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THE WELSH DRAGON

PHASE 1 ECOLOGICAL APPRAISAL

Frank Wingett Cancer Appeal

The Garden House
Erbistock
Wrexham
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1. INTRODUCTION

Gifford LLP were appointed by the Frank Wingett Cancer Appeal in May 2010 to undertake a Phase 1 Ecological Appraisal for the proposed Welsh Dragon development at Halton, Chirk.

The current proposals comprise the construction of a 65m high sculpture of the Welsh Dragon that will provide an iconic landmark gateway into Wales. The site will also feature a crescent shaped visitor centre building with an art gallery and supporting visitor facilities including a café/restaurant and gift shop.

This report details the findings of the study and includes conclusions and recommendations relating to the current ecological status of the site, ecological constraints and whether any further ecological surveys are required.

The development will be subject to the British Research Establishment's Assessment Method (BREEAM) for Bespoke Development¹. This assessment provides an indicator of the overall performance of the project in terms of ecology (as well as a wide range of other environmental disciplines). The BREEAM will assess the ecological value of the site prior to development, protection and mitigation measures used to prevent or minimise damage to ecology and any enhancement and long term ecological management of the site. This is achieved through a credit based system.

¹ BREEAM Bespoke 2008 Assessor Manual (BRE, 2008)

2. SCOPE AND OBJECTIVES

The scope of the work was to undertake an Extended Phase 1 Ecological Appraisal of the site to gain an understanding of its ecological features. This comprised:

- Identification of the habitats and protected areas on, near and adjacent to the proposed development site and to assess their ecological importance;
- Identification of the potential for protected species which may be on, near or adjacent to the proposed development site and assess their ecological importance;
- Identification of the presence of any invasive plant species in or adjacent to the development site; and
- Recommendations on mitigation and compensation measures and, as appropriate, recommendations for any further more detailed ecological investigations that may be required.

The primary purpose of the Extended Phase 1 Ecological Appraisal is to identify any risks to the development based on the site ecology. The appraisal also reviews any potential threats and impacts to those species and habitats which are protected by UK and European nature conservation legislation and to ensure that the development is compliant with the relevant legislation and other conservation guidelines.

In addition to the above the appraisal will also provide information on potential BREEAM credits available and to describe the requirements to satisfy the criteria for the relevant credits.

3. STANDARDS AND LIMITATIONS

This report has been prepared for the Frank Wingett Cancer Appeal and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

The findings and opinions in the report are based upon information derived from a variety of information sources. Gifford believe these information sources to be reliable.

This report has been prepared on the basis of the proposed end land use defined by the Client. If this proposed end land use is altered or changed then it will be necessary to review the findings of this report.

It should be noted that some of the aspects considered in this study are subject to change with time. Therefore, if the development is delayed or postponed for a significant period then it should be reviewed to confirm that no changes have taken place, either at the site or within relevant legislation.

It should be noted that the site ecology will vary seasonally and has been conducted outside the optimal time of year for certain species and species groups. Therefore, the species and issues noted in the report reflect the time of year at which the survey was undertaken. The survey will provide useful guidance on the likely ecology in seasons other than that in which the walkover was undertaken. However, it should be noted that a single survey cannot necessarily provide definitive ecological information and can only provide a 'snap shot' of ecological activity at that time.

The appraisal has considered relevant standards and legislation applicable for this type of development and environmental discipline. This includes but has not been limited to the:

- Wildlife and Countryside Act 1981 (As Amended);
- Conservation (Natural Habitats &c.) (Amendment) Regulations 2007; and
- Technical Advice Note 5 Nature Conservation and Planning 2009.

Consultations have been undertaken as part of the study to establish the key issues at the site. It should be noted that these consultations are preliminary and further detailed consultations may be required in due course.

The biological records obtained from third parties do not represent a full and complete species list for the site and absence of a species from the records does not necessarily mean that they are absent from the site.

No information regarding Tree Preservation Orders or arboricultural issues have been obtained or considered as part of this study.

4. SITE DESCRIPTION AND LOCATION

The Welsh Dragon development is located at Halton which is situated approximately 1.5km north east of Chirk (National Grid reference 330100E, 339400N). The site boundary is indicated on Figure 1 and covers an approximate area of 8 hectares.

The development site predominantly comprises open fields used for grazing livestock and areas of woodland. A summary of the adjacent land uses are defined below:

4.1 Western boundary (north to south):

- Development access road, beyond which is a McDonald's restaurant and open field used for grazing livestock;
- A5 Carriageway (Chirk By-pass); and
- Motocross track, beyond which is the A5 Carriageway.

4.2 Southern boundary (west to east):

- Motocross track, beyond which is Green Lane East and open fields; and
- Wooded area, beyond which are isolated dwellings and open fields.

4.3 Eastern boundary (north to south):

- Residential properties fronting onto Green Lane East, beyond which is open fields; and
- Green Lane East, beyond which is open fields.

4.4 Northern boundary (west to east):

- Open field used for grazing livestock, beyond which is the McDonald's restaurant;
- Unclassified road, beyond which is open fields; and
- Welsh Water Foul treatment pumping station, beyond which is the unclassified road.

The existing site layout is shown on Figure 2.

5. DEVELOPMENT PROPOSALS

The development will comprise a 41.5m tall tower with a 23.5m high dragon sculpture (combined total height of 65m) and a separate two storey cultural centre building that will include a gallery/education area, retail area, café, restaurant, multi-use area and welfare facilities. A car park will be constructed to serve the development which will be located to the north of the development boundary. The development proposals are shown on Figure 3.

6. METHODOLOGY

6.1 Desk-Top Study

A desk-top study was undertaken to determine the presence of any statutory (legally protected) wildlife designations within or close to the site. This was undertaken through the use of the Countryside Council for Wales (CCW) website.²

A biological species record search was commissioned from Cofnod in May 2010. Cofnod is the organisation responsible for holding biological records for the North Wales area. Gifford requested records of designated sites and protected or notable species within 2km of the site.

The study area has been taken as the site boundary and has also considered the potential zone of influence which is defined as:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction; and
- Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

6.2 Ecological Surveys

The ecological walkover and habitat survey was undertaken on 7th May 2010. The weather was cloudy with sunny intervals. The temperature was approximately 14°C with a strong south westerly breeze.

The site was surveyed using the Phase 1 Habitat Survey methodology developed by the Joint Nature Conservation Committee (JNCC, 1993) whereby the habitat types were mapped including dominant plant types. Particular attention was made to the presence of any protected species based on the available habitat within the site and surrounding area. Incidental surveys were also undertaken which search for evidence of the potential presence of protected species and other notable features. These included:

6.2.1 Bats

Trees around the site were assessed for their potential to support roosting bats. The presence of features within mature trees, which have the potential to provide roosting sites for bats, such as cracks, holes, crevices or loose ivy, were noted. No buildings are located at the site.

Trees were assessed externally from ground level for potential bat access points and assessed as having low, medium or high potential to support roosting bats. The criteria to determine the potential for roosting bats is shown in Table 6.1:

	Trees
No Potential	Trees with negligible potential to support bat roosts. Includes saplings and young trees with a diameter at breast height of 30cm or less. These trees would be smooth barked, with no features or ivy cover and good visibility into the canopy. No further ecologist involvement is required should the tree be removed.
Low	Including saplings and young trees with a diameter at breast height of 30cm or less, with one or two potential features, possibly some ivy cover or limited

² www.ccw.gov.uk (accessed May 2010)

	Trees
Potential	visibility into some of the canopy. Ecologist involvement is unlikely to be required if the tree were to be removed, although the tree should be felled taking reasonable avoidance measures.
Medium Potential	Including semi-mature and mature trees with a diameter at breast height of more than 30cm. Rough barked species where fissures, cracks and crevices may be present. Ivy cladding present with restricted visibility into the canopy. Bats may use these trees for roosting. Ecologist involvement is likely to be required if the tree were to be removed. Nocturnal surveys are required to establish the presence absence of bats. If a roost is confirmed within the tree it then would be section felled under a licence and supervision of an ecologist. If no roosts were confirmed it would be downgraded to a tree with low potential and felled taking reasonable avoidance measures.
High Potential	Including semi-mature, mature and veteran trees, especially rough barked species where fissures, crevices and cavities which appear suitable are visible. A bat roost is confirmed within the tree through observation of droppings or other field evidence. Ecologist involvement and further survey would be required if the tree were removed. The tree may need to be section felled under licence and the supervision of an ecologist, following mitigation to replace the habitat that is lost.

Table 6.1 – Criteria to Determine the Potential for Roosting Bats

The evaluation of potential is subjective and relies on professional judgement. Any tree given a medium or high potential would be subject to more detailed assessment if affected by the development.

All bats and their roosts are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended) and Schedule 2 of the Conservation (Natural Habitats &c.) (Amendment) Regulations 2007 (which defines European Protected Species). Therefore, it is illegal to:

- Intentionally or deliberately kill, injure or capture (or take) bats;
- Deliberately disturb bats (whether in a roost or not);
- Recklessly disturb roosting bats or obstruct access to their roosts; or
- Damage or destroy bat roosts.

In addition to the above three bat activity surveys were undertaken as part of the project and the methodology and results are included in Appendix C.

6.2.2 Badgers

The site and land within 30m of the site boundary (where access permitted) was searched for evidence of badger (*Meles meles*) signs and activity, such as setts, paths, foraging (snuffle holes), dung pits and badger hairs.

Badgers and their setts are protected under the Protection of Badgers Act 1992

6.2.3 Reptiles

The potential for the site to support reptiles such as common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*) and slow worm (*Anguis fragilis*) was assessed based on their typical habitat requirements including areas suitable as basking or hibernation sites and the presence

of scrub-edge habitat. Reptiles are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended).

6.2.4 Birds

Habitats within the site and surrounding land were assessed for their potential to support breeding birds. Species and birds identified within the site and the immediate vicinity were recorded and their behavioural activity noted. In particular, the site and surroundings were assessed for their potential to support birds of nature conservation importance, including those listed as 'Red Species' or 'Amber Species' in the Royal Society for the Protection of Birds (RSPB) List of Birds of Conservation Concern 2009, UK and Local Biodiversity Action Plans (BAPs) and/or those included on Schedule 1 of the Wildlife and Countryside Act 1981 (As Amended).

All breeding birds and their nests are protected under the Wildlife and Countryside Act 1981 (As Amended) whereby it is an offence to damage or destroy the nest of any wild bird while it is in use or being built.

6.2.5 Water Voles and Otters

Waterbodies and watercourses recorded in the vicinity of the site were assessed for their potential to support water voles (*Arvicola terrestris*) and otters (*Lutra lutra*), including the presence of key features such as steep-sided earth banks, established bankside and emergent vegetation, and sufficient water depth. Physical evidence such as droppings, cut vegetation, spraints and burrows were also recorded as part of the survey.

6.2.6 Great Crested Newt

Water bodies recorded at the site and within 250m were assessed for their potential to support great crested newt (*Triturus cristatus*). In addition to this an assessment of terrestrial habitat was made with regard to its suitability to support great crested newt along with egg search and torching. The Habitat Suitability Index (*Oldham et al*) approach was also used.

Great crested newts and their sites or structures of breeding or shelter are afforded legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended) and the Conservation (Natural Habitats &c.) (Amendment) Regulations 2007.

6.3 Invasive Weeds

Plant species identified within Schedule 9 of the Wildlife and Countryside Act 1981 (As Amended) were searched for during the walkover survey. Plants included within the Schedule include Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*). It is an offence under this Act to spread or cause the spread of these species.

The presence of habitats potentially suitable for species of conservation importance other than those discussed above were also noted where applicable.

6.4 BREEAM Assessment

BREEAM is an assessment for design professionals to allow them to understand and where possible, mitigate the environmental impact of a building development. This is achieved through a credit based scoring method where credits are awarded for conforming to the specification in

the BREEAM manual for that particular development type. The proposed development will be scored using the BREEAM Bespoke Manual (2008).

One of the topic areas covered by BREEAM is 'Landscape and Ecology'. The subsections and credits available within this area are covered in this report along with recommendations for compliance based on the current stage of development. The design stage of the proposed development is not yet finalised therefore ecological input will be required as part of the detailed design stage.

7. ECOLOGICAL BASELINE

The ecological features described are the combined results of the Extended Phase 1 Habitat Survey and desk-top survey.

7.1 Environmental Designations

No statutory internationally, nationally or locally designated first tier areas were noted to be present within the site based on the available information obtained for the study.

The following internationally designated areas (also known as 'Natura 2000' areas) are located within 10km of the site:

- Berwyn and South Clwyd Special Area of Conservation (SAC) – located 6.1km north west of the site;
- Johnstown Newt Sites SAC – located 5.2km north of the site (at its closest point);
- River Dee and Bala Lake SAC – located 850m north east of the site (at its closest point);

The Berwyn and South Clwyd SAC has been designated as it supports the largest stands of European dry heaths and extensive tracts of near natural blanket bog in Wales. It is considered that there will be no direct or indirect impacts to this designated area due to the distance and nature of the proposed development. The SAC is not hydraulically connected to the site and it is not considered likely that the proposed development will result in acidification of the heathland based on emissions created through traffic generation.

Johnstown Newt Sites SAC has been designated as it supports one of the largest great crested newt populations in the UK. Again, based on the distance to the site and the nature of the proposed development it is not likely there will be any adverse effect on the SAC.

The River Dee and Bala Lake SAC has been designated as it supports Annex I and Annex II species including several species of water crowfoots (*Ranunculus spp.*), Atlantic salmon (*Salmo salar*), floating water plantain (*Luronium natans*), lamprey (*Lampetra spp.*), bullhead (*Cottus gobio*) and otter. Based on the location, topography and proximity to the site it is considered that the SAC is located within the catchment of the River Dee. The location of the SAC in relation to the site is shown on Figure 4. It is therefore likely that the site is in hydraulic connection to the River Dee. Measures will be required to ensure that the proposed development does not adversely effect the River Dee through diffuse and direct pollution.

It is understood that Sustainable Drainage Techniques (SuDS) including ponds and swales and other methods such as the use of petrol/oil interceptors (in accordance with the Environment Agency's Pollution Prevention Guidance Note 3 'Use and Design of Oil Separators in Surface Water Drainage Systems') will be used to manage water quality and rate. A drainage strategy has been prepared as part of the planning submission for the development. On this basis it is not considered that there will be an adverse effect on the SAC however, an Appropriate Assessment under the Habitats Regulations may be required to demonstrate this.

In addition to the above two Site of Special Scientific Interest (SSSI) are located within 2km of the site; Nant Y Belan and Prynella Woods SSSI and River Dee SSSI are located 1km north and 850m north east of the site respectively and are both of national importance. Three second tier, non statutory areas have been identified within 2km of the site. These are:

- Barracks Field Wildlife Site – located 300m west of the site
- Bolas Dingle Wildlife Site – located 900m south east of the site; and

- Canal Wood Wildlife Site – located 1.8km south west of the site.

With the exception of the River Dee SSSI which is discussed above it is considered there will be no significant adverse effects on the above wildlife areas based on the location, scale, magnitude and type of development.

7.2 Desk-Top Information

Species records obtained from Cofnod indicate that a number of species have been recorded at close proximity to the site. These are discussed below. A copy of the species records obtained from Cofnod is included in Appendix A.

The records show that cinnabar moth (*Tyria jacobaeae*) was recorded in the woodland in the eastern part of the site in 2002. The records also indicate that shaded broad-bar (*Scotopteryx chenopodiata*) and polecat (*Mustela putorius*) have been recorded within close proximity. Cinnabar and shaded broad-bar are both listed under Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006. Polecat is protected under the Habitats Directive. The records refer to two dead polecats recorded in 2007 along the A5 Chirk Bypass at the Halton Roundabout.

The species listed under Section 42 of the NERC Act 2006 have been identified as those of principle importance in Wales which require promotion of their conservation status. The proposed development is not likely to affect moth species at the site as it is not proposed to significantly develop areas of the site which may affect moth species (such as trees, shrub and grassland habitats). There is also potential to improve the habitats at the site to provide better conservation opportunities for these species.

No herpetofauna has been recorded at the site although there are records of great crested newts present 1.5km south west of the site.

Common pipistrelle bat (*Pipistrellus pipistrellus*) have been recorded in various locations in the Chirk area the closest of which is approximately 500m west of the site.

Other notable species recorded within 2km of the site include otter, water vole and barn owl (*Tyto alba*).

7.3 Phase 1 Habitat Survey

The habitats noted at the site during the site walkover comprised:

- A1.1.1 Semi natural broad leaved woodland;
- B2.2 Semi improved neutral grassland;
- B4 Improved grassland;
- C3.1 Tall ruderal herb and fern;
- G1 Standing water;
- J1.3 Ephemeral/short perennial; and
- J2.3.2 Species poor hedgerow.

Habitats located adjacent to the site (aside from those listed above) comprised:

- J1.4 Introduced shrub;
- J3.6 Buildings;
- J4 Bare ground (hardstanding).

These habitats are shown on the Phase 1 Habitat Map (Figure 4) with corresponding Target Notes included in Appendix B.

7.3.1 A1.1.1 Semi Natural Broad Leaved Woodland

A block of semi natural broad leaved woodland is present in the central and eastern parts of the site. The woodland comprised young and semi mature species of oak (*Quercus spp.*), rowan (*Sorbus aucuparia*), hawthorn (*Crataegus monogyna*), alder and silver birch (*Betula pendula*). It was noted that drainage was poor in the central area of woodland. A small number of pine trees were noted in the eastern part of the site amongst the broad leaved species.

It is understood that part of the wooded area in the central part of the site will be cleared to provide pedestrian and vehicular access to the dragon.

7.3.2 B2.2 Semi Improved Neutral Grassland and B4 Improved Grassland

The majority of the site was found to comprise improved or semi improved grassland. Dominant species included perennial rye grass (*Lolium perenne*) with herbaceous species such as clover (*Trifolium spp.*).

7.3.3 C3.1 Tall Ruderal Herb and Fern

Tall ruderal herb species were noted throughout the site particularly along the field boundaries and habitat edges. Species comprised nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), yarrow (*Archillea millefolium*), common ragwort (*Senecio jacobaea*), rosebay willowherb (*Chamerion angustifolium*) and dock (*Rumex spp.*).

7.3.4 G1 Standing Water

A small attenuation pond is located in the northern part of the site. The water level during the time of the survey was low and the pond was found to be dominated by reed mace (*Typha spp.*). The pond was found to be heavily silted and surrounded by improved grassland.

7.3.5 J1.3 Ephemeral/Short Perennial

Ephemeral/short perennial species were found across the site but were principally found in areas alongside tall ruderal vegetation. Species noted included greater plantain (*Plantago major*), ribwort plantain, white clover (*Trifolium repens*), dandelion (*Taraxacum officinale agg.*) and field bindweed (*Convolvulus arvensis*).

7.3.6 J2.3.2 Species poor hedgerow

Species poor hedgerow was recorded along the site boundaries as well as delineating internal field borders. These were predominantly found to comprise hawthorn. The hedgerows at the site are considered to be 'not important' when assessed against the Hedgerow Regulations 1997.

7.4 Consultation

As part of this study the following organisations were contacted:

- Countryside Council for Wales (CCW);

- Wrexham CBC; and
- Clwyd Bat Group.

The consultations confirmed that there was potential for bats to be present in the area and that the site is located in close proximity to known lesser horseshoe bat (*Rhinolophus hipposideros*) roosts at Chirk Castle. Chirk Castle is located approximately 4km south west of the site and it is considered that lesser horseshoe bats usually have a range of some 2.5km from roost sites. However, CCW stated that their records indicate that the natural range of this species is gradually moving eastwards in North Wales.

The proximity of ponds in the area was also highlighted specifically with regard to great crested newt which has been recorded in the Chirk area.

7.5 Potential for Notable or Protected Fauna within the Site

Bats

No buildings are located at the site therefore only the trees were assessed for the potential presence of roosts. The trees in the central part and most of those in the eastern part of the site were considered to have no potential for bat roosting as the trunk diameters were less than 30cm or did not offer suitable features for roosting. Some trees in the eastern part of the site could have low potential for roosting bats based on the trunk diameters but were found not to have suitable features such as crevices and voids due to the young age and species of tree in this area. In any case the trees in the eastern part of the site are proposed to be retained as part of the development.

Bats also use trees, lines of trees and hedgerows to navigate at night. Loss or damage to such features affects the ability of bats to commute safely and economically between roosts and feeding sites. A gap in a hedge as little as 10 metres may force some bats to seek an alternative route or to change roosts. Even if not directly affected by development work, bat roosts may be abandoned if the connectivity of the landscape around it is lost by hedge or tree removal or breaking up of other linear features.

All bat species and their roosts are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended) and are listed under Schedule 2 of the Conservation (Natural Habitats &c.) (As Amended) Regulations 2007 which defines European protected species.

Three bat activity surveys were undertaken during June 2010 to establish the species using the site and the level of activity. This is detailed in Appendix C.

Parts of the scheme are proposed to be lit for safety and amenity reasons. The relationship between bats and artificial lighting is not fully understood, and currently the subject of ongoing research. However, lighting can cause bats to stop using a site or affect roost locations if present.

