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ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.6.17 ES Volume F – Park and Ride App F9-1 – Dalar Hir Extended Phase 1 Habitat Survey and HSI Survey

PINS Reference Number: EN010007

Application Reference Number: 6.6.17

June 2018

Revision 1.0

Regulation Number: 5(2)(a)

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-JAC-PAC-APP-00177

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Horizon Nuclear Power (Wylfa) Ltd.

Consultancy Report:
Dalar Hir

Extended Phase 1 Habitat Survey and Great Crested Newt Habitat Suitability Assessment

October 2013

Mark Jackson

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Document Control Sheet

BPP 04 F8
Version 15; March 2013

Project: Wylfa Power Station
Client: Horizon Nuclear Power (Wylfa) Ltd. Project No: B1496000
Document title: Dalar Hir – Extended Phase 1 Habitat Survey
Ref. No: B1496000/WP6-2/R013

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DATE		**Document status: Final**	

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DATE **August 2017**		**Document status: Final**	

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DATE		**Document status**	

Executive Summary

Jacobs UK Limited (Jacobs) carried out an Extended Phase 1 Habitat Survey at land around Dalar Hir, Anglesey, centred on NGR (National Grid Reference) SH 32989 78381. Dalar Hir is an area of grazing and cultivated land situated to the north of the A55 and the A5, northeast of Junction 4. The survey was undertaken in conjunction with potential development of the site.

The report outlines the findings of an Extended Phase 1 Habitat Survey, highlighting the ecological interests, and potential interests, of the site. The survey methodology and results were supported by a desk study examination of records relevant to the site.

The survey recorded all habitats within the proposed works footprint noting in detail the species of flora present. The survey extent was confined to 24ha around Dalar Hir. Habitats were mapped and characterised by their Phase 1 Habitat Survey designation only. Three ponds were identified and a Habitat Suitability Index (HSI) assessment for great crested newt (GCN) (*Triturus cristatus*) was completed for each pond.

There are no statutory and non-statutory designated sites for nature conservation with the survey area or within 1 km of the boundary of the survey area.

Fifteen distinct habitats were identified during the survey of which improved grassland covered the largest extent of the site.

A small stand of Japanese knotweed *(Fallopia japonica)* was found on both sides of the track leading to the remaining barn at Dalar Hir Farm at the western end of the site. Montbretia (*Crocosmia x crocosmiiflora*) was also found. Both species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and it is an offence to plant or otherwise cause the species to grow in the wild. It is likely that exclusion zones or specialist treatment and disposal would be required to prevent an offence being caused if either plant is disturbed by any proposed development activity. Additionally any material that is likely to contain fragments of either plant is classed as controlled waste and would require appropriate permits being obtained prior to any off-site disposal.

Hedgerow, young plantation, buildings and ponds have the potential to provide a resource for several species of notable or protected fauna and therefore further detailed surveys are recommended.

The results from this survey suggest that there is habitat suitable for the following protected species and species groups within the survey area:

- badger;
- barn owl;
- bats;
- GCN;
- reptiles; and,
- water vole.

Additional surveys for these species and species groups are therefore recommended should the site be developed in order to inform the baseline for impact assessment and requirements for mitigation.

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Contents

1 Introduction

1.1 Overview

Jacobs UK Ltd (Jacobs) was commissioned to undertake an Extended Phase 1 Habitat Survey and a GCN Habitat Suitability Index (HSI) assessment of ponds within a survey area of approximately 24ha around Dalar Hir (the “survey area”). This work included the gathering of baseline data from a background data search to support potential EIA and Planning requirements, if required.

1.2 Site Description

The survey area at Dalar Hir is centred on the National Grid Reference SH 32989 78381 to the northeast of Junction 4 of the A55, directly north of the A5. This is shown in Figure 1. The survey area covers an area of approximately 24ha and largely comprises improved and semi-improved grassland and cultivated fields that are divided by hedgerows. The survey area includes the go-cart track at Cartio Mon and the surrounding fields. A number of the fields on the northern, eastern and southern boundaries also have 15-20m wide strips of broadleaf tree plantation.

The survey area includes three ponds and a ditch that runs from north to south through the centre of the site.

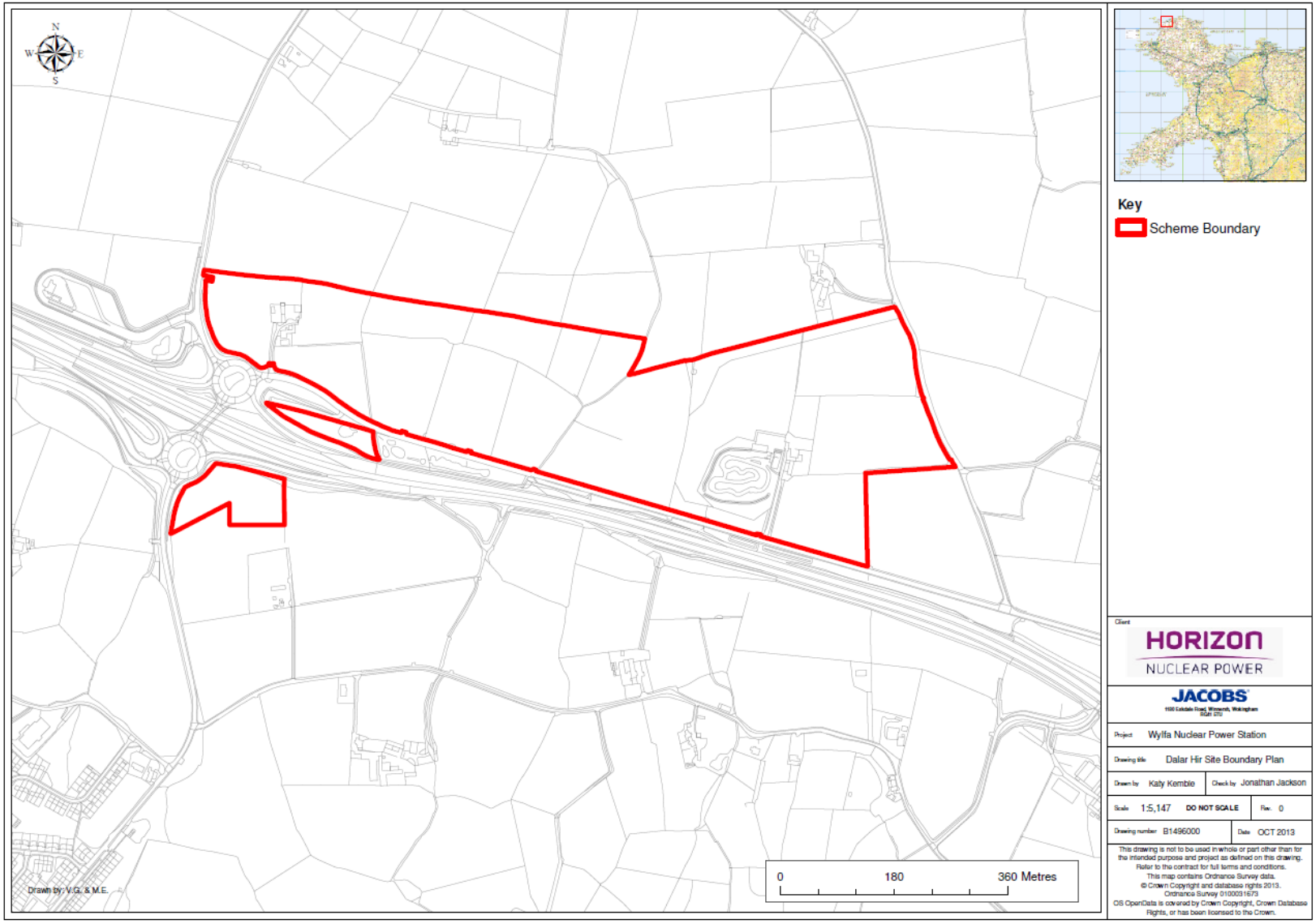

Figure 1 The survey area at Dalar Hir

1.3 Aims and Objectives

This report presents the findings of a background data search and survey work undertaken in September 2013.

The aims of the background data search and survey were to:

- identify any statutory and non-statutory designated sites for nature conservation;
- identify any protected or notable habitats and species;
- identify any ecological constraints and issues;
- identify further considerations and recommend further survey work as required; and,
- report on the findings from the above.

1.4 Previous Work

In July 2013, Mott MacDonald produced an Environmental Due Diligence Assessment (Mott MacDonald, 2013). This report is reviewed in Section 3. The report assessed and highlighted the potential for any foreseeable risks that would need to be considered in relation to ground conditions and ecology.

The report presented the findings of a Phase 1 Habitat Survey. The survey classified the majority of the survey area as semi-improved grassland, with smaller areas of improved grassland and some woodland. The survey also found several water bodies and categorised all of the field boundaries.

Evidence of nesting birds was found in a number of outbuildings at Dalar Hir Farm. This was the only evidence of protected species recorded.

The only other species of note was Japanese knotweed. This species is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) as an invasive species.

