nomada fulvicornis</i>		R RDB3	nest parasite of Andrena nigrospina, an RDB 2 species				+
<i>Panurgus banksianus</i>							+
<i>Panurgus calcaratus</i>				+			+
<i>Sphecodes crassus</i>		NS(Nb)	Cleptoparasite of small halictid mining bees.	+			
<i>Sphecodes ephippius</i>			Cleptoparasite of small halictid mining bees.				+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Sphecodes gibbus</i>			nest parasite of Halictus and Lasioglossum bees that nest on bare banks	+			
<i>Sphecodes monilicornis</i>		Local	Cleptoparasite of halictid mining bees.				+
<i>Sphecodes rubicundus</i>		NS(Na)	nest parasite of solitary bee <i>Andrena labialis</i>				+
Chrysididae	ruby-tailed bees						
<i>Chrysis ignita</i>			cleptoparasitic on eumenid wasps, especially <i>Ancistrocerus</i> species	+			+
<i>Hedychridium roseum</i>		Local	nest parasite of sphecids wasps that in turn nest in sandy soil				+
<i>Hedychrum niemelai</i>		R RDB3	nest parasite of <i>Cerceris</i> species of Sand Wasps	+			+
<i>Omalus auratus</i>			cleptoparasite of stem and wood-nesting wasps - adults at flowers	+			+
<i>Pseudomalus auratus</i>			nest parasite of saproxylic and stems nesting sphecids wasps			+	+
<i>Trichrysis cyanea</i>			parasite of sphecids wasps, especially <i>Trypoxylon</i> species	+		+	+
Formicidae	ants						
<i>Formica cunicularia</i>		Local	under stones, dry turf on banks etc on various soil types, but shade-intolerant	+			+
<i>Formica fusca</i>			usually nests under stones on dry ground	+			+
<i>Lasius flavus</i>			grassland. A high nest density indicates long term grassland continuity	+			+
<i>Lasius niger</i>			generalist species	+	+	+	+
<i>Myrmica rubra</i>			ubiquitous			+	+
<i>Myrmica sabuleti</i>		Local	nests under stones in calcareous grassland	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Myrmica scabrinodis</i>			grassland - preferring shorter, damp turf		+	+	
Pompilidae	spider-hunting wasps						
<i>Agenioideus cinctellus</i>		Local	nests in various habitats including unstable clay undercliff				+
<i>Arachnospila rufa</i>				+			
<i>Arachnospila trivialis</i>							+
<i>Dipogon bifasciatus</i>				+			
<i>Episyron rufipes</i>		Local	mainly coastal, affecting dunes, landslips etc but also inland				+
<i>Evagetus crassicornis</i>		Local	cleptoparasite of other pompilids in sandy habitats				+
Sphecidae	sand wasps and digger wasps						
<i>Ammophila sabulosa</i>		Local	nests in a burrow in sand substrate				+
<i>Argogorytes fargeii</i>		NS(Na)	hunts cuckoo spit bugs in grassland and bramble patches				+
<i>Cerceris quinquefasciata</i>		S 41	predatory on weevils. Nests in deep burrow in the soil			+	+
<i>Cerceris ruficornis</i>		Local	nests in bare ground and provisions the larva with weevils				+
<i>Cerceris rybyensis</i>		Local	ground-nesting, in sandy habitats	+		+	+
<i>Crabro cribrarius</i>			ground-nesting, in light, sandy soils				+
<i>Crossocerus wesmaeli</i>			nests in the ground and preys on flies, especially Therevid flies				+
<i>Diodontus insidiosus</i>		RDB3	an aphid predator that nests in holes excavated in bare ground				+
<i>Entomognathus brevis</i>			nests gregariously in exposed, well-drained, sloping bare ground; preys on chrysomelid beetle grubs	+			
<i>Gorytes laticinctus</i>		NS(Na)	associated with brambles and				+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			rough vegetation				
<i>Gorytes quadrifasciatus</i>		Local	a ground nesting species that preys on the hopper <i>Philaenus spumarius</i>				+
<i>Lindenius albilabris</i>			predator of plant bugs and flies, nesting in the ground			+	+
<i>Oxybelus uniglumis</i>			predator of flies, nesting in burrows in sandy soil				+
<i>Philanthus triangulum</i>		V RDB2	predator of other bees, nesting in extremely deep burrows in level ground	+			+
<i>Tachysphex pompiliformis</i>		Local	ground-nesting predator of grasshopper nymphs	+			+
<i>Trypoxylon attenuatum</i>			preys on spiders. Nests in plant stems, beetle tunnel or other cavities	+		+	
<i>Trypoxylon clavicerum</i>			preys on spiders. Nests in plant stems, beetle tunnel or other cavities	+		+	
Tiphiidae							
<i>Myrmosa atra</i>			a parasitoid of solitary wasps and bees that nest in bare ground	+			+
<i>Tiphia femorata</i>			nests in sandy ground and preys on the grubs of dung beetles (Scarabaeidae)	+			+
<i>Tiphia minuta</i>		NS(Nb)	a parasite of dung beetle larvae	+			+