Many nocturnal insects are attracted to light, particularly those lamps that emit an ultra-violet element and particularly if it is a single light source in a dark area. Noctules (*Nyctalus noctula*), Leisler's (*Nyctalus leisleri*), serotine (*Eptesicus serotinus*) and pipistrelle (*Pipistrellus spp.*) bats swarm around white mercury streetlights (also metal halide) feeding on the insects that are attracted to the lights. However, slower flying species such as long-eared bats (*Plecotus spp.*), Brandt's (*Myotis brandtii*), whiskered (*M. mystacius*), Daubentons (*M. daubentonii*), Natterer's (*M. nattereri*), Bechsteins (*M. bechsteini*), barbastelle (*Barbastella barbastellus*) and greater and lesser horseshoe bats (*Rhinolophus spp.*) generally avoid artificial light.

Insects may be attracted to lights from further afield thereby reducing the amount of insects available to those bats that avoid light and have to forage in those insect depleted dark areas.

Furthermore, those bats that are attracted to artificial light may be at risk of being preyed upon by birds that normally only hunt in daylight. Birds such as kestrels, sparrowhawks and hobbies are normally diurnal raptors but some observations have recorded kestrels hunting at night under artificial lights. Avoiding such predation by day flying birds may be one of the reasons why bats have evolved to hunt at night. Lighting is considered to be particularly harmful if used near woodland edges, ponds and along river corridors and hedgerows used by bats.

Artificial lighting disrupts the normal light patterns of night and day and may, as a result, affect the natural behaviour of bats. Bats may move away from lit areas and some areas of continuous lighting may create a barrier that some species will not cross. This may affect social interaction.

The surveys found that common pipistrelle was the predominant species recorded with some soprano pipistrelle and noctule recorded. All species were noted foraging or commuting along the tree lines and hedgerows at the site. No other species were recorded during the surveys.

The construction of the proposed development will not affect bats to any great degree in terms of loss of roosting potential but there will be the loss of vegetation in the central part of the site that may affect foraging. Replacement planting in this area will be required to minimise gaps along potential flight lines.

Lighting of the site and an increase in human activity may well have an effect on foraging bats. The effect of lighting on bats will depend on the level of light spillage onto roosting, commuting and foraging areas and the duration of that light pollution. As little as 0.06 lux can cause a disturbance to bats according to some researchers but reducing light spill to levels as low as this is difficult. Light spillage onto adjacent trees and hedgerows have been minimised based on the current lighting design and measures in place to reduce spillage accordingly. The proposals include lighting of operational areas only. There is no definitive lighting design for the tower and dragon at this time and this will need to consider the implications on bats.

The northern part of the site was found to be generally well lit from light spillage from street lighting associated with the McDonald's restaurant whilst the remaining areas were generally dark.

In terms of duration of lighting this again should be minimised wherever possible. It is understood that proposals will include lighting of the car park areas, main pedestrian footpath and access road. It is understood that the scheme will be lit throughout the year but timers will turn off the lighting at midnight each day.

The illumination of the site in September, November, October and April period may affect bat foraging significantly but less so in the months of January to early March. However, winter bat activity is highly weather dependant.

Lighting around the structure, buildings and car park will be directed to where it is needed by the designs of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. The height of lighting columns in general should be as short as possible as light at a low level reduces the ecological impact. It is understood that low level lighting will be used where practicable. If lighting is not needed then it is recommended

that it is not lit. The lighting design has only included lighting in the area occupied by the dragon and tower and has been designed to avoid the majority of the tree lines.

Whilst the bats (pipistrelle and noctule) encountered during the surveys are species of bats that are attracted to certain artificial lights to feed on the insects, the presence of some bat species that avoid artificial light cannot be ruled out by this survey merely because they were not encountered during the three survey visits.

Measures to ensure that there will be no net loss in the local bat status will need to be considered taking into account factors such as population distribution, viability and connectivity.

Badgers

No evidence (such as setts or droppings) of badgers was noted at the site during the walkover and no records of this species have been recorded at the site. Fox and rabbit scat was noted throughout the site. It should be noted that no evidence of polecat (such as scat) was recorded at the site. The field compartments were found to be contained with post and rail fencing including mesh inserts. Little evidence of burrowing and hairs was recorded. Some burrows and holes were noted in the wooded area in the eastern part of the site. No evidence was found during the site walkover (and subsequent surveys for bats and great crested newts) that badger is present in this area. On this basis it is considered that there will be no impact to this species as a result of the development although it should be noted that badgers and their setts have been recorded in the wider area.

Reptiles

The habitats within the site were largely unsuitable for use by reptile species due to the lack of varied vegetation structure that would provide suitable basking, foraging and feeding opportunities. No evidence of reptiles was found following a search of refuges and hibernacula during the survey and during subsequent visits to the site as part of the bat and great crested newt surveys.

Birds

The following bird species were noted during the survey:

- Blackbird (*Turdus merula*);
- Magpie (*Pica pica*);
- Nuthatch (*Sitta europaea*); and
- Wood pigeon (*Columba palumbus*).

Some evidence of breeding birds and breeding behaviour was noted during the site walkover. However, there is some habitat suitable for use by nesting birds such as the trees, introduced shrubs and hedgerows. As the development will involve the removal of vegetation at the site these activities should be undertaken outside of the bird nesting season (March to August) to prevent impact to nesting birds. Under current European and UK legislation it is an offence to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy a nest whilst it is in use or being built; and
- Intentionally take or destroy eggs.

All cut trees and vegetation should be chipped or removed off site to prevent colonisation by nesting birds during the nesting period above to prevent potential delays to the development programme.

All breeding birds are protected under the EU Birds Directive and the Wildlife and Countryside Act 1981 (As Amended).

Water Voles and Otters

No watercourses or ditches are located in close vicinity to the site and no evidence (such as burrows or droppings) of these species was noted during the surveys. As stated above no evidence of polecat was found at the site. It is considered that there will be no impact to these species as a result of the development as no works are proposed near watercourses.

Great Crested Newts

Following a review of Ordnance Survey mapping, aerial photography and site walkover three ponds have been identified within 250m of the site. Two of the ponds were surveyed on four occasions using a combination of methods including terrestrial search, egg search and torch survey. In addition to this a HSI assessment was undertaken to determine the suitability of the ponds for great crested newts. The third pond was discounted based on its location and proximity of a barrier to migration (see below).

Great crested newts are protected under both European and UK legislation, the European Habitats Directive and the Wildlife and Countryside Act.

Pond A is a small pond located in the northern part of the site at OSNGR 330167E 339750N that is currently used as an attenuation pond for discharged surface water from the adjacent McDonald's restaurant. The pond was noted to be dominated by *Typha spp.* and have low water levels at the time of the surveys. Water quality varied but generally appeared to be poor. The findings of the HSI are included in Appendix D but the assessment showed that this pond has poor suitability to support great crested newts. No amphibians were recorded during torch surveys or terrestrial searches and no eggs were found.

Pond B is a small pond located approximately 100m south of the site off Green Lane. The pond was found to be completely shaded by trees but did have some macrophyte and emergent vegetation. The pond was found to be heavily silted. The HSI assessment showed that this pond has poor suitability to support great crested newts. No amphibians were recorded during torch surveys or terrestrial searches and no eggs were found.

Pond C is a large pond located approximately 220m west of the site beyond the A5 road. No access was possible to this site but aerial photographs indicate the pond is man made and appears to be used for recreational or ornamental purposes. It is considered that the A5 road forms a barrier to the migration of great crested newt and other amphibian species.

The site does support suitable terrestrial habitat for great crested newts including hedgerow and woodland although the areas of grassland are sub-optimal. There are no records of great crested newt within 1km of the site. It is therefore considered that the proposed development will not impact this species.

7.6 Invasive Weeds

No invasive weeds listed under Schedule 9 of the Wildlife and Countryside Act 1981 (As Amended) were recorded at the site.

8. BREEAM REQUIREMENTS

A summary of the relevant subsections of the Landuse and Ecology section is shown below along with a commentary of the credit requirements. An extract of the Landuse and Ecology chapter from the BREEAM Bespoke Manual is also included in Appendix E.

8.1 LE3 Ecological Value of Site and Protection of Ecological Features

8.1.1 Credit Aim

To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during the site preparation and completion of construction works.

8.1.2 Credit Criteria

Where evidence demonstrates that the site's construction zone is defined as land of low ecological value and that all existing features of ecological value will be fully protected from damage during site preparation and construction works (one credit available).

8.1.3 Actions for Compliance

It is considered that the site has features of ecological value such as woodland and hedgerows that are proposed to be removed. Therefore, it is considered that this credit is not achievable on this basis.

8.2 LE4 Mitigating Ecological Impact

8.2.1 Credit Aim

To minimise the impact of a building development on existing site ecology.

8.2.2 Credit Criteria

Where evidence provided demonstrates that the change in the site's existing ecological value, as a result of development is minimal (one credit available).

Where evidence provided demonstrates that there is no negative change in the site's existing ecological value as a result of development (one credit available).

8.2.3 Actions for Compliance

Two credits should be achievable from this subsection and there is potential to provide significant enhancement. This will ensure that there has been no negative change to the site's ecological value as a result of the development. Potential ecological enhancement could include the provision of a pond or species rich grassland, which will provide suitable habitat for invertebrates and species such as birds. The provision of enhancement will need to be incorporated into the project design and it is recommended that this is undertaken by an experienced ecologist.

8.3 LE 5 Enhancing Site Ecology

8.3.1 Credit Aim

To recognise and encourage actions taken to maintain and enhance the ecological value of the site as a result of development.

8.3.2 Credit Criteria

Where the design team (or client) has appointed a suitably qualified ecologist to advise and report on enhancing and protecting the ecological value of the site; and implemented the professional's recommendations for general enhancement and protection of site ecology (one credit available).

Where there is a positive increase in the ecological value of the site of up to (but not including) six species (one credit available).

Where there is a positive increase in the ecological value of the site of six species or greater (one credit available).

8.3.3 Actions for Compliance

Provided the mitigation and recommendations in this report are met the first credit will be satisfied.

For the second and third credits ecological enhancement will need to be incorporated into the design evolution of the project to allow an increase in species numbers at the site. Given the land take available at the site it is possible that three credits could be achieved through the design and implementation of features to increase biodiversity at the site (e.g. ponds, green roofs, hibernacula). The ecology calculator will need to be used to record the actual increase in species numbers after the construction and the general recommendations followed from this and subsequent ecological reports.

8.4 LE6 Long Term Impact on Biodiversity

8.4.1 Credit Aim

To minimise the long term impact of the development on the site's, and surrounding area's biodiversity

8.4.2 Credit Criteria

The client has committed to achieving the mandatory requirements listed and at least two of the additional requirements (one credit available).

The client has committed to achieving the mandatory requirements listed and at least four of the additional requirements (one credit available).

8.4.3 Actions for Compliance

The mandatory requirements for the first credit will be achievable if a five year landscape and management plan is prepared and implemented for the proposed development. The plan should be prepared by an experienced ecologist and approved prior to site works commencing.

The project will also need to demonstrate that UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the design and construction process.

It should be possible to achieve the second credit as all five of the additional requirements can be applied to this site. The requirements will need to be discussed with the project design team and the client with regard to what they are prepared to include as part of the design and construction of the development.

9. MITIGATION AND ENHANCEMENT

The proposed development has the potential to offer significant ecological enhancement opportunities. Consideration could be given to the inclusion of ecological enhancement at the site as part of the design proposals and are summarised below and shown in Appendix F on the masterplan and landscape layout:

- Construction of bat boxes within the buildings, use of wooden and stone cladding to form semi-natural roosts and erection of external bat boxes on trees at the site;
- Construction of ponds/wetland areas. Ponds should be irregular in shape and be constructed to offer easy access/egress for herpetofauna and other fauna, shallow and deep areas, and suitable aquatic planting;
- Species rich meadows will be created and suitably managed to increase biodiversity (particularly invertebrates such as moths and butterflies);
- Increase and improve existing tree planting at the site using native species of local provenance. This could include species such as black poplar (*Populus nigra*);
- Improve existing hedgerows at the site to increase diversity;
- Construction of insect hibernacula and use of dead wood;
- General use of water features such as pools, scrapes swales or ponds that will be suitably planted;
- Provision of wet/flush meadow planting/habitat;
- Sensitive use of lighting at the site to ensure that bat species are not impacted by the proposal. Measures will include minimising lighting where practicable, use of cowls and directional lighting to prevent spillage and timers to reduce use of lighting. The proposed lighting diagram showing lux levels is included in Appendix G.;
- Minimise use of lighting on hedgerows and tree lines that could be used by bats for foraging or commuting;
- Unmanaged landscaped areas to encourage moths and other invertebrates; and
- Use of SuDS and other measures to prevent surface water run-off and pollution incidents that could affect Natura 2000 areas.

There is also potential to create a night roost suitable for lesser horseshoe and other bat species. The proposed lodge building has been identified as a suitable building as it has a roof space that can be converted into a suitable void for use by roosting bats. The specifications and principles stated in the 'Lesser Horseshoe Bat Conservation Handbook' (Vincent Wildlife Trust, 2008) and the 'Bat Workers Manual' (Mitchell-Jones, 2004) should be used.

10. CONCLUSIONS

An Extended Phase 1 Ecological Appraisal was undertaken for the proposed Welsh Dragon development at Black Park, Chirk. This comprised desk study information, consultations and a site walkover including protected species surveys.

No statutory, first tier internationally, nationally or locally designated areas are located at the site although a number of internationally and nationally designated areas are located within 10km from the site. The closest of these is the River Dee and Bala Lake SAC located 850m north east of the site at its closest point. There is potential for adverse impacts to this Natura 2000 site as a result of the proposed development through diffuse pollution as it is in hydraulic connection with the River Dee. There are not likely to be any adverse effects on other statutory and non statutory designated sites located close to the site.

A number of species have been recorded on or in close vicinity of the site following a review of the data received from Cofnod. These include cinnabar moth, shaded broad-bar and polecat. No protected species were recorded during the site walkover.

The habitats at the site were noted to mostly comprise areas of improved and semi-improved grassland with areas of broad leaved woodland in the central and eastern parts of the site. These are habitats of ecological value. The site is bounded by hedgerow and trees which are also of ecological value. There will be loss of grassland areas as part of the scheme as well as the wooded area in the central part of the site. However, there are significant opportunities for habitat improvement as part of the scheme.

Trees and vegetation could be used by nesting birds during the breeding season (March to August). Some evidence of nesting activity was noted during the site walkover in the wooded areas. Trees and vegetation are also likely to support invertebrate communities including moth species. The hedgerows at the site are considered to be 'not important' under the Hedgerow Regulations 1997 and therefore require no specific planning permission to be removed if required. The only vegetation to be cleared as part of the works is the area of woodland in the central part of the site.

No existing buildings are located at the site and none of the trees are considered to have suitable features which could be used by bats for roosting (negligible or low potential). The hedgerows and tree lines do offer suitable foraging habitat and provide commuting routes for bats. Bat activity surveys undertaken indicate the site is used mostly by common pipistrelle bat but noctules and soprano pipistrelle were also recorded in low numbers.

Lighting has the potential to impact bat foraging activity at the site. The lighting design for the scheme uses low level lighting where practicable and has avoided the majority of the tree lines in areas that are currently not lit. There will be some impact associated with lighting in the central part of the site but is not considered to be significant based on the majority of the site that will remain unlit. It is not known at this time what the proposed lighting proposals are for the tower and dragon itself.

No other evidence of protected species were recorded at the site during the walkover. Three ponds have been identified either on or within 250m of the site. Two of the ponds have been surveyed using torching, egg search and terrestrial refuge search and no evidence of great crested newt was found. HSI assessments have been undertaken for two of the ponds and were considered to be of poor suitability for great crested newts. The third pond is located to the west of the A5 road which is considered to be a barrier to the migration of amphibians.

Whilst the site offers suitable terrestrial habitat it is considered that great crested newts are not likely to be present.

The remaining habitats at the site comprise tall ruderal herb and fern, standing water, ephemeral/short perennial species and introduced shrubs. These habitats are of varying ecological value.

No evidence of invasive weeds listed under Schedule 9 of the Wildlife and Countryside Act 1981 (As Amended) (which makes it an offence to knowingly spread or cause to grow these species) were recorded at the site.

11. RECOMMENDATIONS

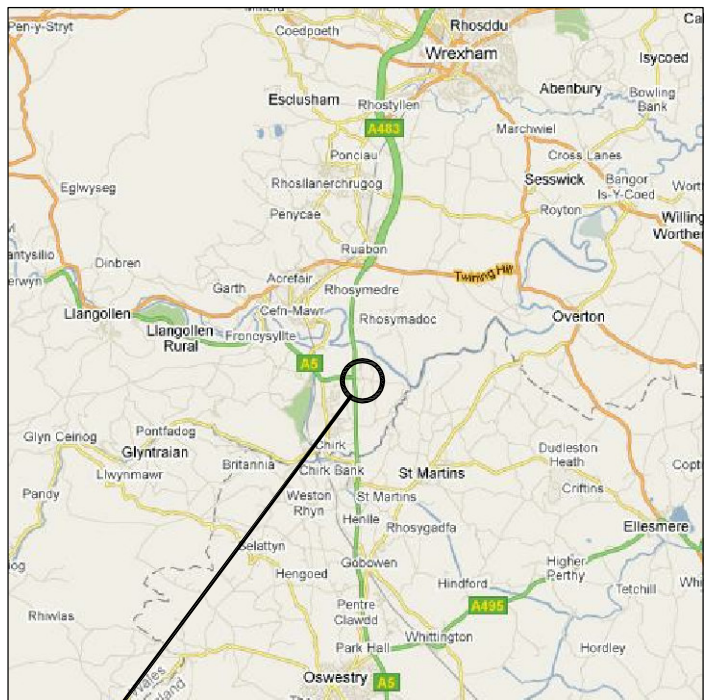
The site is currently considered to be of some ecological value. However, we would make the following recommendations in regards to the protection and enhancement of ecological receptors at the site:

- It is recommended that environmental best practice is used during the construction phase of the development to prevent any impacts to designated sites particularly the River Dee and Bala Lake SAC. This will include the use of SuDS, the Environment Agency's Planning Pollution Guidelines and other standards. It is recommended that a Construction Environment Management Plan is developed which should have input from an experienced ecologist. An Appropriate Assessment may be required to demonstrate the scheme will not have an adverse effect on Natura 2000 sites.
- Trees to be retained at the site should be protected in accordance with the guidelines in BS5837:2005 Trees in relation to Construction. It should be noted that this may involve protection measures for trees outside the site boundary, though the protection works may lie on the site itself.
- Any trees or vegetation clearance is undertaken outside the bird nesting season (March to August) and that all vegetation is removed or chipped to prevent nesting birds using this material to prevent delays to the programme. If vegetation clearance is undertaken during the bird nesting season an ecologist must be present on site to ensure that no nests are disturbed. If nesting birds are found to be present then all works in that area must cease immediately, an exclusion zone set up around the nest until the young have fledged and nest is disused.
- Consideration should be given to exploring the opportunities for ecological enhancement for the site where practicable. Enhancement measures identified include ponds, areas of soft landscaping using native plant species of local provenance, species rich grassland meadow, wet flushes, tree and shrub planting, bat and bird boxes, construction of a bat loft and construction of insect hibernacula. It is recommended that ecological input is allowed for during the detailed design of the development. This will encourage a diversity of fauna and flora to develop at the site.
- The mitigation works will include a 'bat loft' within the proposed lodge building for species such as lesser horseshoe bat. This should be constructed in accordance with the specifications in the Bat Workers Manual and Lesser Horseshoe Bat Conservation Handbook. Features to allow bats to access and egress the loft will be required and features such as ridge ventilators, louvers, tile saddles and slits will be used. The provision of bat boxes will also be required for species such as pipistrelle bat. The design and siting of these features will be undertaken in liaison with an ecologist.
- It is recommended that a Habitat Management Plan is produced to manage the ecological design and requirements for the proposed development. This should include issues such as design and maintenance. Measures should include issues such as not leaving excavations open overnight or alternatively providing means of escape ramps for species such as badger.
- Lighting around the buildings, footpaths and car park should be directed to where it is needed by the designs of the luminaire (use low level where practicable) and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. The height of lighting columns in general should be as short as possible as light at a

