COLIN PLANT ASSOCIATES (UK)
CONSULTANT ENTOMOLOGISTS

14 West Road, Bishops Stortford, Hertfordshire CM23 3QP
UK tel/fax: 01279 507697 mobile telephone: 07770 766416
E-mail: cpauk1@ntlworld.com

Angela Bond
WSP Environmental
Mountbatten House
Basing View
Basingstoke
RG21 4HJ

9th April 2007

My reference: BS/2207/07

Dear Angela,

Kent International Gateway: Invertebrate Walkover and Scoping Survey

Further to your e-mailed instruction, I visited the Kent International Gateway site on 5th April 2007. The entire site was seen and most of it was walked and examined in detail, including all woodland areas, the entire length of the M.20 motorway embankment, all accessible lanes and tracks, all ponds and water courses and some pasture land. However, the site is dominated considerably by grazed pasture that is unlikely to have a raised potential as an invertebrate habitat. Only representative pasture land was examined.

Within the application area, invertebrate interest falls into two primary categories – terrestrial and aquatic.

Aquatic invertebrate interest

This is rather limited in the application area. There are six ponds and a stream, as follows:

The two **Glenrowan House Garden Ponds** are rectangular and with concrete sides. They will have limited value to native invertebrates and will contribute little to local invertebrate ecology. Sampling of invertebrate species is not judged to be necessary.

Barty Farm Field Pond is on the west side of the farm buildings adjacent to an oak tree. This small pond has abundant submerged vegetation and evidently also a zone of emergent plants. It may have a high invertebrate value and should be sampled during spring and autumn.

Barty Farm Large Pond lies to the east of the farm buildings. It is larger than the other ponds and has been artificially created, with the spoil being used to create peripheral bunds. On the survey date, the water surface was covered with duckweed, which would prevent light penetration and reduce invertebrate interest. This is not likely to be an especially important pond for invertebrates, though sampling in the spring is recommended to confirm this supposition.

Subway Pond is situated at the foot of the motorway embankment north and slightly east of Barty Farm Large Pond. It is not a true pond as the water flows constantly, but a stagnant pool formed with concrete sides is situated against the fence that separates it from the public footpath which enters the site via a subway under the M.20. Much of the water surface is shaded by a Sallow tree.

Water Lane Pond appears to be a balancing pond associated with the motorway and is secured within a triangular fenced area; access is via a locked gate on the motorway verge to which we were not given a key. The pond contains reedmace and other emergent vegetation. It would be desirable to access this pond for invertebrate species sampling in spring and autumn.

The stream is fed by Subway Pond and flows south-west under the railway line to pass east of Barty Farm Field Pond. It was partly choked with emergent reedmace and terrestrial grasses and other plants, but has a good flow of water and may have an invertebrate interest. Caterpillars of the reedmace micro moth *Limnaecia phragmitella* were found in the seed heads of the reedmace and in the old stems of this plant evidence of Bulrush Wainscot Moth (*Nonagria typhae*) was visible.

Terrestrial invertebrate interest

Pasture land

Large, grazed fields dominate the site; grazing stock includes sheep, cattle and horses. In some situations, grazed grassland creates ideal conditions for some specialist invertebrate species, though most of the noteworthy species in this category are not expected in this region of Kent and it is not expected that the invertebrate interest of the grazed grasslands here will be high in the application area. Specific survey is not judged necessary, though casual examination during trips to study other habitat features may be desirable.

Woodland and tree groups

Three woodland groups are evident. **Crismill Road Woodland** flanks the east side of the lane and is continuous, partly via the adjacent railway property, with **The Belt** to form three continuous sides of a square. This is ancient woodland with a good physical structure. The canopy is uneven with mature oaks and other trees ascending to heights greater than other younger trees. A secondary canopy is evident in places and there is a shrub layer, which includes honeysuckle, before a rich carpet of Wood Anenome and Bluebell, as well as several other plants that form a varied herb layer; this in turn stabilises a relatively deep litter layer. The saproxylic resource appears high with aerial and fallen dead timber, the former including main boles as well as smaller branches. Several rot-holes are evident at the bases of the long neglected coppice stools. Some sampling was undertaken by sweep-netting and has generated a number of as yet unidentified specimens; the diversity of this unidentified material appears high. This woodland area may have a raised invertebrate interest and detailed survey is recommended to confirm and define this.