Vespidae	wasps						
<i>Vespula germanica</i>			ubiquitous	+		+	+
<i>Vespula vulgaris</i>			ubiquitous	+		+	+
HYMENOPTERA: SYMPHYTA	SAWFLIES						
Argidae							
<i>Arge pagana</i>		Local	host plant associations are currently unclear	+		+	+
Cephidae							
<i>Calameuta filiformis</i>			larvae mine the				+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			stems of grasses in damp habitats				
<i>Calameuta pallipes</i>			a grassland sawfly	+		+	+
<i>Cephus cultratus</i>			larvae mine the stems of grasses	+		+	+
<i>Cephus pygmaeus</i>			larvae mine the stems of grasses	+		+	+
Tenthredinidae							
<i>Aglaostigma aucupariae</i>			larvae feed on bedstraws	+			
<i>Athalia cordata</i>			ubiquitous sawfly species				+
<i>Athalia rosae</i>			phytophagous species	+			
<i>Cladius pectinicornis</i>			larvae feed on rose and also on <i>Sanguisorba officinalis</i>	+		+	
<i>Pontania bridgmannii</i>			larva causes galls on sallow leaves	+		+	+
<i>Pontania proxima</i>			larva makes galls on <i>Salix</i> species - several similar species	+			+
<i>Rhogogaster viridis</i>			larvae on a variety of plant species	+			
<i>Tenthredo arcuata</i>			larvae feed on <i>Trifolium repens</i> leaves				
<i>Tenthredopsis coquebertii</i>			larvae feed on various grasses				+
LEPIDOPTERA 1:	BUTTERFLIES						
Hesperiidae							
<i>Thymelicus lineola</i>	Essex skipper		grassland	+			
Lycaenidae							
<i>Arícia agestis</i>	Brown Argus		usually on rock rose, but must have an alternative on calcareous urban sites	+			
<i>Polyommatus icarus</i>	Common blue		various legumes, especially Bird's-foot Trefoil	+			+
Nymphalidae							
<i>Aglais urticae</i>	Small tortoiseshell		larvae feed on Stinging Nettle			+	+
<i>Aphantopus hyperantus</i>	Ringlet		woodland edge and clearings, hedges and other edge habitats	+			+
<i>Coenonympha pamphilus</i>	Small Heath	S 41	grassland	+			+
<i>Lasiommata megera</i>	Wall Brown	S 41	declining species in southern Britain		+		+
<i>Maniola jurtina</i>	Meadow brown		grassland species	+		+	+
<i>Melanargia galathea</i>	Marbled White	Local	tall calcareous	+		+	+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			grassland				
<i>Pararge aegeria</i>	Speckled wood		grasses in light woodland or scrub	+	+	+	+
<i>Polygonia c-album</i>	Comma		nettles	+			+
<i>Pyronia tithonus</i>	Gatekeeper		larvae feed on coarse grasses	+		+	+
<i>Vanessa atalanta</i>	Red admiral		most often recorded as an immigrant from overseas	+	+	+	+
Pieridae							
<i>Anthocharis cardamines</i>	Orange-tip		edge habitats are preferred	+			
<i>Colias croceus</i>	Clouded Yellow		only known in Britain as a primary immigrant	+	+	+	+
<i>Pieris brassicae</i>	Large white		various Cruciferae	+	+	+	+
<i>Pieris napi</i>	Green-veined white		ubiquitous	+		+	+
<i>Pieris rapae</i>	Small white		ubiquitous	+			+
LEPIDOPTERA 2: MOTHS							
Arctiidae							
<i>Arctia caja</i>	Garden Tiger	BAP(R)	herbaceous plants	+			
<i>Phragmatobia fuliginosa</i>	Ruby Tiger		herbaceous plants		+		
<i>Tyria jacobaeae</i>	Cinnabar	BAP(R)	Ragworts	+			+
Choreutidae							
<i>Anthophila fabriciana</i>	Nettle-tap		nettles	+		+	+
Coleophoridae							
<i>Coleophora alcyonipennella</i>			clovers	+			+
<i>Coleophora artemisicolella</i>			mugwort - on the seeds	+			+
Cosmopterigidae							
<i>Limnaecia phragmitella</i>			larva in seed heads of reedmace (Typha), causing the head to disintegrate	+		+	+
Lyonetiidae							
<i>Lyonetia clerkella</i>			mines leaves of rosaceous bushes and trees, birch etc	+		+	+
Momphidae							
<i>Mompha raschkiella</i>			Rosebay Willow-herb - mining the leaves	+		+	+
Nepticulidae							
<i>Stigmella salicis</i>			mines leaves of rough-leaved Salix (Sallows)	+		+	+
Noctuidae							
<i>Calophasia lunula</i>	Toadflax Brocade	R RDB3	Feeds on toadflax flowers - a recent colonist of the London Area	+			+
<i>Euclidia glyphica</i>	Burnet Companion		Medicago,	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			Trifolium and Lotus corniculatus				
Notodontidae							
<i>Phalera bucephala</i>	Buff-tip		deciduous trees	+			
Psychidae							
<i>Epichnopteryx plumella</i>			grasses	+			+
Pterophoridae							
<i>Euleioptilus carphodactyla</i>	Citron Plume	NS(Nb)	Ploughman's Spikenard	+		+	
<i>Marasmarcha lunaedactyla</i>			+ Harrow	+			
Pyralidae							
<i>Agriphila inquinatella</i>			grasses	+		+	+