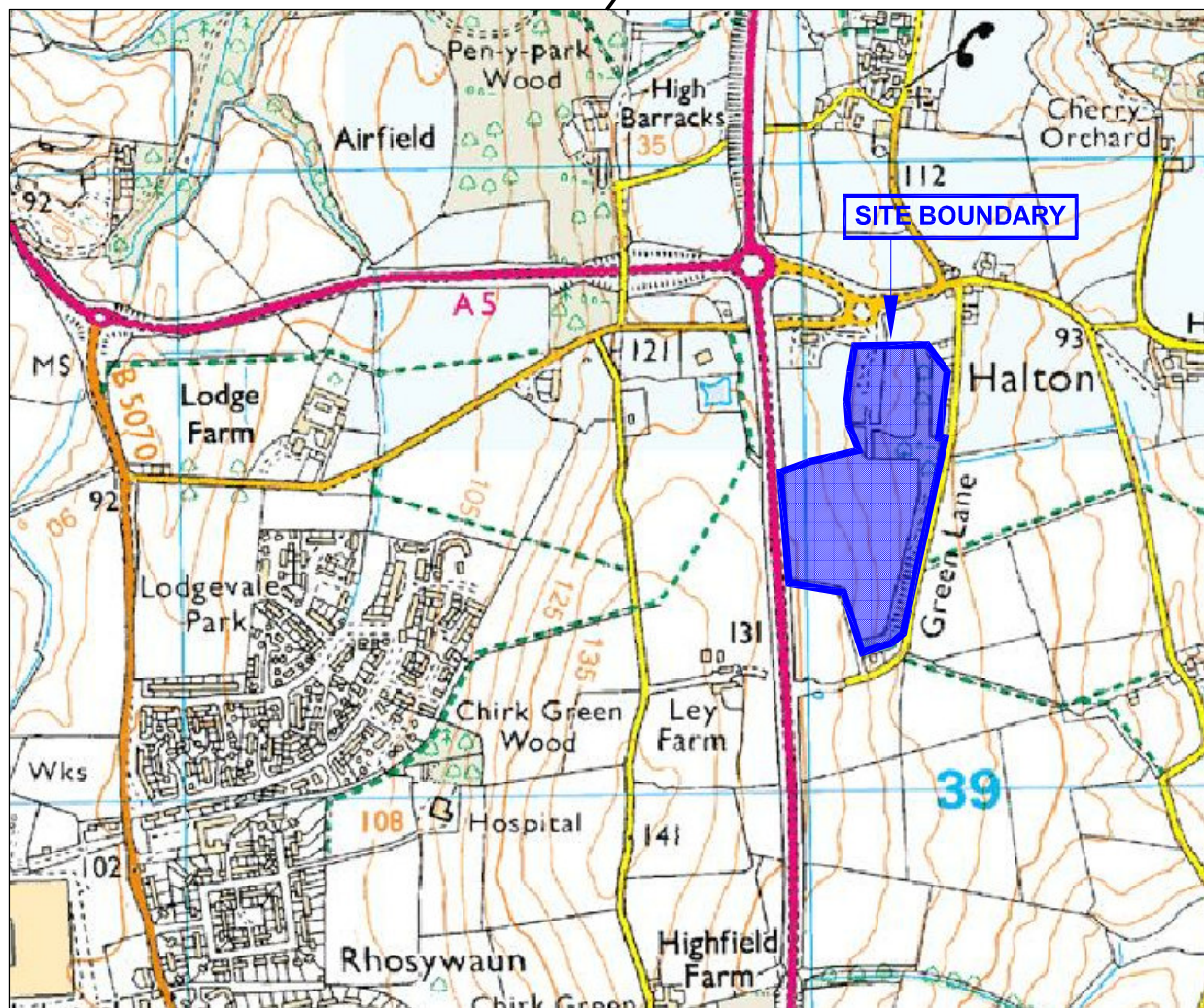
low level reduces the ecological impact. No lighting should be directed onto tree lines or hedgerows. If lighting is not needed then it is recommended that these areas are not lit.

- It is recommended that the ecological considerations of the development are included within the development detailed design. This will be essential to ensure that the development complies with legislation, that the ecology at the site is enhanced and that the maximum credits are achieved through the BREEAM assessment process.

FIGURES



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Project

THE WELSH DRAGON

scale (at A4)

NTS

date

FEB 2010

drawn

JRW

Drg. Title

SITE LOCATION
PLAN

drg. no.

16735-DE-001

rev.

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NOTES

Key

Site boundary.
(Proposed development)

Rev.	I	
Drawn	AF	
Chkd.	MU	
Apprvd.	CSR	
Date	21.06.10	
Description	FOR INFORMATION	

Rev.	I	
Drawn	AF	
Chkd.	MU	
Apprvd.	CSR	
Date	21.06.10	
Description	FOR INFORMATION	

Client

THE FRANK WINGETT CANCER APPEAL

Project

THE WELSH DRAGON

Drawing Title

EXISTING SITE PLAN

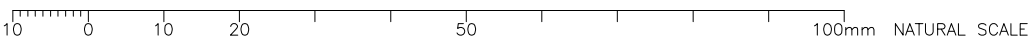
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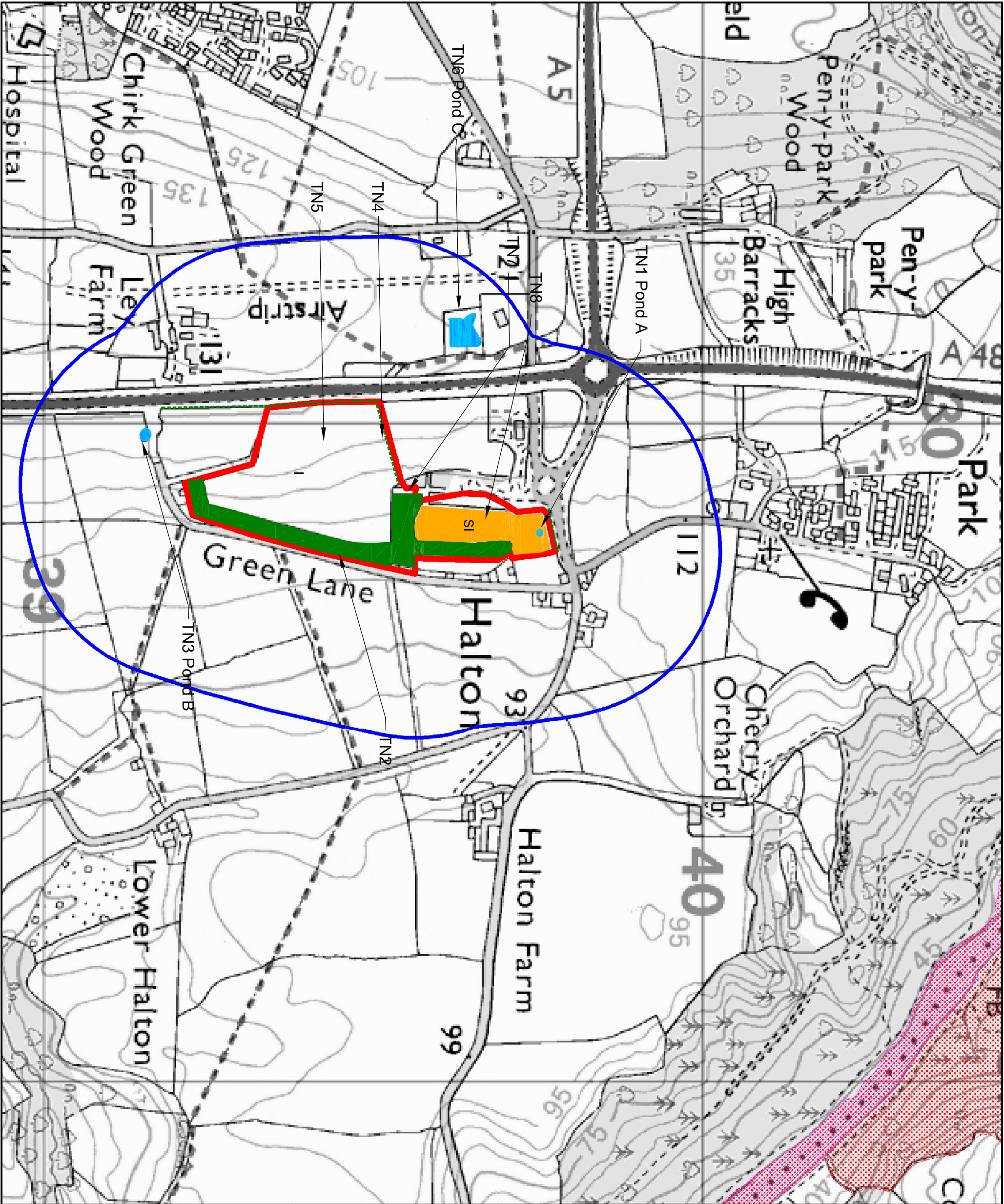
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drq. no. rev.

16735-FIGURE 2 -



-	AF	MU	CSR	30.06.10	FOR INFORMATION		
Rev.	Drawn	Chkd.	Apprvd.	Date	Description		
Client THE FRANK WINGETT CANCER APPEAL							
Project THE WELSH DRAGON							
Drawing Title PROPOSED SITE PLAN							
20 Nicholas Street, Chester, CH1 2NX Tel : 01244 311855 Fax : 01244 314560 www.gifford.uk.com							
scale (at A3) 1:2500		date JUNE 2010			drawn AF		
drg. no. 16735-FIGURE 3							rev. -



NOTES

- A1.1.1 Broad Leaved Woodland
- B2.2 Semi Improved Neutral Grassland
- B4 Improved Grassland
- C3.1 Tall Ruderal Herb and Fern
- G1 Standing Water
- J1.3 Ephemeral/Short Perennial
- J4 Bare Ground
- J2.3.2 Species Poor Hedgerow
- TN1 Target Note
- Site Boundary
- 250m Buffer Around Site Boundary
- River Dee and Bala Lake SAC

Rev.					
Drawn	GP	JDT	MU	30.06.10	PRELIMINARY
Chkd.					
Apprvd.					
Date					
Description					

Client

THE
FRANK WINGETT
CANCER APPEAL

Project

THE WELSH DRAGON

Drawing Title

PHASE 1 HABITAT MAP

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scale (of A3)

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date

JUNE 2010

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GP

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17318-FIGURE 4

rev.

-

APPENDICES

APPENDIX A

Biological Species Records Received from Cofnod

Please read **Important Issues** and **Notes** before interpreting the following information.

Site Name	Grid Reference
Welsh Dagon	SJ303390

Biodiversity Information Search (Species, Habitats & Sites) E01488 (Public) Page 1 of 10

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
Luronium natans (Floating Water-plantain/Llyriad-y-Dwr Amofiol)	SJ286397 (Estimated from Map)	1987	Anon			Shropshire Union Canal		D0821/001/01 (55156)	Bern, EPS, HDir, RD2, S42, UKBAP, WCA8, LBAP[CON,DEN,GWY,SNP]	3
Chiroptera (A Terrestrial Mammal)	SJ2837 (Estimated from Map)	19/07/1999	Anon	0		Site Name Withheld		D1049/001/02 (683062)	WCA5	3
Erinaceus europaeus (West European Hedgehog/Draenog)	SJ291376	1979	Anon			Chirk		D1072/001/01 (407656)	S42, UKBAP, LBAP[ANG,CON,FLI,GWY]	3
Arvicola terrestris (European Water Vole/Llygoden Bengron y Dwr)	SJ2863539906	25/08/1996	C.C.W. Record			Firbank		D1118/013/01 (694343)	S42, UKBAP, WCA5, LBAP[ANG,CON,DEN,FLI,GWY,SNP]	1
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3039	17/04/2003	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: AQ16.0. Please contact CBG for more details..	D0059/001/01 (804329)	BA, LBAP[CON,DEN,FLI,WRE]	3
Pipistrellus pipistrellus (Common Pipistrelle/Ystlum Lleiaf)	SJ2939	1987	Anon			Chirk nr		D1072/001/01 (408463)	Bern, Bonn, EPS, HDir, S42, WCA5, LBAP[ANG,CON,DEN,FLI,GWY,SNP]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3040	5 records, between 13/09/2001 and 28/10/2003	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: B87.0. Please contact CBG for more details.; CBG Ref: B23.0; CBG Ref: B25.0; CBG Ref: B25.2; CBG Ref: B25.3	D0059/001/01	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ2940	3 records, all on 11/11/2001	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: E22.0. Please contact CBG for more details.; CBG Ref: E4.0; CBG Ref: E4.1	D0059/001/01	BA, LBAP[CON,DEN,FLI,WRE]	3
Luronium natans (Floating Water-plantain/Llyriad-y-Dwr Amofiol)	SJ2937 (Estimated from Map)	1954	Anon			Shropshire Union Canal		D0821/001/01 (54998)	Bern, EPS, HDir, RD2, S42, UKBAP, WCA8, LBAP[CON,DEN,GWY,SNP]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ2937	17/04/2003	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: AP2.0. Please contact CBG for more details..	D0059/001/01 (804274)	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3140	14/06/1983	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: B29.0. Please contact CBG for more details..	D0059/001/01 (804416)	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3137	15/03/2005	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: AQ10.0. Please contact CBG for more details..	D0059/001/01 (804321)	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3239	17/04/2003	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: AQ9.0. Please contact CBG for more details..	D0059/001/01 (804320)	BA, LBAP[CON,DEN,FLI,WRE]	3
Satyrium w-album (White-letter Hairstreak/Brithribin W Wen)	SJ2840 (Centroid)	21/07/2001	Dr Jean A. Green	1	Field record / observation	SJ2840		D0127/001/02 (534048)	S42, UKBAP, WCA5, LBAP[FLI]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ2837	19/02/2006	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: AP23.0. Please contact CBG for more details..	D0059/001/01 (804304)	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3041	2 records, both on 28/10/2003	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: B76.0. Please contact CBG for more details.; CBG Ref: B76.1	D0059/001/01	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ3240	24/10/2003	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: B28.0. Please contact CBG for more details..	D0059/001/01 (804415)	BA, LBAP[CON,DEN,FLI,WRE]	3
Meles meles (Eurasian Badger/Mochyn Daear)	SJ2941	2 records, on 01/06/2000 and 19/03/2005	Clwyd Badger Group (CBG)		Badger Sett		CBG Ref: E3.0. Please contact CBG for more details.; CBG Ref: E43.1	D0059/001/01	BA, LBAP[CON,DEN,FLI,WRE]	3
Pipistrellus pipistrellus (Common Pipistrelle/Ystlum Lleiaf)	SJ2941	1987	Anon			Chirk nr		D1072/001/01 (408464)	Bern, Bonn, EPS, HDir, S42, WCA5, LBAP[ANG,CON,DEN,FLI,GWY,SNP]	3

Category 2 Species (Global Red List, British Red Data Book, Nationally Rare & Scarce, Welsh Red and Amber Birds & Welsh Vascular Plant Red Data List, where these are not identified in Category 1) within 2000m - 4 records										
Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
Parentucellia viscosa (Yellow Bartsia/Gorudd Melyn)	SJ296383	1999	Anon			Chirk		D0216/001/02 (1104238)	WVP	1
Senecio cambrensis (Welsh Groundsel/Creulys Gymreig)	SJ288395 (Estimated from Map)	1987	Anon			near Chirk		D0821/001/01 (55158)	RD1, RD2, WVP, LBAP[CON,FLI]	3
Carex elongata (Elongated Sedge/Hesgen Hir)	SJ286396	Before 2004	Anon			Canal		D0216/001/02 (1104359)	RD2, WVP	1
Orthotrichum striatum (Shaw's Bristle-moss)	SJ3041	1833	Wilson, W.			Nant-y-Belan etc SSSI		D1075/001/02 (1766540)	RD1	3

Category 3 Species (LBAP Species not identified under Categories 1 & 2, Locally Important species as specified by local experts) within 2000m - 36 records										
Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
Cottus gobio (Bullhead/Penlletwad)	SJ3158439157 (Estimated from Map)	09/09/2004	Unknown At E.A.W.	18	electrofishing	Ceiriog - Ceiriog eel survey	Quantative Survey. Surveyors:MH/RD/RPi	D1230/001/01 (883636)	HDir, LBAP[CON,DEN,FLI]	3
Ephemerella notata (An Insect - Mayfly (Ephemeroptera))	SJ317396	May 1987	Gabrielle Moffett	Present immature	Field Observation	Coed Leoedd, Chirk, R. Dee, River Dee, Denbighshire		D0217/001/01 (1033200)	LBAP[DEN]	3
Carex disticha (Brown Sedge/Hesgen Lygliw)	SJ286396	1977	Anon			Canal		D0216/001/02 (1104101)	LBAP[CON,GWY]	1
Aloina abides (Common Abe-moss)	SJ3040	1970	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1751741)	LBAP[CON,FLI]	3
Campyladelphus chrysophyllus (Golden Feather-moss)	SJ3040	1970	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1755733)	LBAP[CON]	3
Aphanorhagma patens (Spreading Earth-moss)	SJ3037	1972	Hill, M.O.			Chirk,nr		D1075/001/02 (1752502)	LBAP[CON,FLI]	3
Pleuroidium subulatum (Awl-leaved Earth-moss)	SJ3037	1950	Hill, M.O.			Chirk,nr		D1075/001/02 (1768177)	LBAP[CON]	3
Pohlia lutescens (Yellow Thread-moss)	SJ3037	1950	Hill, M.O.			Chirk,nr		D1075/001/02 (1768708)	LBAP[CON,FLI]	3
Calopteryx splendens (Banded Demoiselle/Morwyn Wych)	SJ2940	08/07/1983	T.J. Wallace	Present Adult		Pentre		D0067/001/01 (636531)	LBAP[SNP]	3
Calopteryx virgo (Beautiful Demoiselle/Morwyn Dywyll)	SJ2940	08/07/1983	T.J. Wallace	Present Adult		Pentre		D0067/001/01 (636532)	LBAP[SNP]	3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
<i>Mnium stellare</i> (Starry Thyme-moss)	SJ2937	1908	Richards, E.A.			Chirk		D1075/001/02 (1765384)	LBAP[CON]	3
<i>Bryum argenteum</i> (Silver-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1738624)	LBAP[CON]	3
<i>Climacium dendroides</i> (Tree-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740350)	LBAP[CON]	3
<i>Ctenidium molluscum</i> (Chalk Comb-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740609)	LBAP[CON]	3
<i>Eurhynchium praelongum</i> (Common Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742069)	LBAP[CON]	3
<i>Hookeria lucens</i> (Shining Hookeria)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1743585)	LBAP[CON]	3
<i>Pellia neesiana</i> (Nees' Pellia)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746545)	LBAP[CON]	3
<i>Plagiomnium cuspidatum</i> (Woodsy Thyme-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746995)	LBAP[CON]	3
<i>Pohlia wahlenbergii</i> (Pale Glaucous Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747658)	LBAP[CON]	3
<i>Schistidium rivulare</i> (River Grimmeria)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Schistidium rivulare</i> s.str..	D1075/001/02 (1749888)	LBAP[CON]	3
<i>Thamnobryum alopecurum</i> (Fox-tail Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1750797)	LBAP[CON]	3
<i>Amblystegium tenax</i> (Fountain Feather-moss)	SJ3041	1833	Wilson, W.			Nant-y-Belan etc SSSI		D1075/001/02 (1751937)	LBAP[CON]	3
<i>Brachythecium glareosum</i> (Streaky Feather-moss)	SJ3041	1830	Bowman, J.E.			Nant-y-Belan etc SSSI		D1075/001/02 (1753477)	LBAP[CON]	3
<i>Climacium dendroides</i> (Tree-moss)	SJ3041	1904	Jones, D.A.			Nant-y-Belan etc SSSI		D1075/001/02 (1756939)	LBAP[CON]	3
<i>Mnium stellare</i> (Starry Thyme-moss)	SJ3041	1950	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1765388)	LBAP[CON]	3
<i>Orthotrichum pulchellum</i> (Elegant Bristle-moss)	SJ3041	2 records, both in 1833	Wilson, W.; Bowman, J.E.			Nant-y-Belan etc SSSI		D1075/001/02	LBAP[CON, FLI]	3
<i>Plagiomnium cuspidatum</i> (Woodsy Thyme-moss)	SJ3041	1881	Lewis, J.H.			Nant-y-Belan etc SSSI		D1075/001/02 (1767564)	LBAP[CON]	3
<i>Rhynchostegiella teneriffae</i> (Teesdale Feather-moss)	SJ3041	1833	Wilson, W.			Nant-y-Belan etc SSSI		D1075/001/02 (1770948)	LBAP[CON]	3
<i>Sanionia uncinata</i> (Sickle-leaved Hook-moss)	SJ3041	1860	Wilson, W.			Nant-y-Belan etc SSSI		D1075/001/02 (1771816)	LBAP[CON]	3
<i>Calopteryx splendens</i> (Banded Demoiselle/Morwyn Wych)	SJ2941	06/06/1982	T.J. Wallace	Present Adult		Wynnstay Park		D0067/001/01 (636529)	LBAP[SNP]	3
<i>Calopteryx splendens</i> (Banded Demoiselle/Morwyn Wych)	SJ2941 (Site Centroid)	06/06/1982	Wallace, T J			Wynnstay Park		D0158/003/01 (1534344)	LBAP[SNP]	1
<i>Calopteryx virgo</i> (Beautiful Demoiselle/Morwyn Dywyll)	SJ2941 (Site Centroid)	2 records, both on 06/06/1982	Wallace, T J; Wallace, B			Wynnstay Park; Wynnstay Park, River Dee		D0158/003/01	LBAP[SNP]	1
<i>Calopteryx virgo</i> (Beautiful Demoiselle/Morwyn Dywyll)	SJ2941	2 records, on 06/06/1982 and 06/10/1982	T.J. Wallace; B. Wallace	Present Adult, Present Adult		Wynnstay Park; Wynnstay Park, R Dee	Collection -	D0067/001/01	LBAP[SNP]	3