Common Wood is of a different character. The trees, including a large quantity of birch, are close together and drawn. Though some mature trees are present, the shrub layer dominates this woodland, especially where it slopes downwards to the north-east and opens to grassland. There will be a raised, but different, invertebrate significance in this area, largely associated with edge habitats, and sampling of invertebrate species is strongly recommended in order to define the interest.

Solitary mature trees

These are most dominant in the “parkland” area of sheep pasture that connects The Belt to Common Wood, though other examples are dotted about the landscape. Some of these contain saproxylic microhabitats that would withstand further examination; this would be especially important where a particular tree may be lost during the development of the site, as specific mitigation measures would need to be determined.

Hedges

In general the hedges on the site are of poor quality as invertebrate habitats. They are mostly thin, gappy, uniform in structure and low in floral diversity so that their intrinsic interest will be relatively low. Their value as physical corridors of invertebrate movement is further minimised by their relative isolation, though they will retain some level of significance in this respect. The contribution of hedges to invertebrate ecology within the wider landscape is well documented and although some low level invertebrate species sampling is desirable to confirm the opinion that they are of low quality here and to ensure that no rare species are

overlooked, the post-development of hedges within the application area should follow best practice and does not require guidance via a species inventory.

Tall ruderal vegetation

Within the triangular area formed in the western angle made by the crossing of the two railway lines near Crismill Lane the land is not actively managed and a ruderal grassland has developed. The habitat here is varied: there are tall herbs in the central area and on the adjacent motorway embankment whilst there is a peripheral dirt track (motorcycle circuit?) that exhibits bare ground and sparsely vegetated areas. Caterpillars of the moth *Endothenia gentianaeana* were found in the seed heads and upper stems of teasel; plants and several other invertebrate species were collected by sweep-netting.

Overall appraisal of invertebrate interest

Habitat features of particular interest to invertebrate ecology are relatively isolated and the lack of hedges in many areas, and the poor quality of those that do exist, might suggest that the landscape does not appear likely to function as a habitat mosaic. Any invertebrate species interest within the application area will, therefore, probably be confined to a few specific places and can be both identified and targetted for appropriate survey so that any losses arising from the proposed development can be adequately mitigated.

In particular, the woodland areas are likely to be of raised significance. The woodland at Crismill Lane may support White Admiral butterflies.

The stream and the various ponds may also support an assemblage of species that is noteworthy.

Recommendations for detailed survey work

Complete invertebrate inventories are extremely time-consuming to produce and consequently excessively costly; additionally, they are seldom necessary for site assessment. Species recording concentrates, therefore, on species targeted for their value in interpreting the habitats present on a site. In order to qualify for selection, species groups must satisfy a number of criteria, including

- the group selected must contain a reasonably large number of species, though not be so large that it becomes impractical to take an representative sample of the species present in the time available;
- the group selected must largely comprise relatively easy-to-identify species;
- the life-histories and habitat requirements of identifiable species in the selected group must be adequately known and must include a good proportion which are directly related to the habitats under investigation;
- collectable and identifiable life-cycle phases of the target species must be available at the time of year when surveying is to take place;
- the group should contain a reasonable number of Nationally Rare or Nationally Scarce species.

Aquatic invertebrate sampling should be undertaken during May/June in the four ponds other than the Glenrowan House Garden Ponds. Where this sampling exercise indicates that there may be a varied fauna additional sampling should be undertaken in September or October, depending on the weather conditions that prevail in the late summer and early autumn this year. This sampling should target water beetles for detailed survey, though other taxa should also be recorded. If there are sufficient species recorded, the WETSCORE value and the Aquatic Species Quality Index should be calculated.

The Stream should be sampled on three or four occasions from May to October to obtain a complete as possible list of aquatic invertebrates. If sufficient species are recorded, the Community Conservation Index (Environment Agency standard) should be calculated.

Access to the Motorway Pond is desirable and needs to be arranged via the Highways Agency.