<i>Agriphila selasella</i>			grasses	+		+	+
<i>Agriphila straminella</i>			grasses	+		+	+
<i>Agriphila tristella</i>			grasses	+		+	+
<i>Chrysoteuchia culmella</i>			grasses	+		+	+
<i>Crambus lathoniellus</i>			grasses	+		+	+
<i>Crambus perlella</i>			grasses	+		+	+
Sesiidae							
<i>Bembecia ichneumoniformis</i>	Six-belted Clearwing	NS(Nb)	Lotus, Anthyllis and Hippocrepis - in the rootstock	+			+
Tortricidae							
<i>Aethes tesserana</i>			feeds in the roots of Picris, Hieracium, Crepis and Inula				+
<i>Agapeta hamana</i>			thistles - in the roots	+			+
<i>Grapholita compositella</i>			Trifolium and Lotus	+			+
Yponomeutidae							
<i>Ypsolopha sequella</i>			maple and sycamore	+			
Zygaenidae							
<i>Zygaena filipendulae</i>	Six-spot Burnet		Lotus corniculatus	+		+	
MEGALOPTERA	ALDER FLIES						
Sialidae							
<i>Sialis lutaria</i>			aquatic larvae in the mud in slow and still waters		+		
MOLLUSCA	SLUGS AND SNAILS						
Arionidae							
<i>Arion ater ater</i>			widely polyphagous	+			+
<i>Arion ater rufus</i>			widely polyphagous	+			+
<i>Arion hortensis</i> agg.			generally herbivorous	+			+
Bithyniidae							
<i>Bithynia tentaculata</i>					+		
Helicidae							
<i>Cepaea nemoralis</i>			amongst herbage	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lyttag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			generally				
<i>Helix aspersa</i>			ubiquitous amongst long vegetation	+			+
Hygromyiidae							
<i>Trichia hispida</i>			most damp habitats	+	+		+
Limacidae							
<i>Deroceras reticulatum</i>			general herbivore	+			+
Lymnaeidae							
<i>Lymnaea auricularia</i>							
<i>Lymnaea peregra</i>			ponds, streams and marshes				
<i>Lymnaea stagnalis</i>							
<i>Stagnicola palustris</i>					+		
Milacidae							
<i>Milax budapestensis</i>			widely herbivorous	+			
Physidae							
<i>Physa fontinalis</i>					+		
Sphaeriidae							
<i>Pisidium sp.</i>					+		
MYRIAPODA: CHILOPODA	CENTIPEDES						
Cryptopidae							
<i>Cryptops hortensis</i>			amongst litter - often synanthropic	+		+	+
Lithobiidae							
<i>Lithobius forficatus</i>			many habitats	+		+	+
MYRIAPODA: DIPLOPODA	MILLIPEDES						
Glomeridae							
<i>Glomeris marginata</i>			deciduous woodland, bare rock and other habitats, but avoids sand dunes and disturbed ground	+		+	+
Julidae							
<i>Cylindroiulus caeruleocinctus</i>		Local	calcareous ground - especially if disturbed	+			+
<i>Tachypodoiulus niger</i>			many habitats and often found climbing trees	+			+
NEUROPTERA	LACEWINGS						
Chrysopidae	green lacewings						
<i>Chrysopa commata</i>		Local	dry grassland	+			
<i>Chrysopa perla</i>			aphid predator amongst herbage	+		+	+
<i>Chrysoperla carnea</i>			aphid predator of trees and bushes	+		+	+
Hemerobiidae	brown lacewings						
<i>Hemerobius lutescens</i>			trees and bushes, hedges, etc	+		+	+
<i>Micromus variegatus</i>			probably a	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
			predator of root aphids				
ODONATA	DRAGONFLIES AND DAMSELFLIES						
Aeshnidae							
<i>Aeshna mixta</i>	Migrant Hawker dragonfly		partially immigrant, flying from the end of July to October	+			
Coenagriidae							
<i>Coenagrion puella</i>	Azure Damselfly		well-vegetated water bodies, the adults flying from May to August	+	+		
<i>Enallagma cyathigerum</i>	Common blue damselfly		static, open water bodies with emergent vegetation, flying mid May to early October		+		
<i>Ischnura elegans</i>	Blue-tailed damselfly		found in most permanent water bodies, the adults flying from May to August		+		
Libellulidae							
<i>Sympetrum sanguineum</i>	Ruddy Darter	NS(Nb)	water-bodies with abundant emergent vegetation	+			
<i>Sympetrum striolatum</i>	Common Darter dragonfly		water-bodies with emergent vegetation, flying mid June to October and often wandering	+			
ORTHOPTERA	GRASSHOPPERS AND CRICKETS						
Acrididae							
<i>Chorthippus albomarginatus</i>	Lesser marsh Grasshopper	Local	grasslands - has spread inland from coastal stations	+			+
<i>Chorthippus brunneus</i>	Field grasshopper		grassland	+		+	+
<i>Chorthippus parallelus</i>	Meadow grasshopper		grassland	+			
Tetrigidae							
<i>Tetrix undulata</i>	Common Ground-hopper		bare ground habitats, including dunes	+			+
Tettigoniidae							
<i>Conocephalus discolor</i>	Long-winged Cone-head	NS(Na)	coarse vegetation on the coast - recently it has colonised inland sites	+			+

