

APP/12/00966



Land North of Goldring Close, Mengham, Hayling Island

Phase 2 Survey Report: Hedgerows, Bats, Birds, Reptiles and Dormice

Prepared on Behalf of Tolcarne Drive Developments

August 2012

**Land north of Goldring Close
Ecology 7008_Phase 2
Issue 01**

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1.0 Executive Summary

- 1.1 Surveyors: Surveyors: Davog McCloskey, Michelle Brown, Ann Thornton, John Simper
Grid Reference: SZ 726 995
Client/contact: Tolcarne Drive Developments
- 1.2 Following an initial ecological assessment (PV Ecology 2011), the need for Phase 2 hedgerow, bat, bird, reptile and dormouse surveys was identified. All hedgerows on site were systematically surveyed and assessed for their importance under the Hedgerow Regulations 1997. A series of three bat transect surveys and three bat emergence surveys, four bird transect surveys, seven presence / absence refugia surveys for reptiles and five presence / absence nest-tube surveys for dormice were conducted between April and September 2011. This report presents the results and implications of the surveys and subsequent ecological mitigation requirements and recommendations.
- 1.3 Six out of seven hedgerows present on site are of ecological importance under the Hedgerow Regulations 1997 and five fulfill the criteria for priority habitats under the UK Biodiversity Action Plan. The client will need to apply for a Hedgerow Removal Notice approval from the Local Planning Authority before the section of hedgerow highlighted in the development proposals can be removed for the proposed access road. All other hedgerows will be retained, where possible, and enhanced for protected species and biodiversity in general. Mitigation measures for hedgerows are detailed in **Section 6.0**.
- 1.4 No bats were recorded roosting in any of the extant buildings on site or within any of the mature trees present within or immediately adjacent to the site boundary. Foraging activity by common pipistrelles (*Pipistrellus pipistrellus*), soprano pipistrelles (*Pipistrellus pygmaeus*) and a *Myotis* sp. (suspected Daubenton's) was recorded along the hedgerow boundaries within both fields and the wooded area around the stable block in the southern field (north-west of southern field). Bat passes were recorded throughout the open areas of the site but on a low incidence rate. No further mitigation is required prior to the development, however, landscaping on site should incorporate native species to enhance bat foraging habitat. No trees with potential to support roosting bats are scheduled for removal as part of this development. However, should mature trees be required to be removed they must be inspected by a suitably qualified ecologist to ensure no roosting bats are present. Simple, low-cost recommendations are presented in **Section 6.0** to provide roosting and foraging opportunities for bats within the new development scheme.
- 1.5 The site was found to support 29 bird species, including three Red Listed species of conservation concern; house sparrow (*Passer domesticus*), song thrush (*Turdus philomelos*) and starling (*Sturnus vulgaris*). The site contains habitats with the potential to support nesting birds. These include a number of mature trees, scrub and hedgerow. Vegetation clearance and building demolition should avoid bird nesting season (01st March to 1st October, inclusive) or not be undertaken without prior inspection by an ecologist. Measures to mitigate against the loss of bird nesting and foraging habitat and measures of best practice will be followed in order to avoid deleterious effects to bird populations and contravention of current UK legislation protecting nesting birds. These are detailed in **Section 6.0**.
- 1.6 The site was found to support a 'low' population of slow-worm (*Anguis fragilis*). Measures to mitigate against the loss of reptile habitat and measures of best practice will

be followed in order to avoid harming reptiles and contravening current UK legislation protecting these species. These include retaining and enhancing hedgerows, the provision of a 1m grassland buffer between hedgerow bases and the development area, the retention of an area of reptile habitat on site and the provision of additional reptile foraging and shelter areas. Mitigation measures are detailed in **Section 6.0**.