Terrestrial survey in the woodland areas and in the area of ruderal herbs is regarded as necessary in order to determine mitigation measures that are both appropriate and politically acceptable. Active sampling is recommended throughout the period from May to October, inclusive, varying visit dates to accommodate the vagaries of the British weather. Six visits are recommended. Target taxa within the woodland areas should include hoverflies (Diptera: Syrphidae) and moths (Lepidoptera), which are especially well-known in Kent. However, a broader-spectrum of sampling should be deployed and any other groups that have potential to act as habitat indicators should be targetted as they are discovered. Moth recording implies overnight visits with lamps powered by generators.

Malaise trapping is recommended in the woodland area if a location can be found where the highly visible net will not be vandalised.

Sampling methodology

Sampling will be undertaken using the most appropriate techniques from the following list.

Sweep-netting. A stout hand-held net is moved vigorously through vegetation to dislodge resting insects. The technique may be used semi-quantitatively by timing the number of sweeps through vegetation of a similar type and counting selected groups of species. This technique is effective for many invertebrates, including several beetle families, most plant bug groups and large number of other insects that live in vegetation of this type. However, it does not sample invertebrates that are confined to lower levels such as the litter layer, which must be sought by careful searching of by sieving litter over a white sheet.

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 targetted for search. Insects are collected from the tray using a pooter. This technique is effective in obtaining records of most arboreal species, including many beetle groups, bugs, caterpillars of Lepidoptera, spiders and others. It can be undertaken at any site where there are trees or bushes present although is rendered ineffective if the vegetation is wet or if the weather is windy.

Pan-trapping. Pan traps are often also referred to as water traps. They consist of shallow (plastic) trays of liquid, which are placed either on the ground or in an elevated position. Insects are attracted to the traps and fall into the fluid. Most effective are yellow traps with white a close second. Most other colours do not work well. The fluid may be water, with a drop of detergent to reduce surface tension, if the traps are to be inspected within a couple of days. Alternatively formaldehyde solution, isopropyl alcohol or other fluids may be preferred if the traps are visited less frequently. These traps are extremely effective in collecting samples of solitary bees, solitary wasps, spider-hunting wasps, some beetles (especially Chrysomelidae and Cerambycidae), some spiders, hoverflies and other groups but work best when the sun is shining. Unfortunately, trapped material decomposes rapidly and so these traps need to be examined within a few days of being set.

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. Traps are typically set in pairs or in groups of three (at the points of an equilateral triangle, usually with a side of 1 metre) and may be positioned along a fixed transect to permit repetition. This is the single most effective means of recording ground beetles (Carabidae) but is also effective for rove

beetles (Staphylinidae), some other beetle groups, spiders and most non-insect soil-dwelling arthropods. Unlike pan traps, pitfall can be left *in* situ for a couple of weeks before they need to be examined.

Moth-trapping. Mercury-vapour (mv) light bulbs are used to attract nocturnal insects - especially moths. These bulbs emit ultra-violet light at a wavelength which causes moths to be attracted but the wavelength used is harmless to humans. The bulbs are mounted over catching chambers filled with cardboard egg-trays and moths entering the chambers settle on these trays and may be examined. Bulbs are powered from mains electricity or by portable generators. Light trapping is the single most effective method of recording moths. It is also valuable for recording some other nocturnal insect groups and as an added attraction in can be helpful in assembling bats (feeding on the concentrated moths over the traps) which can then be identified using "bat detectors". The only drawbacks are that the traps cannot be used when there is a risk of vandalism or other damage/loss, in the presence of large livestock (cattle or horses, etc) which may trample equipment or when there is a risk of torrential rain or of hail. Additionally, equipment is bulky and heavy (especially generators) and its use in inappropriate at remote sites not accessible by vehicle.

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 alcohol, emptied fortnightly or monthly depending on site, habitat and weather. This method almost always generates huge volumes of material and several days are normally required to sort and identify material from a single trap session. It is the single most effective sampling method for all flying insects and frequently catches insects that have not been found by any other method. It is especially useful as a flight interception technique to determine movement along linear features such as hedges or woodland rides and in sites where regular access is a problem or where the terrain makes manual sampling difficult for some reason. It may be undertaken at any date in the year, but there is a risk of vandalism as it is highly visible and there is also a risk of damage by animals (especially deer). During periods of excessively strong winds if the trap is in an exposed position it may be destroyed and the sample lost.

Suction Sampling . A converted leaf blower is used 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. It is particularly productive for Coleoptera, some Diptera and Arachnida.