Group / species	English names	National status	Ecological notes	Where found in 2016			
				Lytag Brown-field	Infra-structure Corridor	Tilbury Centre	The Rest
<i>Leptophyes punctatissima</i>	Speckled Bush-cricket		rough herbage and scrub	+		+	+
<i>Metrioptera roeselii</i>	Roesel's Bush-cricket	NS(Nb)	long grassland	+		+	+
<i>Pholidoptera griseoaptera</i>	Dark Bush-cricket		scrub and edge habitats	+	+	+	+
TRICHOPTERA	CADDIS FLIES						
Limnephilidae							
<i>Limnephilus rhombicus</i>					+		

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. AQUATIC INVERTEBRATES RECORDED IN 2016

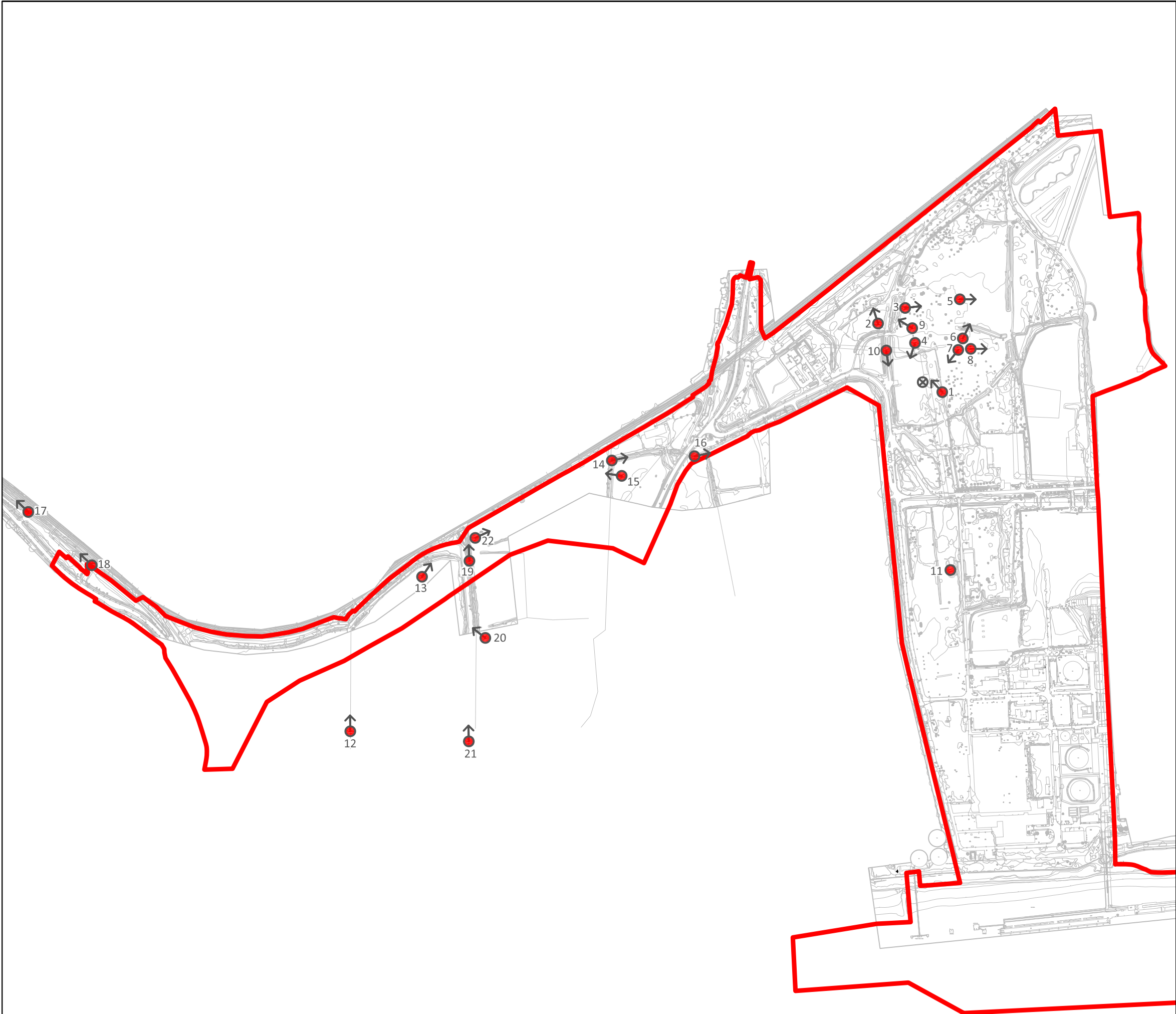
An aquatic invertebrate is taken to include any species in which at least one stage of its life cycle (egg, larva/nymph, pupa or adult) requires to be wholly submerged in water for at least fifty percent of the time occupied in that stage. Thus, species that might be regarded as otherwise terrestrial, such as dragonflies and some of the recorded soldierflies, are included along with the more traditional water beetles and others.