Category 4 Species (Any species not included on the above lists) within 2000m - 227 records										
Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
<i>Archarius pyrrhoceras</i> (An Insect - Beetle (Coleoptera))	SJ301381	20/06/2003	Adrian Fowles	1 Adult	Field Observation	Chirk	swept from roadverge	D0217/001/01 (1018216)		3
<i>Kakapion pallipes</i> (Dogs-Mercury Seed Weevil)	SJ301381	20/06/2003	Adrian Fowles	1 Adult	Field Observation	Chirk	swept from roadverge	D0217/001/01 (1018217)		3
<i>Sitona (Sitona) lineatus</i> (Pea-leaf Weevil)	SJ301381	20/06/2003	Adrian Fowles	1 Adult	Field Observation	Chirk	swept from roadverge	D0217/001/01 (1018218)		3
<i>Petromyzontidae</i> (A Jawless Fish (Agnatha))	SJ3170039300 (Estimated from Map)	2 records, in 2002 and 2003	Unknown At E.A.W.	P, P	electrofishing	Ceiriog - Ceiriog eel site	Quantitive Survey	D1231/001/01		3
<i>Lissotriton</i> (An Amphibian)	SJ29503787	15/06/1992	Anon - Herpetofauna Consultants International	Egg				D1122/002/01 (1271218)		3
<i>Amphinemura standfussi</i> (An Insect - Stonefly (Plecoptera))	SJ314380	1980	Anon	Present	Field Observation	Glyn Morlas		D0217/001/01 (1081963)		3
<i>Agapetus delicatulus</i> (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080170)		3
<i>Alainites muticus</i> (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080175)		3
<i>Amphinemura sulciollis</i> (An Insect - Stonefly (Plecoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080148)		3
<i>Ancylus fluviatilis</i> (A Mollusc)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080187)		3
<i>Aphelocheirus aestivalis</i> (An Insect - True Bug (Hemiptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080179)		3
<i>Asellus aquaticus</i> (Water hog lice/slters)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080161)		3
<i>Atherix ibis</i> (An Insect - True Fly (Diptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080176)		3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
Athripsodes albifrons (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080162)		3
Baetis rhodani (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080186)		3
Baetis scambus (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080190)		3
Caenis rivulorum (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080189)		3
Chimarra marginata (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080165)		3
Crangonyx pseudogracilis (A Crustacean)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080178)		3
Dugesia lugubris (A Flatworm (Turbellaria))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080191)		3
Ecdyonurus torrentis (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080177)		3
Ecdyonurus venosus (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080172)		3
Eiseniella tetraedra (Square-Tailed Worm)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080164)		3
Elmis aenea (An Insect - Beetle (Coleoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080180)		3
Erpobdella octoculata (leeches)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080157)		3
Esolus parallelepipedus (An Insect - Beetle (Coleoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080167)		3
Gammarus pulex (A Crustacean)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080151)		3
Glossiphonia complanata (An Annelid)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080155)		3
Glossosoma boltoni (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080171)		3
Helobdella stagnalis (An Annelid)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080154)		3
Heptagenia sulphurea (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080158)		3
Hydropsyche pellucidula (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080152)		3
Hydropsyche siltalai (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080160)		3
Isoperla grammica (An Insect - Stonefly (Plecoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080166)		3
Lepidostoma hirtum (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080181)		3
Limnius volckmari (An Insect - Beetle (Coleoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080182)		3
Limnophora riparia (An Insect - True Fly (Diptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080173)		3
Nemoura erratica (An Insect - Stonefly (Plecoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080153)		3
Nemurella pictetii (An Insect - Stonefly (Plecoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080150)		3
Oulimnius tuberculatus (An Insect - Beetle (Coleoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080163)		3
Potamopyrgus antipodarum (A Mollusc)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080159)		3
Radix balthica (A Mollusc)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080188)		3
Rhithrogena semicolorata (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080183)		3
Rhyacophila dorsalis (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080169)		3
Sericostoma personatum (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080174)		3
Serratella ignita (An Insect - Mayfly (Ephemeroptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080184)		3
Siphonoperla torrentium (An Insect - Stonefly (Plecoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080168)		3
Triaenodes bicolor (An Insect - Caddis Fly (Trichoptera))	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080156)		3
Valvata (Cincinna) piscinalis (A Mollusc)	SJ317396	1976 - 1981	Anon		Field Observation	River Dee, Coedleoedd Isaf		D0217/001/01 (1080149)		3
Hylobius (Callirus) abietis (Pine Weevil)	SJ288385	04/08/1999	Adrian Fowles		Field Observation	Chirk, Denbighshire	Kronospan chipboard factory. Coll. P.A. Daniel, per J.B. Formstone	D0217/001/01 (1017366)		3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
Macroglossum stellatarum (Humming-bird Hawk-moth/Gwalch-Wyfyn Hofrol)	SJ289378 (Centroid)	06/07/2003	J.B. Formstone	1 Adult	Daytime observation	Chirk bowling green		D0057/001/01 (546783)		3
Lepidostoma hirtum (An Insect - Caddis Fly (Trichoptera))	SJ301409	26/06/1982	Anon			R. Dee, Halton Woods, Pentre		D1081/001/01 (455175)		3
Aglais urticae (Small Tortoiseshell/Trilliw Bach)	SJ3038 (Centroid)	2 records, on 10/07/1997 and 07/04/1998	Dr Jean A. Green	1, 1	Field record / observation	SJ3038		D0127/001/02		3
Inachis io (Peacock/Mantell Paun)	SJ3038 (Centroid)	07/04/1998	Dr Jean A. Green	1 Adult	Field record / observation	SJ3038		D0127/001/02 (528178)		3
Maniola jurtina (Meadow Brown/Gweirbryn y Ddôl)	SJ3038 (Centroid)	10/07/1997	Dr Jean A. Green	1	Field record / observation	SJ3038		D0127/001/02 (527104)		3
Pieris napi (Green-veined White/Gwyn Gwythien Werdd)	SJ3038 (Centroid)	10/07/1997	Dr Jean A. Green	1	Field record / observation	SJ3038		D0127/001/02 (527103)		3
Thymelicus sylvestris (Small Skipper/Gwibiwr Bach)	SJ3038 (Centroid)	10/07/1997	Dr Jean A. Green	1	Field record / observation	SJ3038		D0127/001/02 (527105)		3
Talpa europaea (European Mole/Gwahadden; Twrch Daear)	SJ2939	1966	Anon			Whitehurst Tunnel		D1072/001/01 (408254)		3
Oryctolagus cuniculus (European Rabbit/Cwningen)	SJ2938	1970	Anon			Oswestry		D1072/001/01 (411218)		3
Talpa europaea (European Mole/Gwahadden; Twrch Daear)	SJ2938	1967	Anon			Chirk		D1072/001/01 (407978)		3
Hygrohypnum ochraceum (Claw Brook-moss)	SJ3139	1950	Hill, M.O.			Coedleoedd-Isaf,Afon Dyfrdwy		D1075/001/02 (1762274)		3
Ixodes (Ixodes) canisuga (Dog Tick)	SJ3139	21/11/1950	Schofield, J.N.			Chirk, Ceiriog Cave nr		D1098/001/01 (496652)		3
Pohlia melanodon (Pink-fruited Thread-moss)	SJ3139	1950	Hill, M.O.			Coedleoedd-Isaf		D1075/001/02 (1768754)		3
Anthocharis cardamines (Orange-tip/Gwyn Blaen Oren)	SJ3040 (Centroid)	29/04/2003	Dr Jean A. Green	1	Field record / observation	SJ3040		D0127/001/02 (536641)		3
Chiloscyphus polyanthos (St Winifrid's Moss)	SJ3040	23/04/1833	Bowman, J.E.			Nant-y-Belan etc SSSI		D1075/001/02 (1740210)		3
Fontinalis squamosa var. squamosa (A Moss)	SJ3040	1950	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1760470)		3
Homalothecium lutescens (Yellow Feather-moss)	SJ3040	1950	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1761947)		3
Lepidostoma hirtum (An Insect - Caddis Fly (Trichoptera))	SJ3040	03/07/1982	Anon			R. Dee, Prynells Wood, Ruabon		D1081/001/01 (455179)		3
Orthotrichum rivulare (River Bristle-moss)	SJ3040	2 records, in 1830 and 1833	Wilson, W.; Bowman, J.E.			Nant-y-Belan etc SSSI		D1075/001/02		3
Pararge aegeria (Speckled Wood/Gweirbryn Brych)	SJ3040 (Centroid)	20/08/2003	Dr Jean A. Green	1	Field record / observation	SJ3040		D0127/001/02 (537697)		3
Pieris brassicae (Large White/Gwyn Mawr)	SJ3040 (Centroid)	20/08/2003	Dr Jean A. Green	1	Field record / observation	SJ3040		D0127/001/02 (537696)		3
Pogonatum umigerum (Urn Haircap)	SJ3040	1950	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1768437)		3
Polygonia c-album (Comma/Mantell Garpiog)	SJ3040 (Centroid)	29/04/2003	Dr Jean A. Green	1	Field record / observation	SJ3040		D0127/001/02 (536640)		3
Pyronia tithonus (Hedge Brown/Gweirbryn y Perthi)	SJ3040 (Centroid)	20/08/2003	Dr Jean A. Green	1	Field record / observation	SJ3040		D0127/001/02 (537694)		3
Riccardia chamedryfolia (Jagged Germanderwort)	SJ3040	1950	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1771495)		3
Riccia sorocarpa (Common Crystalwort)	SJ3040	1950	Hill, M.O.			Nant-y-Belan etc SSSI		D1075/001/02 (1771706)		3
Talpa europaea (European Mole/Gwahadden; Twrch Daear)	SJ3040	1967	Anon					D1072/001/01 (407798)		3
Vanessa cardui (Painted Lady/Mantell Dramor)	SJ3040 (Centroid)	20/08/2003	Dr Jean A. Green	1	Field record / observation	SJ3040		D0127/001/02 (537695)		3
Calliergon cordifolium (Heart-leaved Spear-moss)	SJ3037	1950	Hill, M.O.			Chirk,Brynkinalt		D1075/001/02 (1755236)		3
Furcula bicuspis (Alder Kitten/Cathan y Gwernos)	SJ3037	1980 - 1992	Name Withheld					D1063/001/01 (493336)		3
Physcomitrium pyriforme (Common Bladder-moss)	SJ3037	1950	Hill, M.O.			Chirk,nr		D1075/001/02 (1767181)		3
Lepidostoma hirtum (An Insect - Caddis Fly (Trichoptera))	SJ2940	12/07/1981	Anon			R. Dee, Newbridge		D1081/001/01 (455178)		3
Andricus anthracina (Oyster Gall)	SJ2937	Jul 1920	NWRC, W. Fakoner	Present	Field Observation	Chirk		D0217/001/01 (1071356)		3
Autographa bractea (Gold Spangle/Gem Seren Aur)	SJ2937 (Centroid)	06/07/1956	P.J.Gent	1 Adult	Unknown	Chirk		D0057/001/01 (553413)		3
Biston betularia (Peppered Moth/Gwrfyn Brith [Golau])	SJ2937 (Centroid)	08/07/1956	P.J.Gent	1 Adult	Unknown	Chirk		D0057/001/01 (553412)		3
Bryum caespitium (Tufted Thread-moss)	SJ2937	1950	Hill, M.O.			Chirk,nr		D1075/001/02 (1754344)		3
Dasineura filicina (An Insect - True Fly (Diptera))	SJ2937	Jul 1920	NWRC, W. Fakoner	1 present	Field Observation	Velvet Hill, Chirk, Chirk		D0217/001/01 (1071357)		3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
<i>Dasineura galicola</i> (An Insect - True Fly (Diptera))	SJ2937	Jul 1920	NWRC, W. Fakoner	1 present	Field Observation	Chirk Castle		D0217/001/01 (1071288)		3
<i>Didymodon luridus</i> (Dusky Beard-moss)	SJ2937	1950	Hill, M.O.			Chirk		D1075/001/02 (1758407)		3
<i>Hypnum lacunosum</i> (Great Plait-moss)	SJ2937	1950	Benoit, P.M.			Chirk		D1075/001/02 (1762824)		3
<i>Macaria liturata</i> (Tawny-barred Angle/Seffyr Rhesen Winau)	SJ2937 (Centroid)	06/07/1956	P.J.Gent	1 Adult	Unknown	Chirk		D0057/001/01 (553414)		3
<i>Mormo maura</i> (Old Lady/Ethiop)	SJ2937 (Centroid)	06/08/1974	M.Jeffreys	1 Adult	Unknown	Chirk		D0057/001/01 (553224)		3
<i>Pieris brassicae</i> (Large White/Gwyn Mawr)	SJ2937 (Centroid)	06/08/1994	L. Rawsthorne	1	Field record / observation	SJ2937		D0127/001/02 (521292)		3
<i>Pyronia tithonus</i> (Hedge Brown/Gweirlöyn y Perthi)	SJ2937 (Centroid)	06/08/1994	L. Rawsthorne	1	Field record / observation	SJ2937		D0127/001/02 (521291)		3
<i>Amblystegium serpens</i> (Creeping Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1737187)		3
<i>Aneura pinguis</i> (Greasewort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1737564)		3
<i>Atrichum undulatum</i> (Common Smoothcap)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1737752)		3
<i>Barbula unguiculata</i> (Bird's-claw Beard-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1737992)		3
<i>Brachythecium rivulare</i> (River Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1738333)		3
<i>Brachythecium rutabulum</i> (Rough-stalked Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1738418)		3
<i>Bryoerythrophyllum recurvirostrum</i> (Red Beard-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1738534)		3
<i>Bryum bicolor</i> (Bicoloured Bryum)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Bryum bicolor</i> s.l.	D1075/001/02 (1738715)		3
<i>Bryum capillare</i> (Capillary Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1738838)		3
<i>Bryum rubens</i> (Crimson-tuber Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1739176)		3
<i>Calliergonella cuspidata</i> (Pointed Spear-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1739417)		3
<i>Calypogeia fissa</i> (Common Pouchwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1739520)		3
<i>Campylopus fragilis</i> (Brittle Swan-neck Moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1739765)		3
<i>Cephaezia bicuspidata</i> (Two-horned Pincerwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1739928)		3
<i>Ceratodon purpureus</i> (Redshank)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740139)		3
<i>Cinclidotus fontinaloides</i> (Smaller)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740278)		3
<i>Cirriphyllum piliferum</i> (Hair-pointed Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740308)		3
<i>Conocephalum conicum</i> (Great Scented Liverwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Conocephalum conicum</i> s.l.	D1075/001/02 (1740434)		3
<i>Cratoneuron filicinum</i> (Fern-leaved Hook-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Cratoneuron filicinum</i> s.l.	D1075/001/02 (1740527)		3
<i>Dichodontium pellucidum</i> (Transparent Fork-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Dichodontium pellucidum</i> s.l.	D1075/001/02 (1740743)		3
<i>Dicranella heteromalla</i> (Silky Forklet-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740816)		3
<i>Dicranella staphylina</i> (Field Forklet-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1740887)		3
<i>Dicranoweisia cirrata</i> (Common Pincushion)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741025)		3
<i>Dicranum majus</i> (Greater Fork-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741113)		3
<i>Dicranum scoparium</i> (Broom Fork-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741212)		3
<i>Didymodon fallax</i> (Fallacious Beard-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741283)		3
<i>Didymodon insulanus</i> (Cylindric Beard-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741356)		3
<i>Didymodon rigidulus</i> (Rigid Beard-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741410)		3
<i>Diplophyllum albicans</i> (White Earwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741557)		3
<i>Encalypta streptocarpa</i> (Spiral Extinguisher-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741815)		3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
<i>Eppterygium tozeri</i> (Tozer's Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741895)		3
<i>Eurhynchium hians</i> (Swartz's Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1741958)		3
<i>Eurhynchium striatum</i> (Common Striated Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742163)		3
<i>Fissidens bryoides</i> (Lesser Pocket-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742249)		3
<i>Fissidens taxifolius</i> (Common Pocket-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742419)		3
<i>Fontinalis antipyretica</i> var. <i>antipyretica</i> (Greater Water-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742551)		3
<i>Frullania dilatata</i> (Dilated Scalewort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742691)		3
<i>Funaria hygrometrica</i> (Common Cord-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1742819)		3
<i>Grimmia pulvinata</i> (Grey-cushioned Grimmia)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1743059)		3
<i>Heterocladium heteropterum</i> var. <i>heteropterum</i> (A Moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1743389)		3
<i>Homalia trichomanoides</i> (Blunt Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1743422)		3
<i>Hylocomium splendens</i> (Glittering Wood-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1743775)		3
<i>Hypnum cupressiforme</i> (Cypress-leaved Plait-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1744033)		3
<i>Hypnum resupinatum</i> (Supine Plait-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1744284)		3
<i>Isothecium alopecuroides</i> (Larger Mouse-tail Moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1744333)		3
<i>Isothecium myosuroides</i> (Slender Mouse-tail Moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1744454)		3
<i>Leskea polycarpa</i> (Many-fruited Leskea)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1744847)		3
<i>Lophocolea bidentata</i> (Bifid Crestwort)	SJ3140	2 records, both in May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02		3
<i>Lophocolea heterophylla</i> (Variable-leaved Crestwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1745060)		3
<i>Lunularia cruciata</i> (Crescent-cup Liverwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1745169)		3
<i>Metzgeria furcata</i> (Forked Veilwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1745483)		3
<i>Mnium hornum</i> (Swan's-neck Thyme-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1745678)		3
<i>Neckera complanata</i> (Flat Neckera)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1745845)		3
<i>Orthodontium lineare</i> (Cape Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746064)		3
<i>Orthotrichum anomalum</i> (Anomalus Bristle-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746154)		3
<i>Orthotrichum diaphanum</i> (White-tipped Bristle-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746210)		3
<i>Pellia endiviifolia</i> (Endive Pellia)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746403)		3
<i>Pellia epiphylla</i> (Overleaf Pellia)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746518)		3
<i>Philonotis fontana</i> (Fountain Apple-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746732)		3
<i>Plagiochila asplenoides</i> (Greater Featherwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746798)		3
<i>Plagiochila porelloides</i> (Lesser Featherwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1746891)		3
<i>Plagiomnium rostratum</i> (Long-beaked Thyme-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747037)		3
<i>Plagiomnium undulatum</i> (Hart's-tongue Thyme-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747103)		3
<i>Pohlia melanodon</i> (Pink-fruited Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747591)		3
<i>Pohlia nutans</i> (Nodding Thread-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747635)		3
<i>Polytrichum formosum</i> (Bank Haircap)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747847)		3
<i>Porella cordaeana</i> (Cliff Scalewort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1747986)		3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
<i>Porella platyphylla</i> (Wall Scalewort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1748012)		3
<i>Pseudocrossidium hornschuchianum</i> (Hornschuch's Beard-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1748071)		3
<i>Pseudotaxiphyllum elegans</i> (Elegant Silk-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1748154)		3
<i>Radula complanata</i> (Even Scalewort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1748694)		3
<i>Rhizomnium punctatum</i> (Dotted Thyme-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1748838)		3
<i>Rhynchostegiella tenella</i> (Tender Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Rhynchostegiella tenella</i> s.l.	D1075/001/02 (1748862)		3
<i>Rhynchostegium riparioides</i> (Long-beaked Water Feather-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1748987)		3
<i>Rhytidadelphus squarrosus</i> (Springy Turf-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1749166)		3
<i>Riccia glauca</i> (Glaucous Crystalwort)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1749360)		3
<i>Schistidium apocarpum</i> (Sessile Grimmia)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Schistidium apocarpum</i> s.l.	D1075/001/02 (1749777)		3
<i>Tetraphis pellucida</i> (Pellucid Four-tooth Moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1750700)		3
<i>Thuidium tamariscinum</i> (Common Tamarisk-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1750955)		3
<i>Tortula acaulon</i> (Cuspidate Earth-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1751050)		3
<i>Tortula muralis</i> (Wall Screw-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1751126)		3
<i>Tortula truncata</i> (Common Pottia)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr		D1075/001/02 (1751201)		3
<i>Zygodon viridissimus</i> (Green Yoke-moss)	SJ3140	May 1973	Duckett, J.G.			Erbistock, R Dee+woods nr	Formerly recorded as <i>Zygodon viridissimus</i> s.l.	D1075/001/02 (1751629)		3
<i>Maniola jurtina</i> (Meadow Brown/Gweirbŷn y Ddôl)	SJ2839 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2839	Trvor - Chirk canal towpath	D0127/001/02 (521294)		3
<i>Pieris napi</i> (Green-veined White/Gwyn Gwythien Werdd)	SJ2839 (Centroid)	06/08/1994	L. Rawsthorne	1	Field record / observation	SJ2839	Trvor - Chirk canal towpath	D0127/001/02 (521298)		3
<i>Pieris rapae</i> (Small White/Gwyn Bach)	SJ2839 (Centroid)	06/08/1994	L. Rawsthorne	1	Field record / observation	SJ2839	Trvor - Chirk canal towpath	D0127/001/02 (521296)		3
<i>Polyommatus icarus</i> (Common Blue/Glesyn Cyffredin)	SJ2839 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2839	Trvor - Chirk canal towpath	D0127/001/02 (521293)		3
<i>Pyronia tithonus</i> (Hedge Brown/Gweirbŷn y Perthi)	SJ2839 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2839	Trvor - Chirk canal towpath	D0127/001/02 (521295)		3
<i>Talpa europaea</i> (European Mole/Gwahadden; Twrch Daear)	SJ2839	1975	Anon			Chirk		D1072/001/01 (407977)		3
<i>Thymelicus sylvestris</i> (Small Skipper/Gwibiwr Bach)	SJ2839 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2839	Trvor - Chirk canal towpath	D0127/001/02 (521297)		3
<i>Aglais urticae</i> (Small Tortoiseshell/Trilliw Bach)	SJ2838 (Centroid)	14/09/1995	Brian Anderson	1	Field record / observation	SJ2838		D0127/001/02 (523648)		3
<i>Maniola jurtina</i> (Meadow Brown/Gweirbŷn y Ddôl)	SJ2838 (Centroid)	2 records, on 06/08/1994 and 20/06/1999	Dr Jean A. Green; L. Rawsthorne	1, 1	Field record / observation	SJ2838	Trvor - Chirk canal towpath	D0127/001/02		3
<i>Pararge aegeria</i> (Speckled Wood/Gweirbŷn Brych)	SJ2838 (Centroid)	2 records, on 06/08/1994 and 14/09/1995	Brian Anderson; L. Rawsthorne	3, 2	Field record / observation	SJ2838	Trvor - Chirk canal towpath	D0127/001/02		3
<i>Pieris brassicae</i> (Large White/Gwyn Mawr)	SJ2838 (Centroid)	06/08/1994	L. Rawsthorne	1	Field record / observation	SJ2838	Trvor - Chirk canal towpath	D0127/001/02 (521315)		3
<i>Pieris napi</i> (Green-veined White/Gwyn Gwythien Werdd)	SJ2838 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2838	Trvor - Chirk canal towpath	D0127/001/02 (521314)		3
<i>Pieris rapae</i> (Small White/Gwyn Bach)	SJ2838 (Centroid)	2 records, on 06/08/1994 and 14/09/1995	Brian Anderson; L. Rawsthorne	1, 1	Field record / observation	SJ2838	Trvor - Chirk canal towpath	D0127/001/02		3
<i>Polygonia c-album</i> (Comma/Mantell Garpiog)	SJ2838 (Centroid)	14/09/1995	Brian Anderson	1	Field record / observation	SJ2838		D0127/001/02 (523646)		3
<i>Sisyra fuscata</i> (An Insect - Lacewing (Neuroptera))	SJ2838	12/07/1981	Wallace, I.D., Wallace, B.			Bryn-yr-Eos/Chirk		D1104/001/01 (498860)		3
<i>Thymelicus sylvestris</i> (Small Skipper/Gwibiwr Bach)	SJ2838 (Centroid)	20/06/1999	Dr Jean A. Green	1	Field record / observation	SJ2838		D0127/001/02 (530643)		3
<i>Vanessa atalanta</i> (Red Admiral/Mantell Goch)	SJ2838 (Centroid)	14/09/1995	Brian Anderson	5	Field record / observation	SJ2838		D0127/001/02 (523645)		3
<i>Pararge aegeria</i> (Speckled Wood/Gweirbŷn Brych)	SJ2840 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2840	Trevor - Chirk canal towpath	D0127/001/02 (521312)		3
<i>Pieris brassicae</i> (Large White/Gwyn Mawr)	SJ2840 (Centroid)	2 records, on 06/08/1994 and 21/07/2001	Dr Jean A. Green; L. Rawsthorne	1, 1	Field record / observation	SJ2840	Trevor - Chirk canal towpath	D0127/001/02		3
<i>Pieris napi</i> (Green-veined White/Gwyn Gwythien Werdd)	SJ2840 (Centroid)	06/08/1994	L. Rawsthorne	1	Field record / observation	SJ2840	Trevor - Chirk canal towpath	D0127/001/02 (521309)		3
<i>Pyronia tithonus</i> (Hedge Brown/Gweirbŷn y Perthi)	SJ2840 (Centroid)	06/08/1994	L. Rawsthorne	2	Field record / observation	SJ2840	Trevor - Chirk canal towpath	D0127/001/02 (521310)		3