2 Methodology

2.1 Introduction

An Extended Phase 1 Habitat Survey was carried out on 2nd to 6th September 2013.

A GCN HSI survey was also undertaken using best practice methods in accordance with Oldham *et al.*, 2000.

The methodology comprised of:

- a desk-based review of existing information from readily available (web based) sources;
- an ecological field survey of the survey area; and,
- an assessment of the suitability of the water bodies within the survey area to support breeding GCN.

2.2 Desk-based Study

A review of readily available ecological information and other relevant environmental databases was undertaken for the survey area and a 2 km buffer zone around its boundary. This provided the overall ecological context for the survey area and the surrounding landscape. This formed the basis for the habitat and scoping for protected / notable species. The main sources of information consulted in this study were:

- Multi Agency Geographic Information for the Countryside (MAGIC) website for measuring habitat areas;
- Fungal Records Database of Britain and Ireland (FRDBI) (British Mycological Society, 2013);
- CATE, The Association of British Fungus Groups database of UK fungus records (The Fungus Conservation Trust, 2013); and
- Environmental Due Diligence Assessment: Chapter 2.5, (Mott MacDonald, 2013), containing data from Cofnod (the North Wales Environmental Information Service).

2.3 Field Survey

The field survey was undertaken between 2nd and 6th September 2013. The field survey methodologies used are detailed below.

2.3.1 Phase 1 Habitat Survey

Habitat types were classified using the recognised standard methodology as set out by the Joint Nature Conservation Committee (JNCC, 2010). Habitats were mapped and target notes (TN) were made of any features of particular ecological interest. All identified plant and animal species were noted and any evidence of, or potential for, protected species was recorded.

When approximating the relative abundance of plant species in the survey area, the DAFOR scale of abundance was used (see Botanical Society of the British Isles,

2011). This is based on an approximate percentage cover of vegetation, as detailed below:

- Dominant (D) = >75%
- Abundant (A) = 75-51%
- Frequent (F)= 50-26%
- Occasional (O) = 25-11%
- Rare (R) = 10-1%

However, there is a limitation on this scale, in that it is arbitrary and subjective to the surveyor undertaking the survey. Nevertheless, two benchmarks can be set when evaluating plant frequency. If a plant species is seen less than 20 times in a field or found across the whole survey area then it can be assumed that the plant is 'rare'. Conversely, if a plant species is categorised as 'dominant' then it is noticeably the most common plant seen in a field or found across the whole survey area. From these two benchmarks, the remaining scale categories can be deduced.

2.3.2 Hedgerows

Hedgerows were classified using the recognised standard methodology which has been prepared for the Steering Group for the UK Biodiversity Action Plan (Bickmore, 2002). Hedgerows were separated into discrete lengths for ease of locating a particular length of a hedge relevant to the proposed development. The criteria used to determine a unique hedge as being a separate entity from other hedges was as follows:

- the hedge clearly changes direction by 45 degrees or more;
- the length of hedge was unbroken, except in the case of defunct hedges;
- when a length of hedge was broken by a gate or entrance, then it was counted as two separate hedges; or,
- a length of hedge was joined by another perpendicular hedge.

Each hedgerow was assessed for its species richness according to the method below:

- A 30m length objectively thought to be representative of the hedge was marked out.
- The 30m stretch was then walked and any 'woody' species were recorded. Woody species include shrubs, trees and climbing plants.
- If the total number of woody species was five or more, then the hedge was characterised as 'species-rich'.

According to the 'Hedgerow Survey Handbook' (Bickmore, 2002) with respect to the category "hedgerow with trees", all willow species (including grey willow) are recorded as trees.

2.3.3 Habitat Suitability Index (HSI) – Ponds and surrounding habitat

All habitats within the footprint of the proposed scheme were searched for water bodies with the potential to support breeding GCN. The HSI assessment followed the method developed by Oldham *et al.,* 2000.

A lower score would mean that the pond is less likely to provide suitable habitat for GCN and a higher score indicates that the habitats would be more likely to provide suitable habitat for GCN (ARGUK, 2010). See Table 1 for a full interpretation.

A low score does not necessarily mean that GCN would be absent from any given pond, and nor does a high score indicate that GCN would be present. The score is useful as a monitoring tool as there are strong correlations between high scores and higher numbers of GCN, and the reverse for lower scoring ponds. The information from HSI analysis is also a requirement of any future European Protected Species Licence application.

Table 1 Pond suitability classification

HSI Score	Pond Suitability
< 0.5	Poor
0.5 – 0.59	Below Average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

2.3.4 Protected and notable species or habitats

The extended element of the field survey also set out to establish the suitability of habitats to support protected and notable species. For the purposes of this study, notable species are considered to be those species or habitats listed in accordance with the requirements of the UK Post-2010 Biodiversity Framework, Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, The Vascular Plant Red Data List for Great Britain' (JNCC, 2005), Birds of Conservation Concern (Red or Amber listed) or Local Biodiversity Action Plans. The following features and taxon groups were the focus of this survey:

- mammals;
- amphibians;
- reptiles; and,
- birds.

3 Results

3.1 Desk-based Study

3.1.1 Statutory and non-statutory designated sites for nature conservation

There were no statutory or non-statutory designated sites within the footprint of the survey area. However, the Environmental Due Diligence Assessment for the survey area identified Llyn Traffwll Site of Special Scientific Interest (SSSI) and the Valley Wetlands owned by the Royal Society for the Protection of Birds (RSPB) as being located 1 km to the south of the survey area (Mott MacDonald, 2013).

The SSSI has been designated for the small shallow lake that supports an abundance of wildfowl species.

The Valley Wetlands forms part of the SSSI, and although it is cited as being a non-statutory designated site in the Environmental Due Diligence Assessment (Mott MacDonald, 2013), it has no such non-statutory designation. The Valley Wetlands has reedbed habitats that support a number of reedbed specialist species *e.g.* water rail (*Rallus aquaticus*), marsh harrier (*Circus aeruginosus*) and Cetti's warbler (*Cettia cetti*), as well as other wildfowl species.

During the course of the desk-study and the field survey the potential for the survey area to support priority species and habitats listed on the UK Post-2010 Biodiversity Framework was established. Species and habitats listed on the UK Post-2010 Biodiversity Framework are also listed in accordance with the requirements of Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and are material considerations in applications for planning permission.

3.1.1 Mammals

The Cofnod data contained within the Environmental Due Diligence Assessment records three bat species within the study area: noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*) and whiskered bat (*Myotis mystacinus*). Noctule and soprano pipistrelle have been recorded in the vicinity of Llyn Traffwll (SSSI) and whiskered in the vicinity of Dalar Hir.

The Cofnod data included a record of an otter (*Lutra lutra*) road kill to the west of the survey area along the A55.

A roadkill record of polecat (*Mustela putorius*) was provided by Cofnod and reported west of the survey area on the A55.

No records of badger (*Meles meles*) have been reported within 2 km of the survey area to Cofnod. The nearest badgers recorded are several kilometres away to the southwest of Dalar Hir (Pers. comm., Martin Williams Managing Director, Cartio Mon).

3.1.2 GCN and other amphibians

Cofnod have six records from 1999 of GCN within 2 km of Dalar Hir Farm. The records indicate that the species was found in Fields 13, 14, 15 and 16, as shown

on Figure 2. Numerous records of common frog (*Rana temporaria*) and common toad (*Bufo bufo*) were also included in the data provided by Cofnod.

3.1.3 Reptiles

There are no records of reptiles within the Cofnod data set (Mott MacDonald, 2013).

3.1.4 Barn owl

The Cofnod data set provided records of flying barn owl (*Tyto alba*) within 2 km of the survey area (Mott MacDonald, 2013).

3.1.5 Other taxa

There were no records of notable fungi within the 2 km data search area for fungi from the FRDBI (British Mycological Society, 2013) or CATE (The Fungus Conservation Trust, 2013).

The Cofnod data set returned records of three notable bird species within 2 km of the survey area (Mott MacDonald, 2013). These include redwing (*Turdus iliacus*) and merlin (*Falco colombarius*) which are both listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), meaning that they receive additional protection from disturbance when at the nest. However, due to their habitat requirements it is highly unlikely that either species would nest in the survey area. The other notable bird species was golden plover (*Pluvialis apricaria*) which is a Bird of Conservation Concern (BoCC) amber-listed species (Eaton *et al*., 2009).

3.2 Field Survey Results

The results of the Extended Phase 1 Habitat Survey are described below and are shown on Figure 2 and Figure 3. A detailed description of the habitats present in the survey area and Target Notes are given in Appendix A and B respectively. The figures in brackets refer to the standard Phase 1 Habitat Survey code for the habitat concerned. The details of the hedgerows found in the survey area are given in Appendix C. All species recorded from the field survey are given in Appendix D. Plates of specific interest features are given throughout the text and also presented in Appendix E. It should be noted that the records given in the Appendices are not definitive lists of all the species present in the survey area, only the species observed by the surveyors during the survey visit.