Group / species	English names	National status	Ecological notes
ANNELIDA	LEECHES		
Glossiphoniidae			
<i>Glossiphonia complanata</i>			ubiquitous parasite of molluscs and occasionally oligochaete worms
COLEOPTERA	BEETLES		
Dryopidae			
<i>Dryops luridus</i>			in the marginal mud zone of freshwater habitats
Dytiscidae	diving beetles		
<i>Agabus bipustulatus</i>			freshwater generally
<i>Colymbetes fuscus</i>			freshwater generally
<i>Dytiscus circumflexus</i>			brackish waters tolerated or favoured
<i>Hydroporus angustatus</i>			fens and ponds
<i>Hydroporus palustris</i>			freshwater generally
<i>Hygrotus (Coelambus) impressopunctatus</i>		Local	freshwater generally
<i>Hygrotus inaequalis</i>			freshwater generally
<i>Hyphydrus ovatus</i>			freshwater ponds or slow running water, always with vegetation
<i>Laccophilus minutus</i>		Local	freshwater generally
<i>Rhantus frontalis</i>		NS(Nb)	freshwater generally
<i>Rhantus suturalis</i>			freshwater generally
Haliplidae			
<i>Haliplus lineatocollis</i>			mostly in slow running waters
<i>Haliplus ruficollis</i>			ponds ditches and similar static water bodies
Helophoridae			
<i>Helophorus rufipes</i>			freshwater generally
Hydrophilidae			
<i>Anacaena limbata</i>			permanently wet mud at water's edge
<i>Helochaeres lividus</i>		NS(Nb)	freshwater generally
<i>Megasternum concinnum</i>			organic mud and wet (liquid) decaying vegetation
Hygrobiidae			
<i>Hygrobia hermanni</i>			freshwater generally
Noteridae			
<i>Noterus clavicornis</i>		NS(Na)	still waters
CRUSTACEA: AMPHIPODA	SHRIMPS AND ALLIES		
Gammaridae			
<i>Gammarus pulex</i>			freshwater generally
CRUSTACEA: ISOPODA	WOODLICE & SLATERS		
Asellidae			
<i>Asellus aquaticus</i>	freshwater hog louse		freshwater generally
DIPTERA	TRUE FLIES		
Chironomidae			