Taxon Name	Grid Reference	Date	Recorder(s)	Abundance	Record Type	Site Name	Comments	Dataset ID	Lists	V
<i>Thymelicus sylvestris</i> (Small Skipper/Gwibiwr Bach)	SJ2840 (Centroid)	21/07/2001	Dr Jean A. Green	1	Field record / observation	SJ2840		D0127/001/02 (534047)		3
<i>Didymodon tophaceus</i> (Olive Beard-moss)	SJ2837	1970	Hill, M.O.			Chirk		D1075/001/02 (1758559)		3
<i>Dichodontium pellucidum</i> (Transparent Fork-moss)	SJ3041	Oct 1972	Hill, M.O.			Nant-y-Belân etc SSSI		D1075/001/02 (1740715)		3
<i>Dicranella varia</i> (Variable Forklet-moss)	SJ3041	1830	Wilson, W.			Nant-y-Belân etc SSSI		D1075/001/02 (1757828)		3
<i>Dicranum majus</i> (Greater Fork-moss)	SJ3041	1950	Hill, M.O.			Nant-y-Belân etc SSSI		D1075/001/02 (1758104)		3
<i>Eucladium verticillatum</i> (Whorled Tufa-moss)	SJ3041	1861	Wilson, W.			Nant-y-Belân etc SSSI		D1075/001/02 (1759429)		3
<i>Eurhynchium crassirovium</i> (Beech Feather-moss)	SJ3041	1833	Bowman, J.E.			Nant-y-Belân etc SSSI		D1075/001/02 (1759488)		3
<i>Heterocladium heteropterum</i> var. <i>heteropterum</i> (A Moss)	SJ3041	1950	Hill, M.O.			Nant-y-Belân etc SSSI		D1075/001/02 (1761864)		3
<i>Jungermannia atrovirens</i> (Dark-green Flapwort)	SJ3041	1950	Hill, M.O.			Nant-y-Belân etc SSSI		D1075/001/02 (1763278)		3
<i>Jungermannia pumila</i> (Dwarf Flapwort)	SJ3041	1970	Hill, M.O.			Nant-y-Belân etc SSSI		D1075/001/02 (1763461)		3
<i>Leskea polycarpa</i> (Many-fruited Leskea)	SJ3041	1830	Bowman, J.E.			Nant-y-Belân etc SSSI		D1075/001/02 (1763999)		3
<i>Leucodon sciuroides</i> (Squirrel-tail Moss)	SJ3041	1830	Bowman, J.E.			Nant-y-Belân etc SSSI		D1075/001/02 (1764132)		3
<i>Orthotrichum affine</i> (Wood Bristle-moss)	SJ3041	1833	Wilson, W.			Nant-y-Belân etc SSSI		D1075/001/02 (1766103)		3
<i>Orthotrichum lyellii</i> (Lyell's Bristle-moss)	SJ3041	1833	Wilson, W.			Nant-y-Belân etc SSSI		D1075/001/02 (1766366)		3
<i>Orthotrichum tenellum</i> (Slender Bristle-moss)	SJ3041	1833	Wilson, W.			Nant-y-Belân etc SSSI		D1075/001/02 (1766585)		3
<i>Plagiochila asplenoides</i> (Greater Featherwort)	SJ3041	09/04/1830	Bowman, J.E.			Nant-y-Belân etc SSSI		D1075/001/02 (1746797)		3
<i>Pseudephemerum nitidum</i> (Delicate Earth-moss)	SJ3041	1917	Jones, D.A.			Nant-y-Belân etc SSSI		D1075/001/02 (1769608)		3
<i>Tortula subulata</i> var. <i>subulata</i> (A Moss)	SJ3041	1833	Wilson, W.			Nant-y-Belân etc SSSI		D1075/001/02 (1774870)		3
<i>Ulota crispa</i> (Crisped Pincushion)	SJ3041	1830	Bowman, J.E.			Nant-y-Belân etc SSSI	Formerly recorded as <i>Ulota crispa</i> s.l.	D1075/001/02 (1775361)		3
<i>Chloromyia formosa</i> (An Insect - True Fly (Diptera))	SJ2941	06/06/1982	Wallace, I.D.			Wynnstay Park,R Dee		D1107/001/01 (501577)		3
<i>Panorpa germanica</i> (An Insect - Scorpion Fly (Mecoptera))	SJ2941	06/06/1982	Wallace, I.D.			Wynnstay Park		D1104/001/01 (498730)		3

Statutory Sites intersecting 2000m buffer	SAC: River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (Wales) (952m), SSSI: NANT-Y-BELAN AND PRYNELA WOODS (1365m), SSSI: AFON DYFRDWY (RIVER DEE) (952m)
Wildlife Sites within 2000m (C=Candidate)	Coed Y Camlas/Canal Wood (1850m), Bolas Dingle (412m), Barracks Field (847m)
NWWT Reserves within 2000m	None
RSPB Reserves within 2000m	None
RIGS within 2000m	None
Habitat type at application grid reference	Improved Grassland
Habitat type(s) within 2000m	Amenity Grassland, Arable, Bare Ground, Buildings, Caravan Site, Dense Scrub, Ephemeral/Short Perennial, Gardens, Improved Grassland, Marshy Grassland, Not Accessed Land, Running Water, Semi-improved Neutral Grassland, Standing Water, Tall Ruderal Herb, Track, Unimproved Acid Grassland
Ancient Woodland within 2000m	Ancient and Semi Natural Woodland, Plantation on Ancient Woodland Site

Important Issues

1. Usage of the above information is governed by Cofnod's **Terms and Conditions of Data Release** (available from Cofnod on request).
2. Records shown in bold typeface are sensitive species records. In this public version of the original report, the resolution of sensitive species grid references have been reduced and site names and comments have been removed.
3. Past records of presence of a habitat or species do not guarantee continued occurrence; absence of records does not imply absence of a species, merely that no records are held at Cofnod; Cofnod cannot guarantee the accuracy of supplied data; copyright of records remains with the original recorder.

Notes

This report should be used in conjunction with any relevant maps, where these are supplied.

Cofnod uses a search system which reports all priority or protected species within a specified search radius or buffer. Where required a search will also include high priority 'Mobile Species', such as bats, otters, amphibians and certain invertebrates, which lie outside the specified search radius. These species are highlighted on the report with an **asterisk**. They have been selected as 'Mobile Species' as their territory (possibly due to foraging activity or life cycle) could intersect with the search radius.

Records with 4 figure grid references are displayed as 1km squares on any relevant maps. They are listed separately in reports and highlighted in grey *italic* script.

Please note that while we hold Wales Raptor Study Group data for North East Wales we are only permitted to release it to a limited number of trusted partners. We can provide contact details if you would like to contact the Raptor Study Group directly to request species information.

Sites - Designated Sites and non-designated Wildlife Sites within 50m of the grid reference are highlighted in red. Wildlife Sites which remain unconfirmed by the relevant Local Authority are given 'Candidate' status and are displayed with the (c) suffix. The following reasons for candidate status apply: 1. Anglesey and Flintshire Wildlife Sites were identified by survey but have not been formally confirmed. 2. Conwy and Gwynedd Wildlife Sites were identified by survey and air photos and remain candidate until evaluated using selection criteria.

Dataset ID - All species records within the reports include Dataset ID codes, which can be used to find the relevant Metadata, using the **Data We Hold** page on the Cofnod website (www.cofnod.org.uk/DataWeHold.aspx). The number below the Dataset ID is the individual record ID. Please quote this if you need more information on a specific record.

'V' column - Record Verification Level. The following abbreviations apply: **1**: Unassessed, **2**: Unconfirmed, **3**: Considered Correct by Cofnod, **4**: Considered Correct by Expert. Dataset Categories and Record Verification Levels are explained in more detail within Cofnod's policy on Data Quality, available from our website.

Lists

BA - Protection of Badgers Act, **BDir** - EU Birds Directive, **Bern** - The Bern Convention on the Conservation of European Wildlife and Natural Habitats, **Bonn** - The Bonn Convention on the Conservation of Migratory Species of Wild Animals, **CCWP** - CCW Priority Species List, **CITES** - Convention on International Trade in Endangered Species, **EPS** - European Protected Species, **HDir** - EU Habitats Directive, **LBAP** - Local Biodiversity Action Plan, **RD1** - Red Data Book listing based on IUCN guidelines, **RD2** - Red Data Book listing not based on IUCN guidelines (Nationally Rare and Scarce), **S42** - Natural Environment and Rural Communities Act 2006 (Section 42), **UKBAP** - UK Biodiversity Action Plan Priority Species, **WBAm[RSPB]** - Birds of Conservation Concern 2002-07 - Welsh Amber listed birds (not based on IUCN criteria), **WBR[RSPB]** - Birds of Conservation Concern 2002-07 - Welsh Red listed birds (not based on IUCN criteria), **WCA1** - Wildlife & Countryside Act 1981 Schedule 1, **WCA5** - Wildlife & Countryside Act 1981 Schedule 5, **WCA8** - Wildlife & Countryside Act 1981 Schedule 8, **WVP** - IUCN Threat Listing of Welsh Vascular Plants

Abbreviations

ANG - Isle of Anglesey, **CON** - Conwy, **DEN** - Denbighshire, **FLI** - Flintshire, **GWY** - Gwynedd, **SNP** - Snowdonia National Park, **WRE** - Wrexham, **LBAP** - Local Biodiversity Action Plan, **NWWT** - North Wales Wildlife Trust, **RSPB** - Royal Society for the Protection of Birds, **RIGS** - Regionally Important Geodiversity Sites, **WS** - Wildlife Site

Contact Us

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APPENDIX B

Target Notes

Target Reference	Target Note
TN1	Pond A. Small attenuation pond for surface water discharged by McDonald's restaurant site. Dominated by <i>Typha spp.</i> . Low water level and water quality appears poor. No evidence of GCN eggs during egg search.
TN2	Broad leaved woodland. Steep sided slope planted with broad leaved species including oak and silver birch. Some burrows located on the slope. No evidence of badger in this area during site walkover. Some rabbit and fox scat noted in this area.
TN3	Pond B. Small pond with low water level and heavily silted. Completely shaded by trees. No evidence of GCN eggs during egg search.
TN4	Site and internal field boundary comprising species poor hedgerow. Dominated by hawthorn.
TN5	Improved grassland. Grazed and heavily poached by sheep.
TN6	Pond C. No access possible.
TN7	Broad leaved woodland/plantation dominated by silver birch. Some damp areas with alder and willow. Understorey of nettle, bramble and other ruderal and ephemeral species.
TN8	Semi improved grassland used for grazing horses. Some vegetated soil mounds present.

APPENDIX C

Bat Survey Details

APPENDIX C

THE WELSH DRAGON - BAT SURVEY REPORT

1. INTRODUCTION

Gifford were commissioned by the Frank Wingett Cancer Appeal in June 2010 to undertake a bat survey for the redevelopment of a site at Black Park, Chirk.

The current proposals comprise the construction of a 70m high sculpture of the Welsh Dragon that will provide an iconic landmark gateway into Wales. The site will also feature a crescent shaped visitor centre building with an art gallery and supporting visitor facilities including a café/restaurant and gift shop.

This report details the findings of the study and which should be read in conjunction with the Ecological Appraisal Report.

2. SCOPE AND OBJECTIVES

Gifford were appointed to undertake a bat emergence and activity survey to assess whether the site support roosts and if the proposed development has the potential to affect bats. The survey also included an activity survey to establish the level of bat activity in the area and what species are present.

3. STANDARDS AND LIMITATIONS

This report has been prepared for the Frank Wingett Cancer Relief Trust and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

The findings and opinions in the report are based upon information derived from a variety of information sources. Gifford believe these information sources to be reliable.

It should be noted that some of the aspects considered in this study are subject to change with time. Therefore, if the development is delayed or postponed for a significant period then it should be reviewed to confirm that no changes have taken place, either at the site or within relevant legislation.

It should be noted that the site ecology will vary seasonally and has been conducted outside the optimal time of year for certain species and species groups. Therefore, the species and issues noted in the report reflect the time of year at which the survey was undertaken. The survey will provide useful guidance on the likely ecology in seasons other than that in which the walkover was undertaken. However, it should be noted that a single survey cannot necessarily provide definitive ecological information and can only provide a 'snap shot' of ecological activity at that time.

Bats and their roosts are protected under the Wildlife and Countryside Act 1981 (As Amended) and by the Conservation (Natural Habitats &c.) (Amendment) Regulations 2007 whereby it is an offence to damage or destroy any bat roost, intentionally or recklessly obstruct a bat roost, kill, injure or take any bat.

4. SITE DESCRIPTION AND LOCATION

The Welsh Dragon development is located at Halton which is situated approximately 1.5km north east of Chirk (National Grid reference 330100E, 339400N). The site boundary is indicated on Figure 1 and covers an approximate area of 8 hectares.

The development site predominantly comprises open fields used for grazing livestock and areas of woodland. A summary of the adjacent land uses are defined below:

4.1 Western boundary (north to south):

- Development access road, beyond which is a McDonald's restaurant and open field used for grazing livestock;
- A5 Carriageway (Chirk By-pass); and
- Motocross track, beyond which is the A5 Carriageway.

4.2 Southern boundary (west to east):

- Motocross track, beyond which is Green Lane East and open fields; and
- Wooded area, beyond which are isolated dwellings and open fields.

4.3 Eastern boundary (north to south):

- Residential properties fronting onto Green Lane East, beyond which is open fields; and
- Green Lane East, beyond which is open fields.

4.4 Northern boundary (west to east):

- Open field used for grazing livestock, beyond which is the McDonald's restaurant;
- Unclassified road, beyond which is open fields; and
- Welsh Water Foul treatment pumping station, beyond which is the unclassified road.

5. DEVELOPMENT PROPOSALS

The development will comprise a 41.5m tall tower with a 23.5m high dragon sculpture (combined total height of 65m) and a separate two storey cultural centre building that will include a gallery/education area, retail area, café, restaurant, multi-use area and welfare facilities. A car park will be constructed to serve the development which will be located to the north of the development boundary.

6. METHODOLOGY

Three bat activity/emergence surveys were undertaken on the following dates:

- Tuesday 15th June (dusk) and Wednesday 16th June (dawn);
- Friday 25th June (dusk) and Saturday 26th June 2010 (dawn); and
- Wednesday 30th June 2010 (dusk only).

The above surveys were undertaken by Gifford ecologists experienced in undertaking these surveys.

The site was walked by 2 surveyors in daylight and an assessment made of bat roosting potential of the trees at the site. The trees were viewed from the ground, using binoculars as an aid, searching for potential roost sites.

The site was also walked at dusk on three occasions and twice at dawn to look for foraging and commuting bats using the area of the proposed site. Portable, tuneable heterodyne bat detectors as an aid to locating and identifying species of bat. Particular emphasis was made on the detection of lesser horseshoe bats as well as other species. The survey was concentrated along the tree lines and hedgerows at the site. Transects were walked around the tree lines/hedgerows and boundaries of the northern field, southern field, the woodland in the central part of the site and along Green Lane. Transects across the central part of the site were also walked.

The bat activity/emergence surveys have been undertaken in accordance with the guidance in the Bat Workers Manual (JNCC, 2004) and Bat Conservation Trust Bat Surveys Manual (BCT, 2007).

All British species of bat are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended). They are also included in Schedule 2 of the Conservation (Natural Habitats &c.) (Amendment) Regulations 2007 which are the domestic implementation of the EC Habitats Directive (As Amended). In the context of potential development activities affecting bats, this legislation makes it illegal to:

- Deliberately kill, injure or capture (take) bats;
- Deliberately disturb bats in such a way as to be likely to significantly affect:
 - the ability of any significant group of animals of that species to survive, breed, or rear or nurture their young; or
 - the local distribution or abundance of that species;
- Damage or destroy a breeding site or resting place of such an animal; or
- Deliberately or recklessly disturb a bat while it occupies a place of shelter or protection.

In this sense a bat 'resting place' or roost has been interpreted to mean any structure or place which is used for shelter or protection, whether or not bats are present at the time.

In the case of development works, exemption from the protection afforded for bats under Section 39 of the Conservation (Natural Habitats &c) (Amendment) Regulations 2007 can be granted by means of a licence from Natural England. Three tests must be satisfied before Natural England can issue a licence under Section 44 (2)(e) to permit otherwise prohibited acts:

- Section 44 (2)(e) states that licences may be granted by Natural England 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of the social or economic nature and beneficial consequences of primary importance for the environment';
- Section 44 (3)(e) states that a licence may not be granted unless Natural England is satisfied 'that there is no satisfactory alternative'; and
- Under Section 44 (3)(b) a licence cannot be issued unless Natural England is satisfied that the action proposed 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

7. RESULTS

7.1 Desk Study

The Ecological Appraisal report identified that pipistrelle bat had been recorded within 500m of the site based on the records received from Cofnod. CCW have also confirmed that lesser horseshoe bat roosts have been recorded at Chirk Castle some 4km south west of the site. No roosts have been identified at the site based on consultation with Cofnod, CCW and the Clwyd Bat Group.