Figure 2 Extended Phase 1 Habitat Survey map of the west side of survey area

Figure 3 Extended Phase 1 Habitat Survey map of the east side of survey area

3.2.1 Habitats

The majority of the survey area comprised fields of improved grassland with areas of semi-improved neutral grassland and marshy grassland (Plate 1). These fields were divided by hedgerows, as shown in Plates 2 and 3. Also present were areas of broad-leaved plantation woodland on the northern, eastern and southern boundary of the survey area. In addition, three ponds and watercourses (dry and flowing) were recorded.

Other features comprised the Cartio Mon go-cart track and associated buildings, areas of bare ground, and amenity grassland in the eastern half of the survey area. In the western half of the survey area was the one remaining building and area of bare ground associated with the former Dalar Hir Farm.

Plate 1 Looking east across Field 11 – a marshy grassland field

Plate 2 Hedgerow 9 – a species-rich hedgerow

Plate 3 Hedgerow 10 – species-poor defunct hedgerow

The survey area primary comprised a mosaic of improved, poor semi-improved and semi-improved neutral grassland with areas of marshy grassland.

In several places, the marshy grassland is at slightly lower elevations creating wetter depressions that attract the associated hydrophilic plants. However, these areas are not particularly diverse in species or vegetation structure. The marshy grassland is also heavily grazed and does not contain purple moor grass (*Molinia caerulea*). Should purple moor grass have been present the habitat could be classified as rush pasture which is a UK Post-2010 Biodiversity Framework priority habitat.

The semi-improved grasslands have several grass species that indicate neutral grassland conditions. In some places the species diversity is reduced and as such these areas have been evaluated as species-poor semi-improved grassland. In areas where there is a combination of grasses and herb species that indicate neutral

conditions, these have been recorded as semi-improved neutral grassland. These areas are further enhanced by a reduction in the abundance of perennial rye-grass (*Lolium perenne*).

One habitat present in the survey area fulfils the criteria of a UK Post-2010 Biodiversity Framework priority habitat. This was species-rich hedgerow, as approximately 55% of the hedgerows found in the survey area were species rich. Although the remaining 45% of the hedgerows were species-poor, some did exhibit up to eight species in total along the full stretch of the hedge indicating that they are of potential conservation value.

3.2.2 Vascular plants

There was no evidence found of legally protected vascular plant species within the survey area. However, two notable species were found in the survey area: field woundwort (*Stachys arvensis*) and corn spurrey (*Spergula arvensis*), both of which were found in Field 18 (Plate 4). Both are listed in 'The Vascular Plant Red Data List for Great Britain' (JNCC, 2005) as 'near threatened' and 'vulnerable', respectively.

Fewer than 20 individual field woundwort plants and fewer than 20 corn spurrey plants were found in the survey area in Field 18. Both these species are found at several sites across Anglesey and so the populations within the survey area are likely to be of local value only.

Plate 4 Looking northeast across Field 18 a cultivated field

Two species of plant were recorded that are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), meaning that it is an offence to plant or allow these species to spread in the wild. These were Japanese knotweed and montbretia.

Japanese knotweed was present in two small patches on either side of the access track to Dalar Hir Farm at National Grid Reference SH 32555 78434. These are shown as Target Note 19 and 20 on Figures 2 and 3.

Montbretia was recorded in the garden of Dalar Hir Farm.

3.2.3 Bats

The survey area offers suitable habitats for bat species, as it provides potential roost sites, commuting and foraging habitats.

There were buildings with the potential to support roosting bats located at the Cartio Mon go-cart track facility.

There were no trees within the surveyed area that had features with the potential to support roosting bats.

A variety of habitats providing foraging opportunities for bats were recorded, including the plantation woodland, marshy grassland and hedgerows. The linear nature of the hedgerows and plantation woodland also provide potential commuting routes for bats across the survey area.

Plate 5 Showing the reduced vigour of tree species in plantation woodland plot 3b

The combination of records of bats within 2 km of the survey area and the habitats present suggest that bats could be using the survey area for foraging and commuting. The likely use of the buildings at Cartio Mon for roosting by bats can only be established through further dedicated survey efforts e.g. internal inspections and / or dusk emergence or dawn re-entry surveys.

3.2.4 Otter

Field signs of otter were not found along watercourses in the survey area. The only other habitat available for otter would be the plantation woodland at the far northwest corner of Plot 5a, potentially providing an area for lying up, although this is unlikely given the lack of evidence in the surveyed watercourses.

3.2.5 Water vole

All watercourses in the survey area had the potential to support water vole. Brown rat (*Rattus norvegicus*) droppings and burrows were found.

3.2.6 Badger

No badger setts were recorded within the field survey area, and no evidence of badger activity was recorded. There were opportunities for foraging and sett excavation within the footprint of the survey area in areas of higher ground to the east of the watercourse. It is assumed that the rest of the survey area would experience a higher water table and would possibly be waterlogged for at least part of the winter, thus making it unsuitable for sett-building.

3.2.7 GCN and other amphibians

There was suitable habitat for breeding, foraging and over-wintering GCN and other amphibians recorded in the survey area. Suitable breeding habitat was provided by three ponds within the survey area. The results of HSI analysis of these ponds are shown in Table 2. Habitat suitable for foraging and over-wintering included grasslands, hedgerows and plantation woodland. The locations of ponds are shown as Target Notes 12, 13 and 14 in Figure 3. Pictures of the three ponds are shown below in Plates 6, 7 and 8.

Plate 6 Pond 1 (TN12)

Plate 7 Pond 2 (TN13)

Plate 8 Pond 3 (TN14)

Table 2 Results of the HSI

Suitability index	Pond reference		
	Pond 1	**Pond 2**	**Pond 3**
SI1 – Location	0.5	0.5	0.5
SI2 – Pond Area	0.05	0.05	0.05
SI3 – Pond Drying	1	1	0.5
SI4 – Water Quality	0.67	0.67	0.67
SI5 – % Shade	1	1	1
SI6 – Wildfowl Presence	1	1	1
SI7 – Fish Presence	1	1	1

Suitability index	Pond reference		
SI8 – Surrounding Ponds	0.9	0.9	0.9
SI9 – Terrestrial Habitat	1	1	1
SI10 – Macrophyte cover	0.75	0.8	0.8
HSI score	0.64	0.64	0.60

The ponds at Dalar Hir scored between 0.6 and 0.64, thus categorising them all as being of 'average' suitability for GCN. This would equate to all three ponds having attributes that suggest that they have the potential to support GCN.

3.2.8 Reptiles

The habitats found in the survey area provide suitable foraging and hibernation opportunities for the more generalist species of reptile (i.e. slow worm (*Anguis fragilis*), grass snake (*Natrix natrix*) and common lizard (*Lacerta vivipara*)) and have the potential to support a viable population in areas including the edges of the plantation woodland and hedgerows.

3.2.9 Barn owl

Two buildings were located within the survey area of a type favoured by barn owls. These were the barn at Dalar Hir Farm and a large barn at Cartio Mon that was being used for storing go-carts. These are shown as Target Note 15 and 17 respectively on Figures 2 and 3. No evidence of barn owl was found in the remaining barn at Dalar Hir Farm. The barn at Cartio Mon could not be fully assessed at the time of survey. There is suitable habitat for foraging barn owl within the survey area.

3.2.10 Other bird species

The many hedgerows and plantation woodland areas in the survey area offer very good nesting and foraging habitat for birds.

During the Phase 1 Habitat Survey 16 species of bird were recorded in the hedgerows, marshy grassland and plantation woodland areas. Of the observed species in the survey area, several are of conservation concern according to Eaton *et al.*, (2009). These included five amber listed species: kestrel (*Falco tinnunculus*), wheatear (*Oenanthe oenanthe*), meadow pipit (*Anthus pratensis*), swallow (*Hirundo rustica*), and dunnock (*Prunella modularis*). Dunnock are also listed on the UK Post-2010 Biodiversity Framework. Four species are listed on both the UK Post-2010 Biodiversity Framework and the red list of conservation concern: linnet (*Carduelis cannabina*), starling (*Sturna vulgaris*), lapwing (*Vanellus vanellus*) and house sparrow (*Passer domesticus*). The field results of all bird species observations are provided in Appendix D.

The birds recorded in the survey area were from incidental sightings and provide data based on a single visit. However, the information gathered indicates that many more species are likely to be utilising the survey area in the period between spring and mid-summer.

The habitats available in the survey area would provide nesting habitat for several of the notable species recorded during the survey. It is likely that dunnock, and possibly linnet and wheatear, may nest in the hedgerows. Meadow pipit may nest in the plantation woodland or parts of the fields less disturbed by grazing animals. Lapwing could possibly nest in the rush tussocks less disturbed by the grazing

animals. Lastly the house sparrow and swallow may nest in the buildings found in the survey area.

3.2.11 Other taxa

The gall forming fungus alder tongue (*Taphrina alni*) was found on alder in the plantation woodland plot 5b. There are no records of this species on Anglesey according to FRDBI (British Mycological Society, 2013) and CATE (The Fungus Conservation Trust, 2013).