Group / species	English names	National status	Ecological notes
<i>unidentified larval stages</i>			freshwater generally
Dixiidae			
<i>Dixella attica</i>			freshwater generally
Ptychopteridae			
<i>Ptychoptera albimana</i>			damp habitats, though also in seepages and rot holes
<i>Ptychoptera contaminata</i>			Wetland habitats
Sciomyzidae	snail-killing flies		
<i>Illione albiseta</i>			predatory on water snails in non-acidic wetland habitats
<i>Limnia unguicornis</i>			predatory on water snails
<i>Pherbellia dorsata</i>		NS(N)	predator of water snails
<i>Sepedon sphegea</i>		Local	predatory on water snails
<i>Tetanocera hyalipennis</i>			predatory on water snails
Stratiomyidae	soldierflies		
<i>Nemotelus notatus</i>		Local	brackish wetlands in coastal areas
<i>Oplodontha viridula</i>		Local	marshes and pond margins
<i>Oxycera trilineata</i>		Local	larvae in mosses in the edge of water bodies
Syrphidae	hoverflies		
<i>Tropidia scita</i>			reed beds in wetland areas
EPHEMEROPTERA	MAYFLIES		
Baetidae			
<i>Cloeon dipterum</i>			Running and still water - on submerged plants
HETEROPTERA	TRUE BUGS		
Corixidae	water boatmen		
<i>Corixa panzeri</i>			freshwater ponds etc
<i>Corixa punctata</i>			freshwater ponds etc
<i>Cymatia coleoptrata</i>			freshwater generally
<i>Hesperocorixa linnaei</i>			freshwater generally
<i>Hesperocorixa sahlbergi</i>			freshwater ponds etc with very dense submerged vegetation
<i>Sigara dorsalis</i>			most still and slow-flowing waters that are not too eutrophic
<i>Sigara lateralis</i>			freshwater ponds etc thriving in those polluted by animal dung
<i>Sigara selecta</i>			saline and brackish still waters in coastal areas
Gerridae	pond skaters		
<i>Gerris lateralis</i>			predatory on the surface film of still and slow waters
Hydrometridae			
<i>Hydrometra stagnorum</i>	Water Measurer		On the surface film of still or slow-flowing waters
Pleidae			
<i>Plea minutissima</i>			freshwater generally
MEGALOPTERA	ALDER FLIES		
Sialidae			
<i>Sialis lutaria</i>			aquatic larvae in the mud in slow and still waters
MOLLUSCA	SLUGS AND SNAILS		
Bythiniidae			
<i>Bithynia tentaculata</i>			freshwater generally
Lymnaeidae			
<i>Lymnaea auricularia</i>			freshwater generally