- 1.7 No dormice were recorded on site. Measures of best practice are detailed in **Section 6.0** that will avoid harming or isolating dormice in the wider landscape, if present, and avoid contravention of current UK legislation protecting these species. The measures aim to ensure habitats are maintained and enhanced for the benefit of dormice and biodiversity in general.
- 1.8 The report provides an assessment of the potential ecological impacts of the proposed development upon protected species (**Section 5.4**) and details mitigation measures to be implemented prior to and during construction (**Section 6.0**). Mitigation measures include; a) further measures *required* to mitigate against the effects of the development, and b) further measures *recommended* to mitigate against the effects of the proposed development. The report provides details of enhancement measures that will encourage an increase in biodiversity and satisfy the requirements under PPS 9 (Biodiversity and Conservation) and the NERC Act 2006.

2.0 Introduction

Background

- 2.1 PV Ecology was commissioned to carry out a Phase 1 Ecological Assessment of the land north of Goldring Close, Mengham, Hayling Island (Grid Reference: SZ 72600 99500) in April 2011 (PV Ecology, 2011). The survey highlighted the need for further hedgerow, bat, bird, reptile and dormouse surveys at the pre-planning stage, to determine the potential impact upon ecologically important habitats and protected species and advise appropriate mitigation to avoid contravention of current UK legislation protecting these species. A separate survey was carried out on the site and adjacent areas for Brent Geese and Waders which looked at the impact of the proposals on the neighbouring SPA.
- 2.2 This report summarises the findings of the initial Phase 1 Ecological Assessment and presents the results of the further Phase 2 surveys for hedgerows, bats, birds, reptiles and dormice. This report recommends mitigation, timings and enhancements to minimise impacts on ecologically important habitats and protected and notable species.
- 2.3 The results set out within this report are valid for one year from the issue date. A follow up site visit may need to be carried out immediately prior to work starting on site to ensure that there has been no significant change to habitats and species.
- 2.4 This report describes the ecological value of the site, based on the findings of Phase 2 Protected Species Surveys and review of existing data, including previous site based ecological surveys. This report also makes recommendations for enhancement measures to encourage greater biodiversity on site and should be read in conjunction with the extended Phase 1 Report. These measures are in accordance with requirements under the National Planning Policy Framework and NERC 2006.
- 2.5 The methods employed to obtain ecological information on the site are described in **Section 3.0** of this report and the results are detailed in **Sections 4.0**. **Section 5.0** identifies the potential impact on biodiversity receptors and **Section 6.0** describes the environmental measures which will be required to be incorporated into the scheme design to minimise potential effects on biodiversity receptors.

Site Description

- 2.6 The site is located on a plot of land measuring approximately 4.5ha to the north of Goldring Close, Mengham, Hayling Island approximate grid reference SZ 72542 99530 (**Appendix A**). The site is bordered to the north, south and west by residential housing and to the east by agricultural fields. The wider landscape is a mixture of urban development and agricultural fields. The site lies approximately 210m from Chichester Harbour SSSI, Chichester & Langstone Harbours SPA/Ramsar and Solent Maritime SAC. The nearest SINC (Hayling Island Secondary School Playing Field) can be found approximately 0.5km to the north. This SINC is designated for supporting populations of dark-bellied Brent Geese (*Branta bernicla*).
- 2.7 The site comprises two fields currently divided into paddocks for grazing horses. Hedgerows form the boundaries for both fields and provide the divide between the northern and southern fields. These hedgerows have trees scattered throughout and are of varying structural and species diversity. The hedgerows have potential to qualify

as 'important' under the Hedgerow Regulations 1997 and to support protected species such as reptiles, nesting birds and dormice. Semi-improved grassland areas within the site boundaries have been heavily grazed by horses. Two houses are part of the proposals, both proposed to be demolished to access the site. The buildings are brick built with slate and concrete interlocking tile roofs with low – medium bat roosting potential.

- 2.8 The client is proposing to build 131 new residential dwellings on the site (**Appendix B**) with associated access, car parking and landscaping.

Brief

- 2.9 To carry out Phase 2 presence/absence surveys for bats, reptiles, hedgerows and birds on land within the footprint of the proposed development at land off Scratchface Lane and to inform the clients of any ecological implications associated with the site.