Although, the presence of alder tongue is the first record for Anglesey, this species is not protected and has been recorded in many parts of Britain (Redfern and Shirley, 2011). It is likely that it is present elsewhere on any alder stands locally, but is probably still rare in Anglesey.

The survey area does not cover a large area and is dominated by improved pasture. It is also not particularly diverse in habitat diversity or habitat structure and therefore it is unlikely to be important for notable or protected invertebrates, fungi, lichens or bryophytes.

The hedgerows within the survey have the potential to support polecat and rabbits (*Oryctolagus cuniculus*) which are their primary source of prey.

4 Recommendations

In order to inform any future planning application to develop the survey area, the further surveys recommended in this section are likely to be required. The baseline established by these surveys would inform an ecological impact assessment, which would determine the need for any mitigation or protected species licenses. Information on relevant legislation and licensing requirements is provided in Appendix F.

4.1 Further Surveys for Bats

If likely to be affected by demolition or modification, the main building at Cartio Mon and associated buildings in the vicinity should be assessed for their potential to support bats and to confirm whether bats are present. The hedgerows should also be surveyed to assess how they are utilised by bat species. All surveys should be undertaken in accordance with current best practice guidelines.

4.2 Further Surveys for Otter

No dedicated otter survey is recommended due to the general quality of the habitats within the survey area for this species. However, it is possible that otter may periodically use the ditch that runs through the centre of the survey area as a commuting route. The availability of suitable otter habitat in the local environment is sparse and therefore it is unlikely that otter frequently utilise the survey area. However, during any other follow up surveys (i.e. water vole surveys, see below), surveyors should keep alert to any otter field signs present.

4.3 Further Surveys for Water Vole

To assess whether this species is present in the watercourse within the survey area, a more comprehensive survey for water vole should be undertaken in line with current best practice guidelines. This would include a thorough walk-through of the ditch by surveyors to search for and record water vole burrows and any other field signs (e.g. feeding remains, droppings and latrines).

4.4 Further Surveys for Polecat

The single record of a roadkill polecat and habitats present suggest that the species could be affected by development of the survey area. The degree to which development of the survey area could affect the species is not known at this stage, but if significant amounts of hedgerow are likely to be removed then polecat may be affected and so further surveys or precautionary mitigation may be appropriate.

4.5 Further Surveys for Badger

No evidence of badger was recorded incidentally during the survey, although habitat features suitable for sett building was recorded e.g. cloddiau (traditional stone faced earth banks) that formed field boundaries in the survey area. A further survey of these features is therefore recommended to establish presence or likely absence of the species. This should be completed in accordance with current best practice guidance, such as those developed by Natural England (2011).

4.6 Further Surveys for GCN

To ascertain if GCN are likely to be affected by any proposed development activity, further surveys of the existing ponds within the development boundary should be undertaken to determine if GCN are likely to be present. Surveys of all ponds within 500m of the survey area should also be completed provided that there is suitable habitat linking them to the proposed development area. This is due to GCN having the capability to use habitats within 500m of their breeding ponds when in their terrestrial phases. The surveys should be undertaken by surveyors who are licensed to survey for this species in accordance with standard survey practice guidelines (e.g. English Nature (2001) and Gent and Gibson (2003)). Initially the surveys should comprise four presence or likely absence visits to ponds, following by an additional two population estimates, if required.

4.7 Further Surveys for Reptiles

To assess whether reptiles are present in the survey area, the hedgerows and plantation woodlands would need to be surveyed. Surveys should be undertaken in accordance with current best practice guidelines (e.g. the refugia method described by Gent and Gibson (2003)).

4.8 Further Surveys for Barn Owl

A survey should be carried out to determine if barn owls are using any of the buildings within the survey area for roosting. The survey should be undertaken by an experienced licensed barn owl surveyor in line with current best practice guidance.

4.9 Further Surveys for Breeding Birds

Further surveys for breeding and wintering birds are not recommended due to the small size of the survey area and commonality of the habitats in the local environment. However, appropriate mitigation would have to be employed to protect birds during any future development works during the breeding season.

5 Summary

The habitats in the survey area are common and widespread. However, there are habitats present with the potential to support protected and notable species. Following the findings from the Extended Phase 1 Habitat Survey it is therefore recommended that further baseline surveys are undertaken to establish the presence or likely absence of the following species or species groups:

- badger;
- barn owl;
- bats;
- GCN;
- reptiles; and,
- water vole.

There were two species of plant found that are listed as invasive species on Schedule 9 of the Wildlife and Countryside Act (as amended). These were Japanese knotweed and Montbretia. Plans for management or removal of these species would be necessary if development works would be likely to spread either species.

In conclusion, this survey did not identify any significant ecological constraints to a development of the survey area. However, the survey has identified where a number of additional surveys are required to determine likely impacts on protected species and protected species groups, and to ensure compliance with relevant legislation and planning policy.

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Appendix A Detailed Description of Habitats

Broad-leaved semi-natural woodland (A1.1.1)

This habitat was found in only one place within the boundary of the survey area and is situated to the top western corner of the plantation north of Field 5 (see Figure 3). It measures an area approximately 600 square metres (MAGIC, 2013). Due to the density of trees and the tall ruderal herb area a survey of the ground flora was not possible.

Broad-leaved plantation woodland (A1.1.2)

This habitat was recorded as two distinct areas in the survey area.

One of the plantation areas was planted in 2005 and is situated along the northern boundaries of Fields 3 and 5, (plots 3a and 5a). In 2008 this plantation was extended along the eastern boundaries of Fields 2 and 3 (plots 2a and 3b (Plate 5)) (northern plantation) (Pers. comm., Martin Williams Managing Director, Cartio Mon).

The second plantation area was also planted in 2008 along the southern boundaries of Fields 5, 6, 9, 11, 13 and 15, immediately north of the A5 (plots 5b, 6a, 9a, 11a, and 13a southern plantation), as shown in Figures 2 and 3.

The planting schemes between the two plantations vary slightly. Both the northern and southern plantations contain the same species. These species included ash (*Fraxinus excelsior*), sessile oak (*Quercus petraea*), silver birch (*Betula pendula*), hazel (*Corylus avellana*), holly (*Ilex aquifolium*), alder (*Alnus glutinosa*), goat willow (*Salix caprea*), wild cherry (*Prunus avium*) and golden willow (*Salix alba* Var. *vitellina)*. However, the planting in the southern plantation in 2008 included additional species, such as spindle (*Euonymus europaeus*), crack willow (*Salix fragilis*) and English oak (*Quercus robur*), whereas the northern plantation differs in having just white willow (*Salix alba*).

The ground flora of the southern planting scheme was generally similar for plots 13a and 15a and was composed of several species of grasses including abundant cock's-foot (*Dactylis glomerata*) with occasional false oat grass (*Arrhenatherum elatius*) and red fescue (*Festuca rubra*). There was also a diverse herb flora such as frequent yarrow (*Achillea millefolium*) with occasional lesser stitchwort (*Stellaria graminea*) and sneezewort (*Achillea ptarmica*). There were also rare appearances of trailing tormentil (*Potentilla anglica*).The trees planted in each of the field plots showed variation in survival success and tree vigour. Most of the blocks had small areas where the trees have either died or are stunted and the pre-existing vegetation was dominant. A small amount of grey willow and osier (*Salix viminalis*) had invaded the plantation at the southern end of Plot 3a and hazel in Plot 5a.

Scattered scrub (A2.2)

This habitat was only found in a few locations across the whole survey area and was mainly associated with field boundaries that have been removed in the past. It consisted of either grey willow, gorse (*Ulex europaeus*) or hawthorn (*Crateagus monogyna*) growing on the remaining hedge banks dividing Fields 9, 10, 11, 12 and 13. There were also scattered bramble (*Rubus fruticosus* agg.) patches adjacent to the dry ditch at the southern end of Field 2.

Scattered trees – coniferous (A3.2) and broad-leaved (A3.3)

Within the survey area there were scattered coniferous trees in the garden of the house at TN18 and scattered broad-leaved trees in the footprint of the former Dalar Hir Farm at TN4 and on the driveway leading to Cartio Mon. The species of tree present was not recorded.

Cultivated land (arable) J1.1

Field 3 and Field 18 were cultivated land. Both fields displayed the typical species used as a silage crop. Field 3 was dominated by the cultivated form of red clover (*Trifolium pratense*) and Italian rye grass (*Lolium multiflorum*). Field 18 was dominated by perennial rye grass with frequent white clover (*Trifolium repens*).

Improved grassland (B4)

This habitat was common across the survey area especially towards the western end of the survey area (Fields 7, 8, 9, 10, 12, 14, 15, 16, and 17) and the fields surrounding the Cartio Mon (Fields 1, 2, 5 and part of 6). The fields surrounding the Cartio Mon were dominated by rye grasses and clovers. The fields to the west were more diverse and exhibited abundant cover of either perennial rye grass or white clover. The fields were being grazed by sheep and cattle.