Group / species	English names	National status	Ecological notes
<i>Lymnaea peregra</i>			freshwater generally
<i>Lymnaea stagnalis</i>			freshwater generally
<i>Stagnicola palustris</i>			freshwater generally
Sphaeriidae			
<i>Pisidium sp.</i>			
ODONATA	DRAGONFLIES AND DAMSELFLIES		
Aeshnidae			
<i>Aeshna mixta</i>	Migrant Hawker dragonfly		well-vegetated water bodies, with emergent vegetation,
Coenagriidae			
<i>Coenagrion puella</i>	Azure Damselfly		well-vegetated water bodies, with emergent vegetation,
<i>Enallagma cyathigerum</i>	Common blue damselfly		well-vegetated water bodies, with emergent vegetation,
<i>Ischnura elegans</i>	Blue-tailed damselfly		well-vegetated water bodies, with emergent vegetation,
Libellulidae			
<i>Sympetrum sanguineum</i>	Ruddy Darter	NS(Nb)	well-vegetated water bodies, with emergent vegetation,
<i>Sympetrum striolatum</i>	Common Darter dragonfly		well-vegetated water bodies, with emergent vegetation,
TRICHOPTERA	CADDIS FLIES		
Limnephilidae			
<i>Limnephilus rhombicus</i>			well-vegetated water bodies

**PHOTOGRAPHS
OF
INVERTEBRATE HABITATS
AT
TILBURY
IN
2016**



Key

- Order Limits
- Photograph location, direction and reference
- Malaise trap location



DO NOT SCALE

Title		
Invertebrate Survey Photograph Locations (2016)		
Project	Client	
Tilbury2	POTLL	
Drawing No.	Revision	Project No.
Figure 1	A	E1862
Drawn	Checked	Date
STM	RR	June 2017

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.
T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Reproduced from Ordnance Survey
©Crown Copyright. All rights reserved
Licence No. 100005491

TILBURY2 SITE PHOTOGRAPHS



PHOTO 1. This shows the malaise trap in position in an edge habitat zone between damp grassland and a fairly dense patch of young woodland wood/scrub. Regrettably, the trap was tampered with between the first and second site visits and the sample for this period was lost. The trap was reinstated in a different position, where it was more or less entirely obscured from view unless the scrub area selected was physically entered.