3.0 Methodologies

Hedgerow Assessments

- 3.1 Hedgerows on site were surveyed in accordance with Hedgerow Survey Handbook, Second Edition (Defra, 2007). All hedgerows over 20m in length which fulfilled the criteria for true hedgerows under the Hedgerow Regulations 1997 were assessed. A 30m section was assessed within each 100m of hedgerow on 17th April 2012 by two suitably experienced ecologists. The following information was recorded: site information (including a grid reference); hedgerow dimensions (i.e. height, width and length); number of woody species; hedgerow features (including ditches, banks and standard trees); and number of connections to other hedgerows, woodlands or ponds.
- 3.2 For hedgerows over 100m long (where more than one 30m section was surveyed), an average of the number of woody species per 30m section was taken.
- 3.3 Under the Hedgerow Regulations 1997 a hedgerow is deemed to have ecological or landscape value if: It contains protected species of birds, animals or plants, listed on Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981; or it is referred to in a record held by a Biological Record Centre as having held a Schedule 1 or 5 species within the last five years (i.e., between November 2006 and November 2011) or a Schedule 8 species within the last ten years (i.e., between November 2001 and November 2011); or it contains species that are listed as endangered, extinct, rare or vulnerable in Red Data Books for plants, insects, stoneworts and invertebrates other than insects. It contains birds categorised as declining breeders in 'Red Data Birds in Britain'.
- 3.4 The Regulations provide criteria against which the historical and ecological importance of hedges can be assessed. The survey evaluated the ecological importance of the hedgerow and made no assessment of its archaeological / historical importance. For a hedgerow to be classified as being ecologically important it must meet at least one of the following criteria: contain at least seven woody species in a 30m stretch; or contain at least six woody species in a 30m stretch and at least three features; or contain at least six woody species in a 30m stretch and the presence of native black poplar (*Populus nigra*), small leaved lime (*Tilia cordata*), large leaved lime (*Tilia platyphyllos*) and wild service tree (*Sorbus torminalis*); or contain at least five woody species in a 30m stretch and four features; or if adjacent to a bridleway or footpath at least four woody species in a 30m stretch and three features.
- 3.5 Features referred to above include the following: a bank or wall along at least half the length of the hedge; an intact hedge; one standard tree per 50m of length; three valuable ground flora species (as defined in the regulations); a ditch along at least half the length of the hedgerow; good connections with other hedgerows; and a parallel hedge within 15 metres.
- 3.6 Hedgerows with an average of five or more species within a 30m length are defined as species-rich under the UK Biodiversity Action Plan (UKBAP). Hedgerows which have a minimum of 80% cover of at least one native woody species fulfil the criteria for UKBAP priority habitat.
- 3.7 Survey data gained on site was used to determine the status of each hedgerow according to the ecological criteria of the Hedgerow Regulations Act (1997) and the UKBAP.

Bat Activity Surveys

- 3.8 Three separate bat activity surveys (two dusk and one dawn) were conducted between 29th June and 09th September 2011. **Table 1** provides details of each survey visit. The surveys were undertaken by two surveyors walking a pre-determined survey transect route around the site which gave sufficient coverage to determine how bats were using the site. Each surveyor was equipped with a Pettersson D240x and recording equipment (Zoom H1). Recordings of bat echolocations were analysed with BatSound™ software to confirm the identity of species encountered.

Table 1: Phase 2 Bat Activity Survey Details

Date	Survey type	Duration	Weather Conditions	Sunset/Sunrise Time
29.06.11	Dusk	2051 – 2251	16°C at start of survey, wind force 2-3, 20% cloud cover. 15°C at end of survey.	2121
11.08.11	Dusk	2006 – 2206	18°C at start of survey, wind force 3-4. 90% cloud cover. Light rain. 14.9°C at end of survey.	2036
09.09.11	Dawn	0500 – 0700	16°C at start of survey, 100% cloud cover, wind force 0-1, light drizzle. 16°C at end of survey.	0630

Bat Emergence Surveys

- 3.9 Three separate bat emergence (dusk) surveys were conducted in August/September 2012. **Table 2** provides details of each survey visit. Each survey was undertaken by 1-2 surveyors placed at previously identified vantage points around the dwelling which gave adequate coverage of all aspects of the property. Each surveyor was equipped with a Pettersson D240x with recording equipment (Zoom H1 Mp3 player/recorder) or a Wildlife Acoustic EchoMeter EM3 detector with inbuilt recorder. Recordings of bat echolocations were analysed with BatSound™ software to confirm the identity of species encountered.