Marshy grassland (B5)

The majority of Fields 11 and 13 comprised marshy grassland as shown in Figures 2 and 3. These fields were heavily grazed and may at first glance appear to be poor semi-improved neutral grassland due to the level of grazing. However, the low diversity of plant species in the fields along with the dominance of soft rush (*Juncus effusus*), and varying ratios of sharp-flowered rush (*Juncus acutiflorus*), jointed rush (*Juncus articulatus*), hard rush (*Juncus acutus*), compact rush (*Juncus conglomeratus*), common marsh bedstraw (*Galium palustre*), lesser spearwort (*Ranunculus flammula*), greater bird's-foot trefoil (*Lotus pedunculatus*) and marsh foxtail (*Alopecurus geniculatus)* indicated that these areas were marshy grassland.

Poor semi-improved grassland (B6)

The majority of Fields 10 and 11 comprised poor semi-improved grassland as shown in Figures 2 and 3. Although exhibiting characteristics of neutral grassland they showed low diversity in respect to herbs and grasses.

Neutral grassland semi-improved (B2.2)

This habitat was present in several fields as small isolated areas. This habitat had reduced abundance of rush species and perennial rye grass, and increased occurrence of yarrow and crested dog's-tail (*Cynosurus cristatus*). Yorkshire fog (*Holcus lanatus*) and sweet vernal grass (*Anthoxanthum odoratum*) was also present indicating a neutral grassland habitat type. This habitat was also the dominant field layer of the plantation woodland plots.

Tall ruderal (C3.1)

This habitat type is present at only one location in the plantation woodland plot 5a. Species present in this habitat included abundant hedge bindweed (*Calystegia sepium*), frequent broadleaved dock (*Rumex obtusifolius*) with occasional hogweed (*Heracleum sphondylium*) and great willowherb (*Epilobium hirsutum*).

Standing water (G1)

There are three areas of standing water within the development boundary in the form of ponds. The locations of the ponds are shown in Figure 2 as Target Notes 12, 13 and 14. Pond 1 (TN12) and Pond 2 (TN13), are likely to be eutrophic because of the presence of common duckweed (*Lemna minor*). There was no evidence of common duckweed in Pond 3 (Plot 5b). Pond 3 is therefore likely to have water conditions more mesotrophic in nature. Pond 1 and Pond 2 had a low diversity of less than five aquatic plant species. Pond 3 was more diverse with greater reedmace (*Typha latifolia*), common spike rush (*Eleocharis palustris*), great willowherb, marsh bedstraw and jointed rush. Ponds 1, 2 and 3 are shown in Plates 6, 7, and 8.

Running water – mesotrophic (G2.2)

A watercourse runs through the middle of the survey area dividing Field 6 from Fields 7 and 9. Although there was evidence of a small amount of common duckweed present in the channel this watercourse probably has a high level of eutrophication due to its situation adjacent to improved grassland. The channel was dominated by plants such as unbranched bur-reed (*Sparganium emersum*) and common water plantain (*Alisma plantago-aquatica*). Fool's-watercress (*Apium nodiflorum*) was frequent. There was occasional water mint (*Mentha aquatica*), watercress (*Rorippa nasturtium-aquaticum*) and water pepper (*Polygonum hydropiper*), and a species of water crowfoot (*Ranunculus* Sp.), gypsywort (*Lycopus europaeus*) and a sweet grass (*Glyceria* Sp.) were rare.

Boundaries (J2)

There are 36 distinct hedgerows found in the survey area. The hedges represented four of the recognised Phase 1 Habitat Survey categories. Most of hedgerows were part of a hedge bank system and intact for the majority of their length. There were 21 hedgerows with tree species present, although a significant proportion had only one species (grey willow). The maximum number of tree species found in any one hedge was three (H31) and included sycamore (*Acer pseudoplantanus*), a crab apple (*Malus* Sp.) and grey willow. Most of the species rich hedgerows can be found bordering the fields to west of the watercourse. Approximately half of the hedges were categorised as species rich. The remaining hedges were species poor in nature with four or less woody species present.

A wall was present and ran the full length of the southern boundary of the survey area with the A5.

An earth bank was present in Field 6. The vegetation was dominated by perennial rye grass, with abundant couch grass (*Elymus repens*) and a species of *Agrostis*. There was also appearances of gorse, soft rush, creeping thistle (*Cirsium arvense*) and common cats-ear (*Hypochaeris radicata*).

Three hedge banks exist across the survey area and are the result of the original shrubs being removed. They are now dominated with grasses with soft rush and gorse abundant and running adjacent to the banks.

Several dry ditches exist across the survey area and are mostly dominated by soft rush and occasional sharp-flowered and jointed rush.

Amenity grassland (J1.2)

Amenity grassland was present in between the go-cart racing track at Cartio Mon. This comprised a typical lawn mix of grasses of negligible ecological value.

Bare ground (J4) and buildings (J3.6)

Bare ground and buildings were found in two locations at Cartio Mon and Dalar Hir Farm.

Appendix B Target Notes

Target Notes (TN)

1) A small area of distinct vegetation measuring 25 square metres in Field 18. This area showed increased plant diversity compared to the surrounding arable vegetation including frequent redshank (*Persicaria maculosa*), marsh foxtail and smooth sow-thistle (*Sonchus oleraceus*) with the occasional presence of red goosefoot (*Chenopodium rubrum*), fat hen (*Chenopodium album*) and of common fumitory (*Fumaria officianalis*) which was rare. Two notable species were present in low numbers (less than 20 individuals of each species); these were field woundwort and corn spurrey. Both are listed in 'The Vascular Plant Red Data List for Great Britain' (JNCC, 2005) as near threatened and vulnerable respectively.

2) A small area of marshy grassland in the western half of Field 16. This area was dominated by soft rush and sharp-flowered rush with abundant of lesser spearwort, marsh bedstraw, Yorkshire fog and greater bird's-foot trefoil, with occasional marsh foxtail and a species of sweet grass which was rare.

3) TN 3 was a large area of marshy grassland in the northern half of Field 16. This area had a similar flora to TN 2 and was dominated by soft rush and sharp flowered rush, and there was also compact rush which was rare. In addition, the abundance of both perennial ryegrass and white clover was higher in this area compared to TN 2. Other plants included abundant bird's-foot trefoil that was protected by the tussocks of rush. Frequent lesser spearwort, marsh bedstraw and Yorkshire fog were present and rare appearances of brown sedge (*Carex disticha*) and another species of unidentified sedge (*Carex* Sp.) were seen.

4) TN 4 was an area of bare ground where early plant colonisers have started to grow across the whole area. Plants include species such as fat hen, broadleaved dock (*Rumex obtusifolius*), bristly oxtongue (*Picris echioides*), red goosefoot, shepherd's purse (*Capsella bursa-pastoris*) and redshank. This area will quickly become established as tall ruderal herb habitat.

5) An area of poor semi-improved neutral grassland which has not been grazed for a while and therefore herb species have been allowed to become established. Species include, scented mayweed (*Matricaria recutita*), creeping cinquefoil (*Potentilla reptans*), broadleaved dock, common mouse-ear (*Cerastium holosteoides*), knotgrass (*Polygonum aviculare*), spear thistle (*Cirsium vulgare*), are growing over a grass layer of species including Yorkshire fog, false oat grass, marsh foxtail, creeping bent (*Agrostis stolonifera*) and perennial ryegrass.

6) This target note covers two areas shown in Figure 2 in plantation plots 11a and 13a. Both areas may have been ponds in the past or over flows from the ditches in winter. In 13a the habitat is dominated by soft rush, with frequent water horsetail (*Equisetum fluviatile*), sharp-flowered rush, wild angelica (*Angelica sylvestris*) and greater bird's-foot trefoil and occasional water pepper, meadowsweet (*Filipendula ulmaria*) and great willowherb. In plot 11a the water table is closer to the surface in the target noted area and supports plants including plants such as greater reedmace (*Typha latifolia*), yellow flag iris (*Iris pseudacorus*), purple loosestrife (*Lythrum salicaria*) and redshank.

7) An area with physical characteristics representative of both marshy grassland and poor semi-improved grassland. However, there were semi-improved and neutral grassland indicator species present. These included, crested dog's-tail, yarrow, common sorrel (*Rumex acetosa*) and autumn hawkbit (*Leontodon autumnalis*). Taken together the closest match to a Phase 1 Habitat Survey classification was semi-improved neutral grassland.

8) A large area of marshy grassland that was dominated by soft rush with abundant sharp-flowered rush, jointed rush and occasional hard rush (*Juncus inflexus*). Also present was abundant marsh bedstraw, frequent lady's smock (*Cardemine pratensis*) and occasional marsh thistle (*Cirsium palustre*), greater bird's-foot trefoil, marsh foxtail and lesser spearwort.

9) In Field 6, there were two areas of semi-improved grassland. These areas had a diversity of hydrophilic plants, but the presence of neutral indicators and the fact that they had been mown to reduce the growth and abundance of established rushes, means that they conform more closely to the Phase 1 Habitat Survey category of semi-improved neutral grassland.