7.2 Survey

Survey 1

The survey was undertaken during the dusk and dawn periods over the 15th and 16th June 2010. The weather both surveys was dry, mild and still. The temperature during the dusk survey was 16°C at 21:00 reducing to 9°C at 01:00. Sun set was 21:40. The temperature during the dawn survey at 03:45 was 8°C increasing to 9°C at 05:00. Sun rise 04:40.

Whilst some of the trees viewed from the ground did have minor features that may offer some very limited potential for bat roosting the majority of the trees earmarked for felling were considered to have no roosting value for bats.

Bats were noted foraging and commuting around the site. Three common pipistrelle bats were noted around the woodland edges of the southern part of the site during the dusk survey between 22:20 and 23:20. No other species were noted. One common pipistrelle was recorded at 04:16 during the dawn survey within the southern part of the site.

It should be noted that the northern part of the site was well lit from street lights associated with the adjacent McDonald's restaurant.

Survey 2

The survey was undertaken during the dusk and dawn periods over the 25th and 26th June 2010. The weather both surveys was dry, warm and still. The temperature during the dusk survey was 20°C at 21:00 reducing to 14°C at 01:30. Sunset was at 21:45. The temperature during the dawn survey at 03:45 was 11°C increasing to 13°C at 05:00. Sun rise was 04:45.

Twenty two bats were noted foraging and commuting around the site. These predominantly comprised common pipistrelle bat but some soprano and one noctule was recorded (along Green Lane). All of the bats were noted around the woodland edges in the northern and southern parts of the site during the dusk survey between 22:10 and 00:20. No other species were noted.

Thirteen bats were recorded during the dawn survey, all common pipistrelle. These were recorded between 03:55 and 04:15 in the southern part of the site and the access road adjacent to McDonald's restaurant.

Survey 3

The survey was undertaken during dusk on the 30th June 2010. The weather was dry, warm and slightly breezy. The temperature during the survey was 21°C at 21:00 reducing to 13°C at 01:00. Sunset was at 21:40

Sixteen bats were noted foraging and commuting around the site. These all comprised common pipistrelle bat and were recorded around the woodland edges in the northern and southern parts of the site.

8. CONCLUSIONS AND RECOMMENDATIONS

Three dusk and dawn activity surveys were undertaken at the site during June 2010.

No buildings are located at the site and none of the trees are considered to have suitable features which could be used by bats for roosting (negligible or low potential). The hedgerows and tree lines do offer suitable foraging habitat and provide commuting routes for bats. Bat activity surveys undertaken indicate the site is used mostly by common pipistrelle bat but noctules and soprano pipistrelle were also recorded in low numbers. Most of the activity was noted to be in the southern part of the site. No other species of bat were recorded. There will be some habitat loss as a result of the proposal but the design includes significant habitat improvement.

Lighting has the potential to impact bat foraging activity at the site. The lighting design for the scheme uses low level lighting where practicable and has avoided the majority of the tree lines in areas that are currently not lit. There will be some impact associated with lighting in the central part of the site but is not considered to be significant based on the majority of the site that will remain unlit. It is understood that the tower and dragon itself will not be floodlit but will rely on internal lighting to illuminate it which will have less of an adverse effect on bats.

Based on the current proposals it is considered that the potential impact to bats as a result of the development is low and as such it is considered that a Natural England licence is not required to undertake work at the site. It is also considered that the conservation significance of the site is low (i.e. the loss of the site would have a low impact/significance) and the 'favourable conservation status' of the species is unlikely to be affected by the development. However, low impact does not mean that there will be no impact and it is recommended that bat mitigation features are built into the design proposals.

Parts of the scheme are proposed to be lit for safety and amenity reasons. The relationship of bats with artificial lighting is still relatively unknown, and currently the subject of ongoing research. However, lighting can cause bats to stop using a site or affect roost locations if present.

Many nocturnal insects are attracted to light, particularly those lamps that emit an ultra-violet element and particularly if it is a single light source in a dark area. Noctules (*Nyctalus noctula*), Leisler's (*Nyctalus leisleri*), serotine (*Eptesicus serotinus*) and pipistrelle (*Pipistrellus spp.*) bats swarm around white mercury streetlights (also metal halide) feeding on the insects that are attracted to the lights. However, slower flying species such as long-eared bats (*Plecotus spp.*), Brandt's (*Myotis brandtii*), whiskered (*M. mystacius*), Daubentons (*M. daubentonii*), Natterer's (*M. nattereri*), Bechsteins (*M. bechsteini*), barbastelle (*Barbastella barbastellus*) and greater and lesser horseshoe bats (*Rhinolophus spp.*) generally avoid artificial light.

Insects may be attracted to lights from further afield thereby reducing the amount of insects available to those bats that avoid light and have to forage in those insect depleted dark areas.

Furthermore, those bats that are attracted to artificial light may be at risk of being preyed upon by birds that normally only hunt in daylight. Birds such as kestrels, sparrowhawks and hobbies are normally diurnal raptors but some observations have recorded kestrels hunting at night under artificial lights. Avoiding such predation by day flying birds may be one of the reasons why bats have evolved to hunt at night. Lighting is considered to be particularly harmful if used near woodland edges, ponds and along river corridors and hedgerows used by bats.

Artificial lighting disrupts the normal light patterns of night and day and may, as a result, affect the natural behaviour of bats. Bats may move away from lit areas and some areas of continuous lighting may create a barrier that some species will not cross. This may affect social interaction.

The surveys found that common pipistrelle was the predominant species recorded with some soprano pipistrelle and noctule recorded. All species were noted foraging or commuting along the tree lines and hedgerows at the site. No other species were recorded during the surveys.

The construction of the proposed development will not affect bats to any great degree in terms of loss of roosting potential but there will be the loss of vegetation in the central part of the site that may affect foraging. Replacement planting in this area will be required to minimise gaps along potential flight lines.

Lighting of the site and an increase in human activity may well have an effect on foraging bats. The effect of lighting on bats will depend on the level of light spillage onto roosting, commuting and foraging areas and the duration of that light pollution. As little as 0.06 lux can cause a disturbance to bats according to some researchers but reducing light spill to levels as low as this is difficult. Light spillage onto adjacent trees and hedgerows have been minimised based on the current lighting design and measures in place to reduce spillage accordingly. The proposals include lighting of operational areas only. There is no definitive lighting design for the tower and dragon at this time but measures will be required to ensure that bats are not significantly affected.

The northern part of the site was found to be generally well lit from light spillage from street lighting associated with the McDonald's restaurant whilst the remaining areas were generally dark.

In terms of duration of lighting this again should be minimised wherever possible. It is understood that proposals will include lighting of the car park areas, main pedestrian footpath and access road. It is understood that the scheme will be lit throughout the year but timers will turn off the lighting at midnight each day.

Lighting around the buildings, footpaths and car park should be directed to where it is needed by the designs of the luminaire (use low level where practicable) and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. The height of lighting columns in general should be as short as possible as light at a low level reduces the ecological impact. No lighting should be directed onto tree lines or hedgerows. If lighting is not needed then it is recommended that these areas are not lit.

The illumination of the site in September, November, October and April period may affect bat foraging significantly but less so in the months of January to early March. However, winter bat activity is highly weather dependant.

Lighting around the structure, buildings and car park will be directed to where it is needed by the designs of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. The height of lighting columns in general should be as short as possible as light at a low level reduces the ecological impact. It is understood that low level lighting will be used where practicable. If lighting is not needed then it is recommended that it is not lit. The lighting design has only included lighting in the area occupied by the dragon and tower and has been designed to avoid the majority of the tree lines.

Whilst the bats (pipistrelles and noctules) encountered on the survey night are species of bats that are attracted to certain artificial lights to feed on the insects, the presence of some bat species that avoid artificial light cannot be ruled out by this survey merely because they were not encountered during the three survey visits.

Measures to ensure that there will be no net loss in the local bat status will need to be considered taking into account factors such as population distribution, viability and connectivity.

Bat boxes can be erected in trees and on the structures. For pipistrelle bats the use of purpose made roost sites (such as Schwegler Bat Tubes (modular) or Ibstock bat boxes) could be built into the cavity walls of the new buildings. A purpose built bat roost could be incorporated into the roof void of the proposed lodge building to cater for other species such as lesser horseshoe bats. This will need to be designed in accordance with the Lesser Horseshoe Bat Conservation Handbook.

APPENDIX D

Habitat Suitability Index Assessment

Great Crested Newt Survey

1. Pond Details

Project	The Welsh Dragon
Project number/reference	16735
Site	The Welsh Dragon Site, Black Park, Chirk
Pond number/reference	Pond A
OS Grid reference	330167E 339750N
Location details	Pond A located to the east of McDonald's restaurant. Attenuation pond.
Access instructions	N/A

Landowner name	
Address/email	
Telephone	

Habitat Suitability Index

SI1.	Map location	A/B/C	A	SI value
SI2.	Surface area	rectangle/ellipse/irregular	ellipse	1.00
	length (m)		10	
	width (m)		7	
	OR estimate (m ²) if irregular			
	area (m ²) =		54.95	0.11
SI3.	Dessication rate	never/rarely/sometimes/frequently	frequently	0.10
SI4.	Water quality	good/moderate/poor/bad	poor	0.33
SI5.	Shade	% of margin shaded 1m from bank	0	1.00
SI6.	Waterfowl	absent/minor/major	minor	0.67
SI7.	Fish population	absent/possible/minor/major	absent	1.00
SI8.	Pond density	number of ponds within 1km	0.3	0.44
SI9.	Terrestrial habitat	good/moderate/poor/isolated	moderate	0.67
SI10.	Macrophyte cover	%	80	1.00

Note: Guidance in undertaking the HSI is available at www.narrs.org.uk.

HSI score = 0.48

HSI calculation formulae adapted from Rob Oldham

Pond suitability = poor

General description/notes/comments

One pond counted to be in connection with the this pond. Other ponds within 1km are seperated by significant barriers such as the A5 road.

Survey results summary

Number of survey visits	4
Presence or likely absence =	absent
Peak count =	0
Pond population size class =	n/a

Note: The great crested newt mitigation guidelines recommend that a minimum of **four** survey visits are required to determine likely absence, and **six** to assess population size class.

Note: Only bottle-trapping and torch survey are considered suitable methods for assessing population size class.

Note: Peak count is the maximum number of adult newts seen on one visit using one survey method.

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Great Crested Newt Survey

2. Survey Details

	Visit 1	Visit 2	Visit 3
Date	07/05/10	15/06/10	25/06/10
Personnel			
Temperature (°C)	14	9	16
Weather	Dry and breezy	Dry and mild	Dry and warm
Turbidity	3	3	3
Vegetation cover	3	3	3
Methods			
Indicate methods used or number of bottle traps	torch trap net other	torch trap net other	torch trap net other
	Y	Y	Y
T. cristatus			
male			
female			
unknown			
total adults	0 0 0 0	0 0 0 0	0 0 0 0
immature			
larvae			
eggs present?	no	no	no
<i>L. vulgaris</i>			
<i>L. helveticus</i>			
<i>R. temporaria</i>			
<i>B. bufo</i>			
Other			
Date	30/06/10		
Personnel			
Temperature (°C)	18		
Weather	Dry and humid		
Turbidity	3		
Vegetation cover	3		
Methods			
Indicate methods used or number of bottle traps	torch trap net other	torch trap net other	torch trap net other
	Y		
T. cristatus			
male			
female			
unknown			
total adults	0 0 0 0	0 0 0 0	0 0 0 0
immature			
larvae			
eggs present?	no		
<i>L. vulgaris</i>			
<i>L. helveticus</i>			
<i>R. temporaria</i>			
<i>B. bufo</i>			
Other			

Note: Cells highlighted orange indicate a potential detectability issue due sub-optimal survey conditions.

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Great Crested Newt Survey

1. Pond Details

Project	The Welsh Dragon
Project number/reference	16735
Site	The Welsh Dragon Site, Black Park, Chirk
Pond number/reference	Pond B
OS Grid reference	330020E 339150N
Location details	Pond B located in the field south of Green Lane
Access instructions	N/A
Landowner name	
Address/email	
Telephone	

Habitat Suitability Index

		SI value
SI1. Map location	A/B/C	A 1.00
SI2. Surface area	rectangle/ellipse/irregular	ellipse
	length (m)	12
	width (m)	5
	OR estimate (m ²) if irregular	
	area (m ²) =	47.1 0.09
SI3. Dessication rate	never/rarely/sometimes/frequently	frequently 0.10
SI4. Water quality	good/moderate/poor/bad	moderate 0.67
SI5. Shade	% of margin shaded 1m from bank	100 0.20
SI6. Waterfowl	absent/minor/major	absent 1.00
SI7. Fish population	absent/possible/minor/major	absent 1.00
SI8. Pond density	number of ponds within 1km	0.3 0.44
SI9. Terrestrial habitat	good/moderate/poor/isolated	good 1.00
SI10. Macrophyte cover	%	70 1.00

Note : Guidance in undertaking the HSI is available at www.narrs.org.uk.
HSI calculation formulae adapted from Rob Oldham

HSI score = **0.47**

Pond suitability = **poor**

General description/notes/comments

One pond counted to be in connection with the this pond. Other ponds within 1km are separated by significant barriers such as the A5 road.

Survey results summary

Note : The great crested newt mitigation guidelines recommend that a minimum of **four** survey visits are required to determine likely absence, and **six** to assess population size class.

Note : Only bottle-trapping and torch survey are considered suitable methods for assessing population size class.

Note : Peak count is the maximum number of adult newts seen on one visit using one survey method.

Number of survey visits **4**

Presence or likely absence = **absent**

Peak count = **0**

Pond population size class = **n/a**

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Great Crested Newt Survey

2. Survey Details

	Visit 1	Visit 2	Visit 3
Date	07/05/10	15/06/10	25/06/10
Personnel			
Temperature (°C)	14	9	16
Weather	Dry and breezy	Dry and mild	Dry and warm
Turbidity	3	3	3
Vegetation cover	3	3	3
Methods			
indicate methods used or number of bottle traps	torch trap net other Y Y	torch trap net other Y Y	torch trap net other Y Y
T. cristatus			
male			
female			
unknown			
total adults	0 0 0 0	0 0 0 0	0 0 0 0
immature			
larvae			
eggs present?	no	no	no
<i>L. vulgaris</i>			
<i>L. helveticus</i>			
<i>R. temporaria</i>			
<i>B. bufo</i>			
Other			
Visit 4	30/06/10	Visit 5	Visit 6
Date			
Personnel			
Temperature (°C)	18		
Weather	Dry and humid		
Turbidity	3		
Vegetation cover	3		
Methods			
indicate methods used or number of bottle traps	torch trap net other Y Y	torch trap net other Y Y	torch trap net other Y Y
T. cristatus			
male			
female			
unknown			
total adults	0 0 0 0	0 0 0 0	0 0 0 0
immature			
larvae			
eggs present?	no		
<i>L. vulgaris</i>			
<i>L. helveticus</i>			
<i>R. temporaria</i>			
<i>B. bufo</i>			
Other			

Note : Cells highlighted orange indicate a potential detectability issue due sub-optimal survey conditions.

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APPENDIX E

BREEAM Bespoke Manual Landuse and Ecology Chapter Extract

Land Use & Ecology Section

BREEAM : Bespoke : 2008
Land Use & Ecology
LE1 – Reuse of land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Credit aim

To encourage the reuse of land that has been previously developed and discourage the use of previously undeveloped land for building.

Credit criteria

Credits	
1	Where evidence is provided to demonstrate that the majority of the footprint of the proposed development falls within the boundary of previously developed land.

Compliance requirements

The following demonstrates compliance:

- At least 75% of the proposed development's footprint is on an area of land which has previously been *developed* for use by industrial, commercial or domestic purposes in the last 50 years.

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new build projects.
Refurbishment	In the case of refurbishment, the credit can be awarded by default where no new building work or infrastructure is being constructed as part of the refurbishment.
Extensions to existing buildings	Where a refurbishment includes new buildings, hard landscaping, or infrastructure, 75% of the total proposed development footprint (refurbished plus new build and/or hard landscaping and/or infrastructure) must comply with the requirement.
Infill development	New buildings developed within the boundary of existing sites do not automatically comply with the requirements. The land on which at least 75% of the new building will be sited must meet the definition of <i>previously developed</i> .
Shell Only	There are no additional or different requirements to those outlined above specific to shell-only assessments.
Fit Out Only	Credit not applicable for Fit Out-only assessments.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE1 – Reuse of land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Temporary works	Undeveloped areas of the site to be used for temporary works (e.g. temporary offices/parking, material/machinery storage) must be considered as development on undeveloped land and therefore included in the calculations unless they have been defined as 'land of low ecological value' (Ecological Value and Protection credit, LE3).
Developed more than 50 years ago	Where a site has been previously developed (more than 50 years ago) but is now considered undeveloped, the credit may only be awarded on this basis if the site is deemed to be "contaminated" as defined in BREEAM credit LE2.

Schedule of evidence required

Req.	Design Stage	Post Construction Stage
1	Existing site plan, report or site photographs confirming: - Previous land use. - Area (m²) of previous land use.	Assessor's building/site inspection or as built drawings confirming: - The footprint or orientation of the developed area has not altered from that confirmed in the design stage evidence. - Where alteration has occurred the % must be re-calculated using 'as built' plans.
	Proposed site plan showing; Location and footprint (m²) of proposed development and temporary works.	

Additional information

Relevant definitions

Proposed Development: Is defined as the area of any building, hard landscaping, car park and access roads that fall within the boundary of the proposed site.

Previously Developed Land: For the purposes of this credit, BREEAM uses the definition from Planning Policy Statement 3 which defines previously developed land as that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure.

The definition includes:

- a. Defence buildings

The definition excludes:

- a. Land that is or has been occupied by agricultural or forestry buildings.
- b. Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.
- c. Land in built-up areas such as parks, recreation grounds and allotments which, although may feature paths, pavilions and other buildings, have not been previously developed.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE1 – Reuse of land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

- d. Land that was previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings).

References

England and Wales

1. Planning Policy Guidance (PPG) 3: Housing. Available from the Government's Planning Portal website: www.planningportal.gov.uk.

Scotland

2. Scottish Planning Policy Guidance (SPPG) 3: Housing. Available from the Scottish Government's website: <http://www.scotland.gov.uk/Publications/2003/02/16499/18894>

BREEAM : Bespoke : 2008
Land Use & Ecology
LE2 – Contaminated land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Credit aim

To encourage positive action to use contaminated land that otherwise would not have been remediated and developed.

Credit criteria

Credits	
1	Where evidence is provided to demonstrate that the land used for the new development has, prior to development, been defined as contaminated and adequate remedial steps have been taken to decontaminate the site prior to construction.

Compliance requirements

The following demonstrates compliance:

- The site is deemed to be *significantly contaminated* as confirmed by a contaminated land specialist's site investigation, risk assessment and appraisal identifying:
 - the degree of contamination
 - the contaminant sources/types
 - the options for remediating sources of pollution which present an unacceptable risk to the site.
- The client or contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan.

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different requirements to those outlined above specific to shell-only assessments.
Fit Out Only	Credit not applicable for Fit out-only assessments.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE2 – Contaminated land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Prior Decontamination	The credit can only be awarded where remediation has taken place to enable current development of the site for the assessed building, or part of a larger phased development that includes the assessed building (see below). The credit is not achievable for instances where historical remediation and development of the site has occurred outside the scope of the current development proposals.
Large sites split into smaller plots	Where a large site has been decontaminated and is then packaged up into smaller plots of land for individual buildings (possibly as part of a phased development strategy), the credit can be awarded regardless of the plot location of the assessed building. This is on the condition that the whole site could not have been developed without remediation work taking place.
Health and Safety-related decontamination	Contaminated land that has been decontaminated solely for health and safety reasons (rather than for the specific purpose of re-development) does not comply.
Asbestos	Where the only decontamination required is for the removal of asbestos within an existing building fabric, this cannot be classified as contaminated land. However, where asbestos is found to be present in the ground this will be classed as contamination for the purposes of assessing this credit.