Table 2: Phase 2 Bat Emergence Survey Details

Date	Survey type	Duration	Weather Conditions	Sunset/Sunrise Time
29.08.12	Dusk	1930 – 2130	17°C at start of survey, wind force 2-3, 5% cloud cover. 17°C at end of survey.	2000
5.9.12	Dusk	1920 – 2115	23°C at start of survey, wind force 0. 0% cloud cover. 22°C at end of survey.	1945

			9°C at start of survey, wind force	
07.09.12	Dawn	0500 – 0631	0. 10% cloud cover. 10°C at end of survey.	0631

Bird Surveys

- 3.10 A series of four bird surveys were conducted within the boundaries of the proposed development site between 22nd April and 27th June 2011. The site extent was surveyed for bird activity by walking a transect around the site boundaries and recording all birds seen and calling. Each record, with a corresponding number of individuals, was plotted on a site base map using the BTO (British Trust for Ornithology) two letter species codes. Using this method allowed for a visual representation of bird locations on site during each survey visit to be produced. The surveys were carried out in the morning, a time when birds are actively feeding and singing/calling, and during periods of favourable weather conditions as defined in BTO survey guidance (BTO, 2011).

Reptile Surveys

- 3.11 A series of presence/likely absence surveys were conducted within the boundaries of the proposed development site, targeting areas of habitat highlighted by the initial ecological survey (PV Ecology, 2012) as having potential to support reptiles. Seven separate survey visits were conducted between 17th May and 9th September 2011, under optimal weather conditions (as defined by Griffiths and Inns, 1998). All field surveys were undertaken by an experienced reptile ecologist.
- 3.12 The surveys consisted of the following three methods, in accordance with current guidance (Griffiths and Inns, 1998; Froglife, 1999):
- *Visual Search* – The site was searched visually during each visit. Details of reptiles encountered basking in the open were recorded. Recorded data included; species, sex, age and location.
 - *Extant Refugia* – Any existing potential refugia present within the site boundaries were carefully searched by hand for reptiles. Such refugia included; logs and discarded wood as well as artificial refugia from discarded bits of material throughout the site.
 - *Artificial Refugia* – 34 artificial refugia, consisting of a mixture of carpet tiles, corrugated tin and bitumen roofing felt, were sited in areas of reptile habitat. Such areas included; scrub margins, areas of rough grassland, bramble and ruderal vegetation. All refugia were lifted during each survey visit and all reptiles present on, under or next to each refugia were recorded.

Dormouse Surveys

- 3.13 The Phase 1 report highlighted areas of suitable habitat to support dormice (PV Ecology 2011) and a series of presence/likely absence surveys was recommended. Current guidance for dormice (English Nature, 2006) recommends the use of 'nest tubes' for ascertaining presence / likely absence. Natural England recommend at least 50 tubes be placed within areas of suitable habitat as shown in **Table 2**. Nest tubes should be left on site and checked monthly. **Table 3** gives an index of values for each survey month and a score of 20 or more is required to constitute sufficient survey effort.

3.14 The surveys were conducted monthly between May and September 2011 giving a 'score' of 20. Nest tube locations are depicted in **Appendix G**.

Table 2: *Factors affecting the probability of dormice being present on a woodland site within their known range.*