10) Tall ruderal vegetation was present within the plantation plot 5a. The vegetation comprised abundant hedge bindweed (*Calystegia sepium*), frequent broadleaved dock and occasional hogweed (*Heracleum sphondylium*) and great willowherb.

11) A fenced watercourse at the southern end of Field 2 that ran for almost half the length of the field. It was dominated by scattered scrub in the form of bramble (*Rubus fruticosus* agg.) that was interspersed with soft rush and a diverse mix of herbs and grasses. Herbs included frequent great willowherb and greater bird's-foot trefoil, with occasional sneezewort, meadow vetchling (*Lathyrus pratensis*), tufted vetch (*Vicia cracca*), red campion (*Silene dioica*), marsh woundwort (*Stachys palustris*), corn mint (*Mentha arvensis*), and lesser stitchwort (*Stellaria holostea*). Common mouse-ear (*Cerastium fontanum*) and creeping cinquefoil (*Potentilla reptans*) were rare. Grasses included frequent false oat grass, cock's-foot (*Dactylis glomerata*) and couch grass with occasional Timothy (*Phleum pratense*).

12) Pond 1 situated in Field 7.

13) Pond 2 situated in Plot 5a.

14) Pond 3 situated in Plot 5b.

15) Dalar Hir barn.

16) Cartio Mon reception and bar.

17) Cartio Mon go-cart storage barn.

18) Small houses.

Appendix C Hedgerows

Table 3 Hedgerow species richness and details

Map ID	Species richness (No of woody species /30m length)	Total - woody species in hedgerow	Comments
H1	Poor (2)	2	A hedge bank with an intact hedge row.
H2	Poor (4)	7	A hedge bank with an intact hedgerow with trees (wych elm (*Ulmu glabra*)) that is divided by a gated entrance to Field 15.
H3	Poor (4)	8	A hedge bank with an intact hedge that is divided by a gated entrance to Field 16.
H4	Poor (4)	6	A hedge bank with an intact hedgerow with trees (grey willow).
H5	Poor (4)	4	A hedge bank with an intact hedge with trees (grey willow).
H6	Poor (3)	5	A hedge bank with an intact hedge and trees (grey willow).
H7	Rich (5)	5	A hedge bank with a hedgerow and trees (grey willow) that is intact for the majority of its length with one gap approximately 2 metres wide.
H8	Poor (4)	4	A hedge bank with a hedgerow that is intact for the majority of its length with one gap approximately 5 m wide, filled with bracken.
H9	Rich (8)	10	A hedge bank with an intact hedge with trees (grey willow and eared willow (*Salix aurita*)).
H10	Poor (2)	3	Defunct hedge with trees (grey willow) composed of hawthorn and grey willow.
H11	Rich (6)	7	A hedge bank with an intact hedge.
H12	Poor (2)	2	Intact hedge composed of planted hawthorn interspersed with bramble.
H13	Rich (5)	6	A hedge bank with an intact hedge.
H14	Poor (4)	4	A hedge bank with an intact hedge with trees (grey willow).
H15	Rich (5)	6	A hedge bank with an intact hedge with trees (osier).
H16	Rich (6)	8	A hedge bank with a defunct hedge with trees (grey willow).
H17	Rich (5)	5	A hedge bank with an intact hedge with trees (grey willow).
H18	Rich (6)	7	A hedge bank with an intact hedge
H19	Poor (4)	5	A hedge bank with an intact hedge with trees (grey willow).
H20	Poor (4)	4	A hedge bank with an intact hedge.
H21	Rich (7)	9	A hedge bank with an intact hedge with trees (grey willow and eared willow).
H22	Rich (6)	8	A hedge bank with a hedgerow that is intact for the majority, ending approximately 20m from the northern end

Map ID	Species richness (No of woody species /30m length)	Total - woody species in hedgerow	Comments
			of the boundary. The hedgerow has grey willow present.
H23	Poor (4)	5	A hedge bank with an intact hedge.
H24	Rich (5)	5	A hedge bank with an intact hedge.
H25	Poor (3)	5	Defunct hedge – a large gap is located towards the southern end – one large Monterey pine (*Pinus radiata*) is present.
H26	Rich (5)	8	A shallow hedge bank with a defunct hedge.
H27	Poor (3)	5	A shallow hedge bank with an intact hedge.
H28	Rich (5)	5	A shallow hedge bank with an intact hedgerow with trees (eared willow).
H29	Rich (5)	7	A shallow hedge bank with an intact hedgerow with trees (eared willow).
H30	Rich (7)	8	A shallow hedge bank with an intact hedgerow with trees (grey willow).
H31	Rich (5)	8	A shallow hedge bank with an intact hedgerow with trees (sycamore, crab apple and grey willow).
H32	Rich (5)	5	A hedge bank with an intact hedge.
H33	Rich (5)	5	A hedge bank with a defunct hedge.
H34	Poor (3)	3	A hedge bank with a defunct hedgerow.
H35	Rich (6)	8	A hedge bank with an intact hedgerow with trees (sycamore and bullace (*Prunus domestica* subsp. *insititia* var. *nigra*)).
H36	Rich (6)	6	A recently planted hedgerow.
Total	**16 Species poor 20 Species rich**	**Min 2 species Max 10 species**	**36 hedgerows**

Appendix D Species Lists

Flora

Table 4 Tree and shrub species recorded in the survey area

Tree and shrub species			
Scientific name	**Common name**	**Relative abundance in hedgerows (DAFOR)**	**Relative abundance in plantations (DAFOR)**
Acer campestre	Field maple	Rare	-
Acer pseudoplatanus	Sycamore	Rare	-
Alnus glutinosa	Alder	-	Abundant
Betula pendula	Silver birch	-	Abundant
Cornus sanguinea	Dogwood	Rare	-
Corylus avellana	Hazel	Rare	-
Crataegus monogyna	Hawthorn	Dominant	-
Euonymus europaea	Spindle	Rare	-
Fraxinus excelsior	Ash	-	Abundant
Ilex aquifolium	Holly	-	Rare
Malus sylvestris	Crab apple	Rare	-
Pinus radiata	Monterey pine	Rare	-
Prunus avium	Wild cherry	-	Abundant
Prunus domestica ssp. domestica	Domestic plum	Rare	-
Prunus domestica ssp. insititia	Bullace -damson	Rare	-
Prunus spinosa	Blackthorn	Dominant	-
Quercus petraea	Sessile oak	-	Occasional
Quercus robur	English oak	-	Occasional
Salix alba	White willow	-	Occasional
Salix alba Var. vitellina	Golden willow	-	Frequent
Salix aurita	Eared willow	Occasional	-
Salix caprea	Goat willow	-	Occasional
Salix cinerea aggregate	Grey willow	Rare	-
Salix cinerea ssp. cinerea	Grey willow	Rare	-
Salix cinerea ssp. oleifolia	Grey willow	Abundant	-
Salix fragilis	Crack willow	-	Rare
Salix repens	Creeping willow	Occasional	-
Salix variety	Willow hybrid	Rare	-
Salix viminalis	Osier	Rare	-
Sambucus nigra	Elder	Frequent	-
Spiraea salicifolia	Bridewort	Rare	-
Ulmus glabra	Wych elm	Rare	-
Ulmus species	Elm hybrid	Rare	-
Viburnum lantana	Wayfaring tree	Rare	-

Table 5 Herb species recorded in the survey area

Herb species		
Scientific name	**Common name**	**Relative abundance (DAFOR scale)**
Achillea millefolium	Yarrow	Occasional
Achillea ptarmica	Sneezewort	Occasional
Alisma plantago-aquatica	Water plantain	Rare
Anagalis arvensis	Scarlet pimpernell	Rare
Angelica sylvestris	Wild angelica	Occasional
Anthriscus sylvestris	Cow parsley	Rare
Apium nodiflorum	Fools water-cress	Rare
Artemisia vulgaris	Mugwort	Rare
Aster novi-belgii agg	Michaelmas-daisies	Rare
Brassica rapa	Turnip	Rare
Callitriche species	A water-starwort	Rare
Callitriche Sp.	A water-starwort	Rare
Calystegia sepium	Hedge bindweed	Occasional
Capsella bursa-pastoris	Shepherd's purse	Rare
Cardamine pratensis	Cuckoo flower - Lady's smock	Frequent
Centaurea nigra	Common knapweed	Occasional
Centaurea scabiosa	Greater knapweed	Rare
Cerastium fontanum	Common mouse-ear	Abundant
Cerastium holosteoides	Common mouse-ear chickweed	Frequent
Chamerion angustifolium	Rosebay willowherb	Rare
Chenopodium album	Fat hen	Rare
Chenopodium rubrum	Red goosefoot	Rare
Cirsium arvense	Creeping thistle	Abundant
Cirsium palustre	Marsh thistle	Occasional
Cirsium vulgare	Spear thistle	Occasional
Coronopus squamatus	Swine-cress	Rare
Crepis capillaris	Smooth hawk's-beard	Rare
Crepis Sp.	A hawk's beard	Occasional
Crocosmia x crocosmiiflora	Montbretia	Rare
Cytisus scoparius ssp. scoparius	Broom	Rare
Daucus carota	Wild carrot	Occasional
Digitalis purpurea	Foxglove	Rare
Epilobium ciliatum	American willowherb	Occasional
Epilobium hirsutum	Great willowherb	Occasional
Epilobium Sp.	Willowherb spp.	Occasional
Eupatorium cannabinum	Hemp agrimony	Rare
Filipendula ulmaria	Meadowsweet	Rare
Fumaria officinalis	Common fumitory	Rare
Fuchsia magellanica 'Versicolour'	Fuchsia	Rare
Galium aparine	Cleavers	Rare
Galium palustre	Marsh bedstraw	Abundant
Geranium dissectum	Cut leaved cranesbill	Rare
Geranium robertianum	Herb Robert	Rare
Geranium x Oxonianum	Druce's cranesbill	Rare
Glechoma hederacea	Ground-ivy	Rare
Gnaphalium uliginosum	Marsh cudweed	Occasional
Hedera helix	Ivy	Occasional
Hieracium agg.	A hawkweed	Rare