Schedule of evidence required

Req.	Design Stage	Post Construction Stage
1	A copy of the specialist's land contamination report confirming: - The degree, type and sources of site contamination. - The options for remediating the site. Existing site plan(s) showing: - Location of areas contaminated and to be remediated in relation to any proposed development.	The evidence required at the post construction stage is the same as for a design stage assessment.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE2 – Contaminated land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

2	A letter from the main contractor or remediation contractor confirming: - The remediation strategy for the site. - Summary details of the implementation plan. If a contractor has not yet been appointed, a letter from the client, or their representative confirming: - That the appointed contractor will undertake necessary remediation works to mitigate the risks identified in the specialist report.	A copy of the verification report (or relevant sections of the report) confirming: - Description of remedial works undertaken. - Description of relevant <i>pollution linkages</i> addressed*. * This may not be applicable where the contaminant is a non-native invasive plant species.
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Additional information

Relevant definitions

Contaminant: Is defined as any solid, liquid or gaseous material in, or on the ground to be covered by the building, which is classed as a hazard and therefore presents an unacceptable risk to human health and the environment. The definition also includes land significantly infested by *non-native invasive plant species* (see below).

Significant contamination: For the purposes of this credit, significant contamination is contamination compliant with the above and that, without remediation, development of the site is not possible.

Remediation: Activity undertaken to prevent, minimise, remedy or mitigate the risk caused by contaminated land to human health or the environment.

Non-native invasive plant species: Are non-indigenous species that adversely affect the habitats they invade economically, environmentally or ecologically. For the purposes of BREEAM this currently includes Japanese Knotweed and Giant Hogweed only. Further information on the control and disposal and how this fits into the legislative framework relating to such species can be obtained from DEFRA.

Pollution Linkages: A relevant pollutant linkage is one that has been identified during the risk assessment stage as representing unacceptable risks to human health or the environment.

References

- CLEA Overview Documents (These and other documents relating to CLEA are available from the Environment Agency's website: www.environment-agency.gov.uk):
 - CLR 7: Assessment of risks to human health from land contamination; an overview of the development of Soil Guideline Values and related research.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE2 – Contaminated land

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

- b. CLR 8: Potential contaminants for the assessment of land.
 - c. CLR 9: Contaminants in soil: collation of toxicological data and intake values for humans.
 - d. CLR 10: The Contaminated Land Exposure Assessment (CLEA) model: technical basis and algorithms.
2. Further advice and technical publications are available for download from the Environment Agency's website: www.environment-agency.gov.uk, including;
 - a. Remedial methods for contaminated groundwater.
 - b. Verification of treatment performance – How sure can you be?
 - c. Issues for the selection of remedial strategies, good practice guidance.
 - d. Process-based remediation of land contamination.
3. Approved Document C: “*Site Preparation and Resistance to contaminants and moisture*”, 2004 edition, ODPM. (<http://www.communities.gov.uk>)
4. “*Environment Agency Guidance on Requirements for Land Contamination Reports*”, Environment Agency, 2005.
5. Scottish Environment Protection Agency (SEPA) www.sepa.org.uk

BREEAM : Bespoke : 2008
Land Use & Ecology
LE3 – Ecological value of site AND Protection of ecological features

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Credit aim

To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.

Credit criteria

Credits	
1	Where evidence provided demonstrates that the site's construction zone is defined as land of low ecological value and all existing features of ecological value will be fully protected from damage during site preparation and construction works.

Compliance requirements

The following demonstrates compliance:

- Land within the *construction zone* is defined as 'land of low ecological value' using either:
 - BREEAM checklist A4 **OR**
 - A *suitably qualified ecologist* who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.
- All existing features of ecological value surrounding the *construction zone* and site boundary area are adequately protected from damage during clearance, site preparation and construction activities as listed below:
 - Trees of over 100 mm trunk diameter, and/or of significant ecological value, are protected by barriers. Barriers must prohibit construction works in the area between itself and the tree trunk. Minimum distance between tree trunk and barriers must be either the distance of branch spread or half tree height, whichever is the greater.
 - In all cases trees must be protected from direct impact and from severance or asphyxiation of the roots.
 - Hedges and natural areas requiring protection must either have barriers erected and be protected, or, when remote from site works or storage areas, be protected with a prohibition of construction activity in their vicinity.
 - Watercourses and wetland areas are to be protected by cut-off ditches and site drainage to prevent run-off to natural watercourses (as this may cause pollution, silting or erosion).
- In all cases, the contractor is required to construct ecological protection prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).

BREEAM : Bespoke : 2008
Land Use & Ecology
LE3 – Ecological value of site AND Protection of ecological features

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new build projects.
Refurbishment	A refurbishment of a building (with no new construction), must protect any existing ecological features of value. Protection includes clear exclusion procedures for construction traffic/personnel and material storage, as well as physical barriers.
Extensions to existing buildings	Where a refurbishment includes new building work or infrastructure, the land on which the new build area and its associated infrastructure (e.g. roads, pavements, car parks etc) will be situated, must comply with the criteria.
Shell Only	There are no additional or different requirements to those outlined above specific to shell-only assessments.
Fit Out Only	Credit not applicable for Fit out-only assessments.
No features of ecological value	Where the construction zone is defined as 'land of low ecological value' and where the surrounding site contains no features of ecological value, this credit can be awarded.
Suitably qualified ecologist report	The suitably qualified ecologist must base their findings on data collected from a site visit conducted at appropriate time(s) of the year, when different plant and animal species are evident. The content of the Ecology Report is to be representative of the existing site's ecology prior to the commencement of initial site preparation works (i.e. before RIBA stage K, Operations On Site). Where the ecologist has made no on-site visit, the credit cannot be awarded. See additional guidance for definition of a suitably qualified ecologist.
Features of little or no ecological value	If a suitably qualified ecologist has confirmed that a feature has little or no ecological value, or where a tree is deemed to create a significant danger to the public or occupants by a statutory body or qualified arboriculturalist, then that feature may be exempt from the protection of ecological features requirement of this credit.
Removal of features of ecological value	If features of ecological value have been removed as part of site clearance then the development cannot achieve this credit, even if they are to be replaced as part of a new landscaping strategy.
Site clearance prior to purchase of the site	For sites that have been cleared more than five years ago, the ecological value of the site would be its present ecological value, on the basis that in the intervening five years, ecological features would have started to re-establish themselves and therefore act as an indicator of the site's ecological value. For sites that have been cleared less than five years before assessment, a suitably qualified ecologist should make an estimation of the site's ecological value immediately prior to clearance on the basis of available desktop information (including aerial photography) and the landscape type/area surrounding the site.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE3 – Ecological value of site AND Protection of ecological features

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Schedule of evidence required

Req.	Design Stage	Post Construction Stage
First Credit		
1&2	A completed copy of checklist A4 signed and dated by the client, their representative or a design team member e.g. architect. AND One of the following: A plan and/or site photographs of the existing site highlighting any ecological features OR A copy of the ecologist's report containing: • Confirmation that the land within the construction zone is of low ecological value. • A description of any ecological features within the site or on the site boundary. • Date(s) of site survey(s). A completed, signed copy of sections A and B of checklist A6 'Guidance for relating ecology reports to BREEAM' to confirm the ecologist's professional status OR A copy of the ecologist's report containing the information in sections A and B from the above.	The evidence required at the post construction stage is the same as for a design stage assessment.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE3 – Ecological value of site AND Protection of ecological features

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

2&3	A copy of the relevant section of the contract specification confirming: - Requirement to protect all identified features of ecological value. - Scope of protection measures required. - Protection measures implemented prior to commencement of site activities.	Assessor site inspection report OR ecologist's report confirming: - The boundary of the site and the construction zone has not been altered. - Where applicable, all existing ecological features still remain.
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Additional information

Relevant definitions

Construction zone: For the purpose of this BREEAM credit the construction zone is defined as any land on the site which is being developed (and therefore disturbed) for buildings, hard standing, landscaping, site access, plus a 3m boundary in either direction around these areas. It also includes any areas used for temporary site storage and buildings.

If it is not known exactly where buildings, hard standing, site access and temporary storage will be located it must be assumed that the construction zone is the entire site.

Suitably qualified ecologist (SQE): An individual achieving all the following items can be considered to be "suitably qualified" for the purposes of a BREEAM assessment:

1. Holds a degree or equivalent qualification (e.g. N/SVQ level 5) in ecology or a related subject.
2. Is a practising ecologist, with a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures. Examples of relevant experience are: ecological impact assessments; Phase 1 and 2 habitat surveys and habitat restoration.
3. Is covered by a professional code of conduct and subject to peer review.

Peer review: Is defined as the process employed by a professional body to demonstrate that potential or current full members maintain a standard of knowledge and experience required to ensure compliance with a code of conduct and professional ethics.

Full members of the following organisations, who meet the above requirements, are deemed suitably qualified ecologists for the purposes of BREEAM:

- Association of Wildlife Trust Consultancies (AWTC)
- Chartered Institution of Water and Environmental Management (CIWEM)
- Institute of Ecology and Environmental Management (IEEM)
- Institute of Environmental Management and Assessment (IEMA)

BREEAM : Bespoke : 2008
Land Use & Ecology
LE3 – Ecological value of site AND Protection of ecological features

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

- Landscape Institute (LI)

Where a suitably qualified ecologist is verifying an Ecology Report produced by another ecologist who does not meet the SQE requirements, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

- represent sound industry practice
- report and recommend correctly, truthfully and objectively
- be appropriate given the local site conditions and scope of works proposed
- avoid invalid, biased and exaggerated statements.

Additionally, written confirmation from the third party verifier that they comply with the definition of a *Suitably Qualified Ecologist* is required.

References

1. British Standard BS5837 "*Trees in relation to construction*", BSI, 2005.
2. "*The Hedgerows Regulations 1997*", Office of Public Sector.
3. Environmental good practice on site (CIRIA C502): "*Guidance on how to avoid causing environmental damage and the financial penalties that can follow*", CIRIA, 1999.
4. Environmental good practice on site (CIRIA C503): "*Practical advice on how to carry out construction works without harming the environment*", CIRIA, 1999.
5. Working with wildlife site guide (CIRIA C567): "*Guidance to understand and implement good practice in relation to wildlife on development and construction projects*", CIRIA, 2005.
6. "*RSPB Good Practice Guide for Prospective Developments – General Principles*", RSPB, 1997: www.rspb.org.uk.
7. Pollution Prevention Guideline (PPG) 5: "*Works in, near, or liable to affect watercourses*", Environment Agency.
8. Pollution Prevention Guideline (PPG) 6: "*Working at construction and demolition sites*", Environment Agency.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

Credit aim

To minimise the impact of a building development on existing site ecology.

Credit criteria

Credits	
1	Where evidence provided demonstrates that the change in the site's existing ecological value, as a result of development, is <i>minimal</i> .
2	Where evidence provided demonstrates that there is <i>no negative change</i> in the site's existing ecological value as a result of development.

Compliance requirements

The following demonstrates compliance:

1. Where the change in ecological value of the site is less than zero and equal to or greater than minus nine plant species i.e. a minimal change (one credit).
2. Where the change in ecological value of the site is equal to or greater than zero plant species i.e. no negative change (two credits).

The change in ecological value of the site is calculated by **EITHER** of the following:

3. Determine the following information and input this data in to Ecology calculator 1 within the spreadsheet tool:
 - a. Plot type(s) and areas (m²) that define the landscape of the assessed site, in its existing pre-developed state and proposed state (see additional guidance).

OR

4. Where a *suitably qualified ecologist* has been appointed and, based on a site survey, they confirm the following and the assessor or ecologist inputs this data in to the Ecology calculator 2:
 - b. Actual plot/habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state
 - c. Area (m²) of each plot/habitat type
 - d. Number of plant species found within each plot type

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings. Refer also to the note below on infill developments.
Shell Only	There are no additional or different requirements to those outlined above specific to shell-only assessments.
Fit Out Only	Credit not applicable for Fit out-only assessments.
Completing Ecology Calculator 1	First, define the landscape type (based on the typology of the surrounding sites, table 1). This category is unlikely to change through the development, although it may in some cases, e.g. when a disused site is developed as part of a master plan for a large multi-use or multi-building development/regeneration project. Then, define and calculate the area (m²) of each vegetation-plot type (table 2) and building or hard landscaped area, both before and after development, for the site. Once the data is entered, the Ecology Calculator 1 will indicate the indicative change in ecological value. The result must be used to award the credits.
Number of plant species	BREEAM measures ecological value using number of plant species. The plant species figures for each land type are programmed into the Ecology Calculator tool 1. These figures are based on national figures from the Countryside Survey prepared for the Digest of Environmental Statistics (see table 3).
Wildlife garden planting	In the 'change of ecological value' table (table 3), 'garden planting (typical)' and 'wildlife garden planting' will always record a score of zero, unless a suitably qualified ecologist has been appointed: whereby they will make the distinction between 'typical' and 'wildlife' garden planting species and record 'actual' species numbers.
Derelict Sites	The ecological value of derelict sites is time dependent (table 3); a linear scale has been used to determine intermediate values between zero ecological value at 1 year from dereliction/demolition to a value at 30 years based on marginal upland figures. This presents a worst case figure which can be amended on the advice of a suitably qualified ecologist.
Assessment of a single development on a larger site	Where the assessment is of a single building that forms part of a larger site development and the landscaping and ecological features form a common part of the whole site, for the purpose of assessing this credit the plot types and areas for the entire site must be used.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

Infill developments on existing occupied site	Where a development is an infill (or new building) on an existing occupied site, then the construction zone for the new building would be the area of site assessed for the purposes of this credit.
Site clearance prior to purchase of the site	Refer to the compliance note in LE3 on this issue.
Green Roofs	The contribution of species from a Green roof can only be incorporated where a suitably qualified ecologist has been appointed.

Schedule of evidence required

Req.	Design Stage	Post Construction Stage
First & Second Credit		
1,2 & 3	Existing and proposed site plans and, if required, maps and aerial photographs confirming: • Landscape and vegetation plot types • Area (m²) of vegetation plot types AND A completed copy of Ecology Calculator 1.	The evidence required at the post construction stage is the same as for a design stage assessment. Plus: Assessor's/ecologist's building/site inspection confirming: • Post construction vegetation plot types and areas are in accordance with design stage evidence.
1,2 & 4	A copy of the suitably qualified ecologist's report confirming prior to and after the development: • Landscape and vegetation plot types • Area (m²) of vegetation plot types AND A completed, signed copy of checklist A6 – Relating ecology reports to BREEAM OR a copy of the ecology report containing the information outlined in checklist A6. AND A completed copy of Ecology Calculator	

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

	2.	
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Additional information

Relevant Definitions

Construction zone: As defined for credit LE3 – Ecological Value of site AND Protection of ecological features

Suitably qualified ecologist (SQE): As defined for credit LE3 – Ecological Value of site AND Protection of ecological features

Table 1: General Landscape Types

Pastoral	Mainly grasslands.
Arable	Land dominated by cereals and other arable crops, as well as intensively managed grasslands.
Marginal Upland	Areas which are on the periphery of the uplands, and which are dominated by mixtures of low intensity agriculture, forestry and semi-natural vegetation.
Upland	Land generally above a height suitable for mechanised farming and frequently dominated by semi-natural vegetation.
Building & Derelict Land	Land currently or previously occupied by buildings.
Urban Mosaic	A complex mix of habitats located within cities, towns, or villages, which will include; buildings, hard standing, pockets of disused land and scrub, and areas of managed green spaces, such as gardens, allotments, and parkland. Parklands can be characterised as being accessible to the public and will usually be fairly intensively managed spaces, consisting of a matrix of grassland (grazed or mown) with scattered trees at various densities and areas of dense planting. This landscape type is to be used only when no other landscape type in the table is more appropriate / predominates.

Table 2: Vegetation Plot Types

Crops/weeds	Mostly highly disturbed vegetation of arable fields and their boundaries; includes cereal and vegetable crops.
Tall grassland/herb	Typical vegetation of overgrown lowland field boundaries, ditches and roadside verges.
Fertile grass	The bulk of agriculturally improved grasslands, intensive pasture and silage crops; but also includes mown areas of improved grasslands for recreational and amenity purposes, as well as re-sown roadside verges.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

Infertile grass	A diverse group of semi-improved and semi-natural grasslands; includes acidic to basic, wet to dry grasslands, and tall-herb vegetation mainly present in the lowlands; often found on stream sides and roadside verges.
Lowland wooded	Includes wooded vegetation of hedges and broadleaved woods in the lowlands.
Upland wooded	A varied group of acidic vegetation types usually associated with upland woods, including: semi-natural woodland; conifer plantations; bracken and wooded streamsides.
Moorland grass/mosaic	Typically grazed moorland vegetation, including extensive upland acidic and peaty grassland, and species-rich but very localised flushes.
Heath/bog	Mostly heather moorland, blanket bog and montane heath, but also lowland heath and raised bog.
Wildlife garden planting	Garden planting that uses native species and/or those that have a known attraction or benefit to local fauna, based on the advice of a suitably qualified ecologist.

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Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

Table 3: Number of plant species by plot for different landscape types

Types of Plot	Landscape Types									
	Arable	Pastural	Marginal Upland	Upland	Existing Building/Hard Landscaped Areas	Urban Mosaic	Derelict Land <1 Years	Derelict Land < 10 Years	Derelict Land < 20 Years	Derelict Land <= 30 Years
Crop Weeds	5.4	8.3	-	-	-	-	-	-	-	-
Tall Grassland/Herb	12.7	15.0	-	-	-	17.6	0	6.3	15.8	21.1
Fertile Grassland	11.6	12.7	15.3	-	-	11.6	0	4.6	11.5	15.3
Infertile Grassland	17.1	17.6	21.1	-	-	17.6	0	6.3	15.8	21.1
Lowland Wooded	12.9	12.5	-	-	0	13.8	-	-	-	-
Upland Wooded	-	12.7	13.8	20.4	0	13.8	-	-	-	-
Moorland Grass/Mosaic	-	2.0	20.4	21.0	-	-	-	-	-	-
Heath/Bog	-	-	14.3	20.0	-	-	-	-	-	-
Hard Landscaping	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0
Garden Planting (typical)	-	-	-	-	0	0	0	0	0	0
Wildlife Garden Planting*	-	-	-	-	0	0	0	0	0	0
- Insufficient data to produce national averages, as not all vegetation plot types are found in all landscaped types. * Only where the rule concerning wildlife garden planting in table 2.0 has been met can actual species values be used.										

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

Calculating the change and increase in ecological value

BREEAM calculates the change in ecological value by comparing the diversity (number and area) of plant species on the site pre and post construction. The ecological value of the site is expressed as an area-weighted average of plant species for the site's landscape type. This enables BREEAM to use this as an indicator of the proposed development's impact on the site's existing ecological value.

A simple example of the calculation is outlined below.

1. Calculate the ecological value of a previously developed existing site:

A 2065m² existing site consists of the following types of land:

- a. 1865 m² hard landscaping = 0 species
- b. 200m² urban mosaic - infertile grassland = 17.6 species (Table 3.0).

The ecological value of the existing site is calculated as follows, for each plot type;

- Number of species on plot type x plot type area as % of total area.

Therefore, for our example site:

- a. Hard landscaping: $\{(0 \text{ species} \times (1865\text{m}^2/2065\text{m}^2))\} = 0 \text{ species}$
- b. urban mosaic-infertile grassland: $\{(17.6 \text{ species} \times (200\text{m}^2/2065\text{m}^2))\} = 1.70 \text{ species}$
- c. Ecological value of the existing site = $0 + 1.70 = 1.70 \text{ species}$

2. Calculate the ecological value of the proposed site:

The 2065m² post-construction site consists of the following types of land:

- a. 1375m² of building = 0 species.
- b. 550m² of hard landscaping = 0 species
- c. 140 m² has remained as urban mosaic-infertile grassland = 17.6 species

The ecological value of the proposed site is as follows:

- a. Building: $\{(0 \text{ species} \times (1375\text{m}^2/2065\text{m}^2))\} = 0 \text{ species}$
- b. Hard landscaping: $\{(0 \text{ species} \times (550\text{m}^2/2065\text{m}^2))\} = 0 \text{ species}$
- c. Urban mosaic-infertile grassland: $\{(17.6 \text{ species} \times (140\text{m}^2/2065\text{m}^2))\} = 1.19 \text{ species}$
- d. Ecological value of the proposed site = $0 + 0 + 1.19 = 1.19 \text{ species}$

The ecological impact is the difference between the two ecological values:

$$\text{Change in ecological value: } 1.19 - 1.70 = -0.51 \text{ species}$$

Therefore, for this example 1 credit is achieved.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE4 – Mitigating ecological impact

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	1	1	1

References

1. Figures are based on data from the Countryside Survey which can be accessed through the Digest of Environmental Statistics:
 - a. <http://www.defra.gov.uk/environment/statistics/wildlife/wdcs.htm>
 - b. <http://www.countrysidesurvey.org.uk/archiveCS2000/>

BREEAM : Bespoke : 2008
Land Use & Ecology
LE5 – Enhancing site ecology

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Credit aim

To recognise and encourage actions taken to maintain and enhance the ecological value of the site as a result of development.

Credit criteria

Credits	
1	Where the design team (or client) has appointed a suitably qualified ecologist to advise and report on enhancing and protecting the ecological value of the site; and implemented the professional's recommendations for general enhancement and protection of site ecology.
2	Where there is a positive increase in the ecological value of the site of up to (but not including) 6 species.
3	Where there is a positive increase in the ecological value of the site of 6 species or greater.