PHOTO 2. Semi-bare grassy area with some lichen elements. This is an important nesting area for species of solitary bees. The physical structure of the ground renders is extremely sensitive to physical disturbance.



PHOTO 3. Areas of hard-standing dominate the central area, but are in danger of being over-run by Buddleia and other scrub to end up looking more like photos 9 and 10. The intrinsic interest of areas like this is vested in the flora that they support which, in turn, favour selected invertebrate species.



PHOTO 4. Rabbit grazed area. This is mostly hard-standing with a very thin layer of soil that includes cinders, presumably from the old railway lines that ran through the area. This area supports a rich fauna of ground beetles in particular.



PHOTO 5. Open grassland affects some areas but is not particularly species rich in comparison with other areas. The area shown is drier than the damper, rank grass areas east of the malaise trap shown in photo 1.



PHOTO 6. This small, sandy bank with bare patches provides the breeding site for the majority of the solitary bees and wasps recorded during 2016. Other breeding sites identified in a 2009 survey appear to have become overgrown.



PHOTO 7. General view looking southwards across the central area. The scrub edge habitat is important for a significant proportion of the overall species inventory.



PHOTO 8. The open habitat is diversified by invading birch scrub. The large bank in the background did not support any significant number of nesting bees and wasps during 2016; the substrate is largely unsuitable for tunnelling.



PHOTO 9. Buddleia and other scrub is rapidly encroaching on open areas and altering the invertebrate fauna. Some control might be regarded as desirable.



PHOTO 10. The old railway line. In 2009 this was an open area, but an apparent decline in rabbit grazing means that scrub is now taking over and altering the character of the site. This photo also shows a member of our survey team using a suction sampler to examine ground layer invertebrates, which remain diverse in this “ride”.



PHOTO 11. Tilbury Centre (TEEC) Pond. Densely surrounded by reeds, steep-sided and rather anaerobic.

INFRASTRUCTURE CORRIDOR PHOTOGRAPHS



PHOTO 12. One of the ditches (67) at the western end of the western infrastructure corridor. Densely-vegetated with minimal water and physically a problem to sample for aquatic invertebrates.



PHOTO 13. The edge habitats by the fence to the Hyundai car storage yard have minimal intrinsic interest but nevertheless contribute to the maintenance of the green continuity. The land to the south is tarmac and is of no value as invertebrate habitat.



PHOTO 14. Ditch 1: In a horse-grazed field so subject to poaching. Water level is very low and the surface is obscured by duckweed. Conditions are extremely eutrophic and aquatic invertebrates are few and far between.



PHOTO 15. Ditch 56: This was a continuation of ditch 1 and has minimal invertebrate interest.



PHOTO 16. Ditch 9: This ditch runs south of Substation road. The extreme western end is open to the horse grazing fields and is subject to fly tipping. The remaining section is full of rubbish. Invertebrate interest here is minimal.



PHOTO 17. Ditch 97: Ditches that are open on one side and have a hedge on the other may support a raised invertebrate interest. However, the water here is highly eutrophic and the aquatic fauna is limited.



PHOTO 18. Ditch 97: This ditch was sampled where it turns west and runs alongside the A1089, Ferry Road.



PHOTO 12

PHOTO 19. Ditch 65: The northern end, here, is culverted. The water is clearly polluted and there were almost no signs of aquatic invertebrate life within..



PHOTO 13

PHOTO 20. Ditch 65. The southern section is culverted, with vertical banks rendering sampling difficult. The water is clearly polluted and there were almost no signs of aquatic invertebrate life within.



PHOTO 21. Public right of way that runs between the horse-grazed pasture (common land) and the Fortland Distribution Park before turning west to run between the Distribution Park and the London-Southend railway line. This has been cut and is little more than amenity grassland – invertebrate interest here is minimal.



PHOTO 22. Northern horse-grazed fields are potential habitat for the Horner Robber-fly (*Asilus crabroniformis*).