Herb species		
Scientific name	**Common name**	**Relative abundance (DAFOR scale)**
Heracleum sphondylium	Hogweed	Occasional
Hyacinthoides non-scripta	Bluebell	Rare
Hypericum pulchrum	Slender St John's wort	Rare
Hypericum tetrapterum	Square stalked St John's wort	Rare
Hypochaeris radicata	Common cat's-ear	Frequent
Iris pseudacorus	Yellow iris	Rare
Lamium purpureum	Red dead-nettle	Rare
Lapsana communis	Nipplewort	Rare
Lathyrus pratensis	Meadow vetchling	Occasional
Lemna minor	Common duckweed	Occasional
Leontodon autumnalis	Autumn hawkbit	Occasional
Linaria vulgaris	Common toadflax	Rare
Lonicera periclymenum	Honey suckle	Rare
Lotus corniculatus	Common bird's-foot trefoil	Rare
Lotus pedunculatus	Greater bird's-foot trefoil	Abundant
Lycopus europaeus	Gypsywort	Rare
Lythrum portula	Water purslane	Rare
Lythrum salicaria	Purple loosestrife	Rare
Matricaria matricarioides	Pineapple weed	Occasional
Matricaria recutita	Scented mayweed	Rare
Mentha aquatica	Water mint	Occasional
Mentha arvensis	Corn mint -Field mint	Rare
Myosotis laxa	Tufted forget-me-not	Rare
Myosotis scorpioides	Water forget-me-not	Rare
Odontites vernus	Red bartsia	Rare
Oenanthe crocata	Hemlock water-dropwort	Rare
Persicaria amphibia	Amphibious bistort	Rare
Picris echioides	Bristly oxtongue	Rare
Plantago lanceolata	Ribwort plantain	Frequent
Plantago major	Greater plantain	Rare
Polygonum aviculare	Knotgrass	Occasional
Polygonum hydropiper	Water pepper	Rare
Polygonum persicaria	Redshank	Rare
Potentilla anglica	Trailing tormentil	Rare
Potentilla anserina	Silverweed	Occasional
Potentilla fruticosa (Garden variety)	Shrubby cinquefoil	Rare
Potentilla reptans	Creeping cinquefoil	Occasional
Prunella vulgaris	Selfheal	Rare
Pulicaria dysenterica	Common fleabane	Rare
Ranunculus acris	Meadow buttercup	Abundant
Ranunculus flammula	Lesser spearwort	Frequent
Ranunculus repens	Creeping buttercup	Abundant
Ranunculus species	A water crow-foot	Rare
Rorippa nasturtium-aquaticum	Watercress	Rare
Rosa canina	Dog-rose	Rare
Rubus fruticosus agg.	Bramble	Frequent
Rumex acetosa	Common sorrel	Frequent
Rumex conglomeratus	Clustered dock	Rare
Rumex crispus	Curled dock	Occasional
Rumex obtusifolius	Broad-leaved dock	Frequent
Sagina procumbens	Procumbent pearlwort	Rare

Herb species		
Scientific name	**Common name**	**Relative abundance (DAFOR scale)**
Scenecio jacobaea	Common ragwort	Occasional
Scenecio viscosus	Sticky groundsel	Rare
Silene dioica	Red campion	Occasional
Solanum dulcamara	Bittersweet - Woody nightshade	Occasional
Sonchus arvensis	Perennial sow-thistle	Rare
Sonchus asper	Prickly sow-thistle	Occasional
Sonchus oleraceus	Smooth sow-thistle	Rare
Sparganium emersum	Un-branched bur-reed	Rare
Spergula arvensis	Corn spurrey	Rare
Stachys arvensis	Field woundwort	Rare
Stachys palustris	Marsh woundwort	Occasional
Stellaria graminea	Lesser stitchwort	Occasional
Stellaria holostea	Greater stitchwort	Rare
Stellaria media	Common chickweed	Occasional
Succisa pratensis	Devil's bit scabious	Rare
Symphytum officinale	Common comfrey	Rare
Teucrium scorodonia	Wood sage	Rare
Torilis japonica	Upright hedge parsley	Rare
Trifolium pratense	Red clover	Occasional
Trifolium rubens	White clover	Dominant
Typha latifolia	Greater reedmace	Rare
Ulex europaeus	Common gorse	Frequent
Ulex minor	Dwarf gorse	Rare
Urtica dioica	Common nettle	Occasional
Vicia cracca	Tufted vetch	Rare
Vicia sativa subspecies sativa	Common vetch	Rare
Vicia sepium	Bush vetch	Rare

Table 6 Grass species recorded in the survey area

Grass species		
Scientific name	**Common name**	**Abundance (DAFOR scale)**
Agrostis sp.	A bent species	Abundant
Agrostis stolonifera	Creeping bent	Abundant
Alopecurus geniculatus	Marsh foxtail	Frequent
Anthoxanthum odoratum	Sweet vernal grass	Occasional
Arrhenatherum elatium	False oat grass	Occasional
Avena strigosa	Bristle oat	Rare
Cynosurus cristatus	Crested dog's-tail	Frequent
Dactylis glomerata	Cock's-foot	Frequent
Elymus repens	Common couch	Occasional
Festuca rubra	Red fescue	Occasional
Glyceria fluitans	Floating sweet grass	Rare
Glyceria sp.	Sweet grass species	Rare
Glyceria sp.	A sweet grass	Rare
Holcus lanatus	Yorkshire Fog	Abundant
Lolium italica	Italian rye-grass	Occasional
Lolium perenne	Perennial ryegrass	Dominant
Phleum pratense	Timothy	Occasional
Phragmites australis	Common reed	Rare
Poa annua	Annual meadow grass	Occasional
Poa sp.	Meadow-grass species	Abundant

Table 7 Sedge species recorded in the survey area

Sedge species		
Scientific name	**Common name**	**Abundance (DAFOR scale)**
Carex binervis	Green ribbed sedge	Rare
Carex disticha	Brown sedge	Rare
Carex hirta	Hairy sedge	Rare
Carex sp.	A sedge	Rare
Eleocharis palustris	Common spike rush	Rare

Table 8 Lower plants recorded in the survey area

Fern Species		
Scientific name	**Common name**	**Abundance (DAFOR scale)**
Asplenium adiatum-nigrum	Black spleenwort	Rare
Dryopteris felix-femina	Lady fern	Rare
Dryopteris felix-mas	Common male fern	Rare
Equisetum arvense	Field horsetail	Occasional
Equisetum fluviatile	Water horsetail	Rare
Polypodium vulgare	Common polypody	Occasional
Pteridium aquilinum	Bracken	Occasional
Rush Species		
Scientific name	**Common name**	**Abundance (DAFOR scale)**
Juncus acutiflorus	Sharp flowered rush	Abundant
Juncus articulatus	Jointed rush	Frequent
Juncus conglomeratus	Compact rush	Occasional
Juncus effusus	Soft rush	Abundant
Juncus inflexus	Hard rush	Frequent
Bryophyte species		
Scientific name	**Common name**	**Abundance (DAFOR scale)**
Oxyrrhynchium hians	Swartz's feather-moss	Rare
Pellia endiviifolia	Endive pelia	Rare
Rhytidiadelphus squarrosus	Springy turf moss	Abundant