Compliance requirements

The following demonstrates compliance:

First credit

1. A *suitably qualified ecologist* (SQE) has been appointed to report on enhancing and protecting the ecology of the site.
 - a. The SQE provides an Ecology Report with appropriate *recommendations* for protection and enhancement of the site's ecology.
 - b. The report is based on a site visit/survey by the SQE prior to the commencement of initial site preparation works.
2. The general *recommendations* of the Ecology Report for enhancement and protection of site ecology have been, or will be, implemented.

Second credit

1. The first credit is achieved.
2. The *recommendations* of the Ecology Report for enhancement and protection of site ecology have been implemented, and the *suitably qualified ecologist* confirms that this will result in an increase in ecological value of the site up to (but not including) 6 species.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE5 – Enhancing site ecology

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

3. The increase in plant species has been calculated using Ecology calculator 2, using actual species numbers.

Third credit

1. The first credit is achieved.
2. The *recommendations* of the Ecology Report for enhancement and protection of site ecology have been implemented, and the suitably qualified ecologist confirms that this will result in an increase in ecological value of the site of 6 species or greater.
3. The increase in plant species has been calculated using Ecology calculator 2, using actual species numbers.

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different requirements to those outlined above specific to shell-only assessments.
Fit Out Only	Credit not applicable for Fit out-only assessments.
Timing of Ecologist Report	It is recommended that the suitably qualified ecologist is appointed to carry out site surveys of existing site ecology, on which their report is based, or to provide verification where the report is prepared by others, at the feasibility stage (RIBA Stage B or equivalent) in order to facilitate and maximise potential ecological enhancement.
General recommendations	'General' recommendations for enhancing and protecting the ecological value of the site are to include, and go beyond, compliance requirements for all current EU and UK legislation relating to protected species and habitats. These 'general' recommendations may include ecological recommendations as detailed in the definitions.
Guidance for ecologists and assessors	Please refer to Checklist A6 – Relating ecology reports to BREEAM, section D for assistance in assessing and interpreting the requirements of this credit.
Native species	Only native floral/plant species and those with a known attraction or benefit to local fauna can be considered for the purpose of increasing the number of species on site, as well as general enhancement.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE5 – Enhancing site ecology

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

No ecological survey completed or construction works have commenced	Where it is not possible to determine 'actual' number of species per vegetation plot type, either because an on-site ecological survey has not been conducted, or, because construction works have already commenced, the second and third credits cannot be achieved.
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Schedule of evidence required

Req.	Design Stage	Post Construction Stage
First Credit		
1	A copy of the ecologist's report containing: - Details and scope of the site survey. - Information as outlined in checklist A6 – Relating ecology reports to BREEAM. OR A copy of the ecologist's report containing a completed, signed copy of checklist A6.	The evidence required at the post construction stage is the same as for a design stage assessment.
2	Proposed site plan highlighting implementation of the ecologist enhancement recommendations. AND One of the following: A copy of the relevant section of the specification requiring the main contractor to implement the SQE's recommendations for protection and enhancement OR A letter from the client or design team member confirming: That the specification will require the main contractor to implement the ecologist's recommendations.	Assessor site inspection report and photographic evidence confirming that the ecologist's recommendations have been implemented. For large mixed-use/multi-building developments, where the whole site has not been completed and ecological enhancements have not been added, or where features are being added at a later date in an appropriate planting season: A copy of the contract/specification or a letter from the main contractor confirming when the planting will be complete. This must be within 18 months from completion of the development.
Second & Third Credit		

BREEAM : Bespoke : 2008
Land Use & Ecology
LE5 – Enhancing site ecology

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

1-3	Evidence as outlined above, confirming compliance with the first credit. A copy of the SQE's report containing the information outlined in checklist A6 – Relating ecology reports to BREEAM. OR A copy of the SQE's report containing a completed, signed copy of checklist A6. AND A completed copy of Ecology Calculator 2.	Evidence (as outlined above) confirming compliance with the first credit.
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Additional information

Relevant Definitions

Suitably qualified ecologist (SQE): As defined for BREEAM credit LE3.

Ecological recommendations are defined as measures adopted to enhance the ecology of the site, which may include:

- The planting of native species or those with a known attraction or benefit to local wildlife
- The adoption of horticultural good practice (e.g. no, or low, use of residual pesticides)
- The installation of bird, bat and/or insect boxes at appropriate locations on the site
- Development of a full Biodiversity Management Plan including avoiding clearance/works at key times of the year (e.g. breeding seasons)
- The proper integration, design and maintenance of SUDs and Green Roofs, community orchards etc.

Only native floral species or those with a known attraction or benefit to local wildlife can be considered for the purpose of enhancing the ecological value of the site.

References

1. **AWTC:** The Association of Wildlife Trust Consultancies, www.awtc.co.uk
2. **CIWEM:** Chartered Institution of Water and Environmental Management, www.ciwem.org
3. **IEEM:** The Institute of Ecology and Environmental Management, www.ieem.org.uk
4. **IEMA:** The Institute of Environmental Management and Assessment www.iema.net.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE5 – Enhancing site ecology

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

5. LI - Landscape Institute www.landscapeinstitute.org

BREEAM : Bespoke : 2008
Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Credit aim

To minimise the long term impact of the development on the site's, and surrounding area's, biodiversity.

Credit criteria

Credits	
1	The client has committed to achieving the mandatory requirements listed below and at least two of the additional requirements.
2	The client has committed to achieving the mandatory requirements listed below and at least four of the additional requirements.

Compliance requirements

The following demonstrates compliance:

Mandatory Requirements

1. A *suitably qualified ecologist* (SQE) has been appointed prior to commencement of activities on site.
2. The *suitably qualified ecologist* (SQE) confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.
3. A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This is to be handed over to the building occupants and includes:
 - Management of any protected features on site
 - Management of any new, existing or enhanced habitats
 - A reference to the current or future site level or local Biodiversity Action Plan.

Additional Requirements

1. The contractor nominates a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.
2. The contractor trains the site workforce on how to protect site ecology during the project. Specific training should be carried out for the entire site workforce to ensure they are

BREEAM : Bespoke : 2008
Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

aware of how to avoid damaging site ecology. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.

3. The contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of construction. The requirement commits the contractor to make such records available where publicly requested.
4. Where a new ecologically valuable habitat, appropriate to the local area, is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any habitat listed in the UK Biodiversity Action Plan (UK BAP), Local Biodiversity Action Plan (LBAP), those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans.
5. Where flora and/or fauna habitats exist on site, the contractor programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and landscaping have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a suitably qualified ecologist.

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to the assessment of refurbished buildings (unless the building is listed – see below).
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different requirements to those outlined above specific to shell-only assessments.
Fit Out Only	Credit not applicable for Fit out-only assessments.
Refurbishment of listed buildings	The refurbishment of a listed building may be exempt from the credit requirements if they conflict with the need to maintain the building's listed features, or are counter to the conservation requirements. Confirmation is required from a suitably qualified ecologist that all possible requirements/enhancements have been achieved before the credit can be awarded (i.e. if no suitably qualified ecologist has been appointed then this credit cannot be awarded).

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Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Biodiversity Champion	A Biodiversity Champion does not have to be an ecologist or ecological expert but must have sufficient authority and time on site to influence activities and ensure that they have minimal detrimental impact on biodiversity.																					
Local biodiversity expertise	Local biodiversity expertise should be sought at, or before, the design stage to help identify species of local biodiversity importance on site. It is likely that their recommendations will draw on the Local Biodiversity Action Plan (LBAP) where one exists.																					
The site and surrounding areas	The steps taken in the above requirements will depend on the nature of the site, e.g. urban sites, and the surrounding areas. It is likely that either all, or none, of the optional items will apply. Where the optional items and the mandatory item 3, the management plan, are deemed, in writing, by the appointed suitably qualified ecologist not to be applicable, all credits can be awarded. Mandatory items 1 and 2 must be met in all instances. This is likely to be the case in the majority of assessments in central town/city areas which have a high proportion of surrounding and existing development and no existing external landscaped areas within the boundary of the assessed site.																					
Sites of no ecological value	Where a site is deemed to have no ecological value, it is still necessary to employ a suitably qualified ecologist to achieve this credit. The ecologist must confirm that all the mandatory items (1), (2) and (3) have been achieved and provide guidance on how to achieve optional item (4). Note that in such cases, mandatory item (1) and additional requirement (4) is likely to be applicable in relation to any ecological enhancements (e.g. green roofs, bird boxes, etc.) adopted in order to achieve the Enhancing Site Ecology credit (LE5).																					
Not all additional items are applicable	Where the SQE confirms that not all additional items are applicable to the development, for example it is a city centre refurbishment on a confined site with no external areas, then the credits can be awarded accordingly: <table><tr><th>No. applicable items</th><th>No. of BREEAM credits</th><th>Requirements</th></tr><tr><td rowspan="2">1 item</td><td>One credit</td><td rowspan="2">Meet mandatory reqs. plus applicable item</td></tr><tr><td>Two credits</td></tr><tr><td rowspan="2">2 items</td><td>One credit</td><td rowspan="2">Meet mandatory reqs. plus all applicable items</td></tr><tr><td>Two credits</td></tr><tr><td rowspan="2">3 items</td><td>One credit</td><td>Meet mandatory reqs. plus 2 applicable items</td></tr><tr><td>Two credits</td><td>Meet mandatory reqs. plus all applicable items</td></tr><tr><td rowspan="2">4 items</td><td>One credit</td><td>Meet mandatory reqs. plus 3 applicable items</td></tr><tr><td>Two credits</td><td>Meet mandatory reqs. plus all applicable items</td></tr></table>	No. applicable items	No. of BREEAM credits	Requirements	1 item	One credit	Meet mandatory reqs. plus applicable item	Two credits	2 items	One credit	Meet mandatory reqs. plus all applicable items	Two credits	3 items	One credit	Meet mandatory reqs. plus 2 applicable items	Two credits	Meet mandatory reqs. plus all applicable items	4 items	One credit	Meet mandatory reqs. plus 3 applicable items	Two credits	Meet mandatory reqs. plus all applicable items
No. applicable items	No. of BREEAM credits	Requirements																				
1 item	One credit	Meet mandatory reqs. plus applicable item																				
	Two credits																					
2 items	One credit	Meet mandatory reqs. plus all applicable items																				
	Two credits																					
3 items	One credit	Meet mandatory reqs. plus 2 applicable items																				
	Two credits	Meet mandatory reqs. plus all applicable items																				
4 items	One credit	Meet mandatory reqs. plus 3 applicable items																				
	Two credits	Meet mandatory reqs. plus all applicable items																				

BREEAM : Bespoke : 2008
Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Schedule of evidence required

Req.	Design Stage	Post Construction Stage
First & Second Credit		
Mandatory Requirements		
1&2	The SQE report or letter confirming: - That they were appointed prior to commencement of activities on site. - All relevant UK and EU legislations will be complied with. AND A completed, signed copy of checklist A6 – Relating ecology reports to BREEAM OR A copy of ecology report containing the information outlined in checklist A6.	A letter from the SQE confirming: That all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with.
3	A copy of the site management plan. OR A copy of the specification requiring the development of plan and outlining the scope of its content. OR Where the timing of assessment does not permit either of the above, a letter from the client confirming: - A commitment to produce a management plan - The scope of the management plan	A copy of the site's landscape and habitat management plan.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

Additional Requirements		
1	A letter from the contractor confirming: • The appointment of the biodiversity champion and their job title. • Their on site role and responsibilities. OR Where not yet appointed, a copy of the specification clause requiring the appointment of a biodiversity champion.	A copy of the relevant sections of the site log book, highlighting: • Details of any action/events taken by the biodiversity champion. If no actions required/taken, this should be confirmed in the log book.
2	Training schedule or letter of confirmation from the contractor committing to provide relevant training. OR Where not yet appointed, a copy of the specification clause requiring the training of the site's workforce.	A record of training undertaken by the site workforce confirming: • Who delivered & developed the training • The scope of the training delivered.
3	A letter from the contractor confirming: • Monitoring and reporting requirements for the development. • The records will be publicly available if and when requested. OR Where not yet appointed, a copy of the specification clause outlining the contractor's monitoring and reporting requirements.	A copy of the relevant sections of the site log book, highlighting: • Records of monitoring and actions taken to protect biodiversity. • Records and outcome of any requests to view such information.
4	A copy of the proposed site plan highlighting the new ecologically valuable habitat. A SQE's report or letter confirming that the habitat supports the relevant biodiversity action plan(s)	Assessor's (or SQE's) site inspection report and photographic evidence confirming the existence of the proposed habitat.

BREEAM : Bespoke : 2008
Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

5	The SQE's report or letter confirming: - Wildlife on site that needs to be accounted for in programming works. - Actions required with respect to programming site works to minimise disturbance. A copy of the contractor's main programme of works. OR A copy of the relevant section of the main contract confirming: - The programme of site works will minimise disturbance to wildlife in accordance with SQE's recommendations.	A letter from the SQE, or a copy of their report confirming: Site works executed in a manner that minimised disturbance to wildlife in accordance with their recommendations.
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Additional information

Relevant definitions

Suitably qualified ecologist (SQE): As defined for credit LE3 – Ecological Value of site AND Protection of ecological features

Biodiversity: Is defined as the variety of life on earth. It includes all species, animal, plants, fungi, algae, bacteria and the habitats that they depend upon.

Biodiversity Action Plan: A plan which sets specific, measurable, achievable, realistic and time bound conservation targets for species and habitats. The UKBAP website www.ukbap.org supports the implementation of the UK Biodiversity Action Plan (UK BAP) on behalf of the UK Biodiversity Partnership and the UK Government.

Steps to produce a site level BAP are outlined in the UK Business and Biodiversity Resource Centre website, hosted by Earthwatch Institute Europe <http://www.businessandbiodiversity.org> under 'your sector'

References

1. Earthwatch Europe: www.businessandbiodiversity.org
2. UK BAP: www.ukbap.org.uk
3. Construction Industry Key Performance Indicators: www.kpizone.com

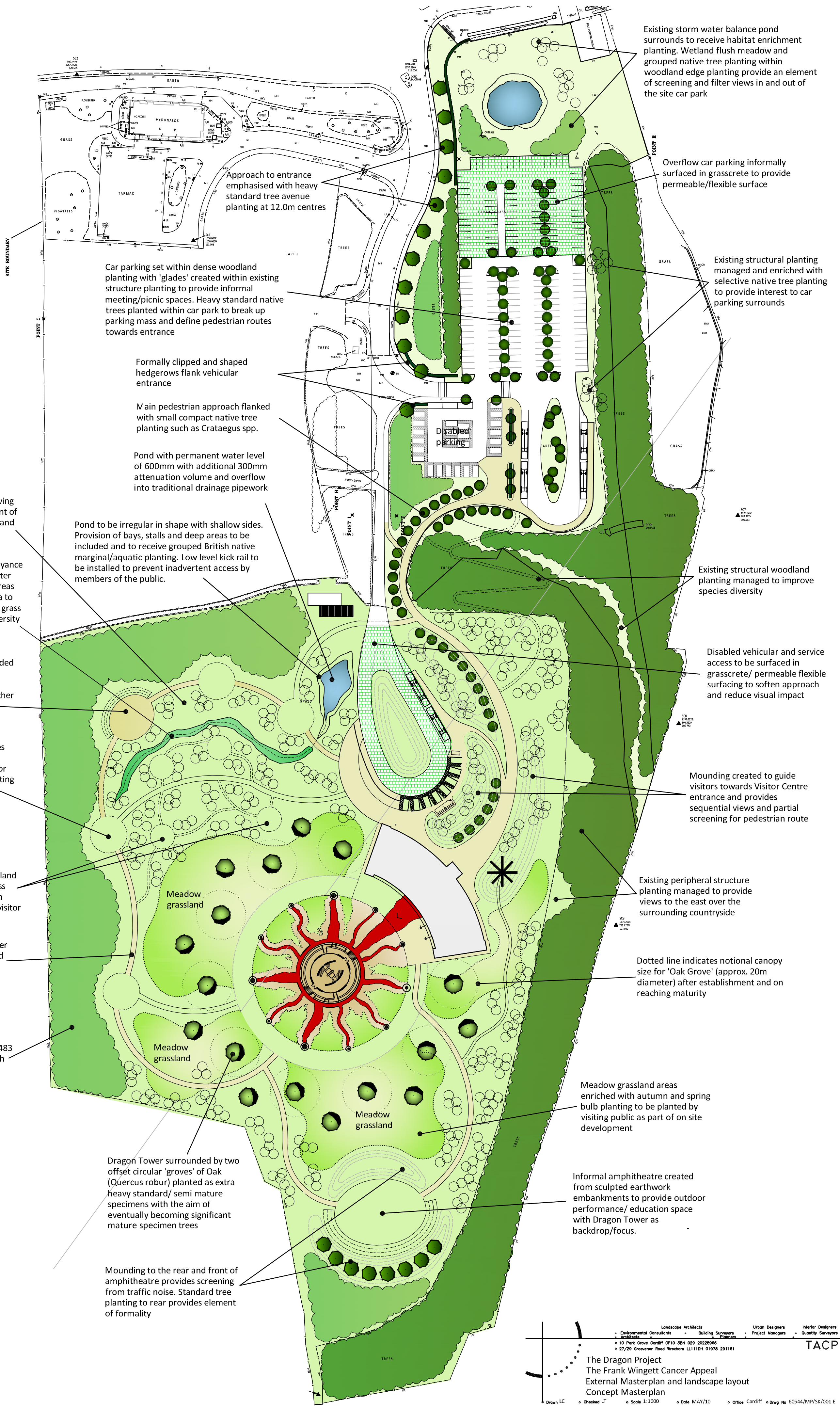
BREEAM : Bespoke : 2008
Land Use & Ecology
LE6 – Long term impact on biodiversity

Minimum BREEAM Standards					
Rating Level	P	G	VG	E	O
Min. credits to achieve rating	-	-	-	-	-

4. Natural Environmental and Rural Communities Act, 2006: www.opsi.gov.uk
5. “A Handbook of Good Practice for Public Bodies Dealing with Best Value and Biodiversity in Scotland”, The Scottish Government, 2004.
6. Delivering the Scottish Biodiversity Duty: www.biodiversityscotland.gov.uk/duty/index.htm
7. “Action for Scotland Biodiversity”, Scottish Biodiversity Group.

APPENDIX F

Masterplan and Landscape Layout



Existing storm water balance pond surrounds to receive habitat enrichment planting. Wetland flush meadow and grouped native tree planting within woodland edge planting provide an element of screening and filter views in and out of the site car park

Overflow car parking informally surfaced in grasscrete to provide permeable/flexible surface

Existing structural planting managed and enriched with selective native tree planting to provide interest to car parking surrounds

Approach to entrance emphasised with heavy standard tree avenue planting at 12.0m centres

Car parking set within dense woodland planting with 'glades' created within existing structure planting to provide informal meeting/picnic spaces. Heavy standard native trees planted within car park to break up parking mass and define pedestrian routes towards entrance

Formally clipped and shaped hedgerows flank vehicular entrance

Main pedestrian approach flanked with small compact native tree planting such as Crataegus spp.

Pond with permanent water level of 600mm with additional 300mm attenuation volume and overflow into traditional drainage pipework

Pond to be irregular in shape with shallow sides. Provision of bays, stalls and deep areas to be included and to receive grouped British native marginal/aquatic planting. Low level kick rail to be installed to prevent inadvertent access by members of the public.

Woodland edge planting giving opportunity for development of varied woodland and grassland habitats

Shallow meandering conveyance swale to collect surface water from paving and grassed areas discharging into pond. Area to receive wet/flush meadow grass seeding to promote biodiversity

Smaller amphitheatre provided for educational activities/ outdoor classroom. Hard surfaced to provide all weather area.

Path network links a series of open grassed clearings providing opportunities for external exhibition and siting of artworks

Smaller more intimate clearings set within woodland edge planting. Mown grass paths link spaces and path network is developed as visitor numbers increase.

Perimeter path around wider site areas surfaced in bound gravel suitable surfacing to facilitate disabled access

Mounding placed along A483 boundary and planted with dense native woodland planting to provide visual screening and structure

Dragon Tower surrounded by two offset circular 'groves' of Oak (Quercus robur) planted as extra heavy standard/ semi mature specimens with the aim of eventually becoming significant mature specimen trees

Mounding to the rear and front of amphitheatre provides screening from traffic noise. Standard tree planting to rear provides element of formality

Existing structural woodland planting managed to improve species diversity

Disabled vehicular and service access to be surfaced in grasscrete/ permeable flexible surfacing to soften approach and reduce visual impact

Mounding created to guide visitors towards Visitor Centre entrance and provides sequential views and partial screening for pedestrian route

Existing peripheral structure planting managed to provide views to the east over the surrounding countryside

Dotted line indicates notional canopy size for 'Oak Grove' (approx. 20m diameter) after establishment and on reaching maturity

Meadow grassland areas enriched with autumn and spring bulb planting to be planted by visiting public as part of on site development

Informal amphitheatre created from sculpted earthwork embankments to provide outdoor performance/ education space with Dragon Tower as backdrop/focus.

APPENDIX G

External Lighting Levels