Fauna

Table 9 Notable bird species recorded in the survey area

Bird species				
Scientific name	**Common name**	**Number seen**	**Location**	**Status on BoCC and/or UK Post-2010 Biodiversity Framework**
Accipiter nisus	Sparrowhawk	1	Field 12	-
Anthus pratensis	Meadow pipit	1	Field 11	Amber List
Buteo buteo	Buzzard			-
Carduelis cannabina	Linnet	6	Plot 6a	Red list & UK Post-2010 Biodiversity Framework
Carduelis carduelis	Goldfinch	5	Field 11	-
Corvus corone	Crow	Numerous	Throughout	-
Cyanistes	Blue tit	1	Hedgerow	-

caeruleus			29 and 31	
Falco tinunculus	Kestrel	1	Field 13	Amber list
Hirundo rustica	Swallow	33	Field 3 and 5	Amber list
Motacilla alba	Pied wagtail	Numerous	Throughout	-
Oenanthe oenanthe	Wheatear	Tail feathers	Field 11	Amber list
Passer domesticus	House Sparrow	Egg and nests	Dalar Hir barn TN 15	Red list & UK Post-2010 Biodiversity Framework
Pica pica	Magpie	1	Plot 5a and Hedgerow 15	-
Prunella modularis	Dunnock	1	Field 16 and Hedgerows 8, 20 21, 28, and 29	Amber list & UK Post-2010 Biodiversity Framework
Sturnus vulgaris	Starling	11	Plot 5a	Red list & UK Post-2010 Biodiversity Framework
Vanellus vanellus	Lapwing	8	Field 11	Red list & UK Post-2010 Biodiversity Framework

Table 10 Other species recorded incidentally in the survey area

Invertebrates (Insects, insect galls and spiders)		
Scientific name	**Common name**	**Comments**
Aglais urticae	Small tortoiseshell	Seen in the plantation 5a
Andricus curvator-	A gall wasp	A gall induced by a wasp - found on sessile oak and English oak
Andricus foecundatrix	Artichoke gall	A gall induced by a wasp - found on sessile oak and English oak
Andricus kollari	Marble gall	A gall induced by a wasp - found on sessile oak and English oak
Araneus diadematus	Cross orb-weaver	Seen in the southern plantation
Araneus quadratus	Four spot orb-weaver	Seen in the southern plantation
Coreus marginatus	Dock bug	Seen in plantation 15a
Eristalis arbustorum	Dwarf drone fly	Seen near to the dense scrub at Dalar Hir Farm (Plate 9)
Gyrinus species	A whirlygig beetle	Seen in the pond at Field 7
Helophilus pendulus	Bridled hoverfly	Seen near to the dense scrub at Dalar Hir Farm and TN 11
Maniola jurtina	Meadow brown	Seen in the Semi improved grassland in Field 6
Pararge aegeria	Speckled wood	Seen in the plantation 5a
Phyllonorycter rajella	A micro-moth	Creates a leaf mine on common alder
Pieris rapae	Small white	Seen at the ditch that runs through the centre of the survey area
Polyommatus icarus	Common blue	Seen at the southern plantation
Pontania proxima-	Red bean gall	A gall induced by the red bean sawfly found on white willow and crack willow
Rabdophaga	A gall midge	A gall induced by a gall midge – found on

Invertebrates (Insects, insect galls and spiders)		
Scientific name	**Common name**	**Comments**
salicis		eared willow
Rhingia campestris	Snouted hoverfly - Heineken hoverfly	Seen near to the dense scrub at Dalar Hir Farm
Sympetrum striolatum	Common darter	Seen at TN 11
Syritta pipiens	Thick-legged hoverfly	Seen near to the dense scrub at Dalar Hir Farm
Tetramesa hyalipennis	A gall wasp	Induces a gall on common couch grass (Plate 10)
Urophora cardui	Thistle stem gall	A gall induced by a picture wing fly
Xylota segnis	Gold belted hoverfly	Seen near to the dense scrub at Dalar Hir Farm
Fungus and fungal galls		
Scientific name	**Common name**	**Comments**
Agaricus campestris	Field mushroom	A basidiomycete fungus
Erysiphe alphatoides	Oak mildew	A powdery mildew
Erysiphe heraclei	Hogweed mildew	A powdery mildew
Illosporiopsis christiansenii	A lichenicolous fungus	A lichenicolous fungus that parasitises *Xanthoria* and *Physcia* lichens. Found in Hedgerow 25
Puccinia punctiformis	Creeping thistle rust	A gall induced by a rust fungus - found on creeping thistle.
Taphrina alni	Alder tongue gall	First record for Anglesey – A gall induced by a fungus
Taphrina tosquinetii	A galling fungus	A gall induced by a fungus – found on common alder
Trochila ilicina	Holly speckle	An ascomycete fungus
Lichen		
Scientific name	**Common name**	**Comments**
Arthonia radiata	A lichen	A crustose lichen
Lecidella eleochroma	A lichen	A crustose lichen Hedgerow 25
Physcia tenella	A lichen	A foliose lichen
Xanthoria parietina	Golden shield lichen	A foliose lichen
Xanthoria polycarpa	A lichen	A foliose lichen

Appendix E Additional Plates

Plate 9 Dwarf drone fly (*Eristalis arbustorum*) on Michaelmas daisy

Plate 10 Galls on common couch grass caused by *Tetramesa hyalipennis* – a gall wasp

Appendix F Protected Species Legislation and Licensing Considerations

The survey area has habitats with the potential to support protected species. However, the presence or likely absence of these species has not been established. In the event that protected species are present and are likely to be affected by development of the survey area then mitigation may be required. Provided in this appendix is a brief summary of the legal protection afforded to those species that have the potential to be present in the survey area, and a brief discussion regarding the derogation licence process with respect to each species or species group.

Great crested newt

GCN is a fully protected species under all elements of Section 9 of the Wildlife and Countryside Act, 1981 (as amended). It is also protected under parts 1 and 2 of Regulation 39 of The Conservation of Habitats and Species Regulations, 2010. This legislation taken together makes it an offence to:

- deliberately kill, injure or capture (take) a GCN;
- intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a GCN;
- intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose;
- deliberately disturb GCN in such a way as to be likely to significantly affect the ability of a population to survive over time, breed or rear or nurture their young;
- negatively affect the local distribution or abundance of the species; and,
- deliberately damage or destroy a breeding site or resting place of a great crested newt.

A broad definition of 'deliberate' is implied and an offence may be committed by a person who may not intend to kill or capture a great crested newt but nevertheless performs the relevant action, being sufficiently informed and aware of the consequences of his action will most likely have. Consequently both the species itself and its habitat are protected, and activities that damage or impede the use of this habitat are prohibited. If there is a risk of great crested newt being present within the development boundary then it is likely that a European Protected Species Licence would need to be obtained before any development works could start.

Bats

All British bat species and their roosts are protected through The Conservation of Habitats and Species Regulations 2010 (as amended) and Wildlife and Countryside Act 1981 (as amended).

In summary, the legislation most relevant to this report, makes it an offence to:

- deliberately capture, injure, kill or disturb any bat species, or to damage or destroy a breeding site or resting place of such an animal;

- intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection; or

- intentionally or recklessly obstruct access to any structure or place which a bat uses for shelter or protection.

A development which has the potential to disturb bats may require a European Protected Species (EPS) licence to be obtained from Natural Resources Wales (NRW). A licence may be granted before work commences to authorise actions which would otherwise be in breach of the protection afforded by the Habitats Regulations. If bat roosting presence is confirmed in any of the buildings likely to be affected by the proposed development then the above licencing procedure will be necessary.

A general note about EPS licensing

It should also be noted that in all cases involving EPS, the circumstances in which an EPS licence may be granted are narrowly defined and three specific tests must be satisfied. These are:

- the development must preserve public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;

- there must be no satisfactory alternative available that would avoid initiating the licence application process; and,

- the action authorised must not be detrimental to the maintenance of the population of the EPS concerned at a favourable conservation status in their natural range.

It is important to note that an application for a licence will fail if any one of the above tests is not satisfied and a strong justification in each case will have to be made.

Badger

Under the Protection of Badgers Act 1992 it is an offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so;

- interfere with a sett by damaging or destroying it;

- obstruct access to, or any entrance of, a badger sett; and

- disturb a badger when it is occupying a sett.

A licence must be obtained from Natural Resources Wales if the ecologist on-site considers that a disturbance or damage to a sett will occur during the proposed work. What actually constitutes a disturbance is a complex issue, but in this case factors such as the proximity of proposed works, the type of machinery used, the frequency of use, and timing of works will contribute to this issue.

Licences to destroy or disturb a sett are not normally granted during the breeding season for badger when there may be dependant young. This period is between 30th November and 1st July. It is therefore advised that all activities likely to require

a licence are programed outside of this period when a licence will be required to comply with the relevant legislation.

Water vole

In 2008 water vole received an increased level of protection by becoming fully covered by the provisions of section 9 of the Wildlife and Countryside Act 1981 (as amended). Full legal protection under the Act makes it an offence to:

- intentionally kill, injure or take water voles;
- possess or control live or dead water voles or derivatives;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection;
- intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose;
- sell water voles or offer to expose for sale or transport for sale; and
- publish or cause to publish an advertisement which conveys the buying or selling of water voles.

If a population of water vole are found in the ditch within the development boundary then the simplest method of remaining within the boundaries of what is legal within the legislation would be to avoid affecting the habitat altogether. If it is unavoidable that the habitat will be destroyed then a licence will need to be obtained to trap and translocate the population of water vole out of the area. The timing of a trapping, translocation scheme can be complicated and are not discussed here as the presence of water vole has not been established.