Increased probability	● Large woods: area over 50 ha – very likely; at least 20 ha – likely; between 2 and 20 ha – possible. ● Adjacent to ancient woodland or PAWS (including conifer), scrub or early successional stage woodland, including conifer. ● Wide range of broadleaved species present, including some fruiting, either in patches, scattered or at the edge. ● Wide range of ages of trees. ● Species-rich shrub layer, especially with hazel, honeysuckle or bramble. ● Species-rich edge strip or ride sides. ● Thick, wide hedgerow connections to nearby suitable woodland. ● Contains hazel or sweet chestnut coppice – ideally managed in small coupes. ● No thinning history (for conifers).
Decreased probability	● Small wood, especially if mostly conifer. ● Old conifer plantation subject to multiple thinning. ● Isolated from other woodland or adjacent only to older conifer plantation already subjected to multiple thinning. ● Little or no shrub understorey. ● No fruiting broadleaved trees. ● High local deer population suppressing most regeneration. ● Presence of cattle, sheep or pigs. ● Seasonally waterlogged ground. ● Derelict coppice or clear-felled in very large coupes (that is, blocks of woodland) relative to the woodland area. ● Site more than 300m above sea level.

Table 3: Index of probability of finding dormice present in nest tubes in any one month. A score of 20 or more is required to ensure sufficient survey effort.

Month	Index of probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

Limitations

Hedgerows

- 3.15 The hedgerow surveys were conducted in April. However, the ecologists conducting the assessments were suitably experienced to confidently identify woody species, trees and shrubs in the absence of their spring and summer foliage.
- 3.16 It was not possible to access both sides of the southern section of hedgerow H2 and hedgerows H3, H4 and H7 as they border private residential gardens. However, this restriction is not considered to have detrimentally impacted upon the results of the assessments as all the hedgerows were thoroughly assessed from at least one side.

Bats

- 3.17 Some bat species, most notably long-eared bats emerge when it is darker and sometimes do not emit a call so can go unnoticed. Bat usage of sites can change on a daily basis so gathering details on numbers and status can be difficult. However, it is considered that the site received sufficient coverage with surveyors and throughout the year to enable a robust assessment of bat activity to be made.

Birds

- 3.18 Although the surveys are thought to give a reasonable picture of bird populations on the site, given the public nature of the site, the detectability of individuals was inevitably influenced by factors that may have made birds less easy to record, such as disturbance by walkers on the adjacent footpath to the eastern boundary. Additionally, morning temperatures increased rapidly on some of the surveys resulting in warm survey conditions, during which birds may become quiet and more retiring, making them harder to observe.

Reptiles

- 3.19 The existing hedgerow provides ideal connectivity to areas of suitable terrestrial habitat for reptiles across the extent of the site. It is therefore possible that reptiles use the extent of the site for foraging / hunting despite the fact that reptiles were only found in three areas of habitat within the site boundaries.
- 3.20 Current reptile survey guidance (Froglife, 1999; HGBI, 1998) recommends the following number of site visits and refugia densities depending on the site parameters and the aims of the survey: To determine presence / likely absence seven separate survey visits in suitable weather conditions and between 5 and 10 artificial refugia per hectare.
- 3.21 To determine the relative abundance and distribution of reptiles within a site: twenty separate survey visits in suitable weather conditions and a minimum of 5 to 10 refugia per hectare.
- 3.22 However, it is becoming increasingly recognised that population estimates for secretive and cryptic species, such as reptiles, are often inaccurate and unreliable (Fearnley, 2009; Edgar *et al.* 2010). Therefore, the methods employed for the purposes of this report have sought to maximise detection probability through the use of a far higher density of artificial refugia (136/ha of reptile-suitable habitat) than current survey guidance recommends (10/ha).
- 3.23 This report therefore proposes that the remaining 13 visits recommended in the current guidance are unnecessary for the purposes of estimating relative abundance in this case. The peak adult counts from the presence / absence surveys have already provided sufficient detail to determine the presence of an approximately estimated 'Low' (Froglife, 1999; HGBI, 1998) population of slow-worm (*Anguis fragilis*) within the site boundaries and determined key areas of distribution around the site, without the need for further surveys. Additionally the options for mitigation, in this case, have been designed to provide an overall benefit to the range of protected and notable species confirmed to be present at the site and within the immediate vicinity.
- 3.24 The peak adult count contained in current guidance (Froglife, 1999; HGBI, 1998) is based on a refugia density of up to 10/ha. The methods employed in this report used a refugia density of 136/ha of potentially suitable reptile habitat and, as a result, increased the likelihood of detecting reptiles present. As there are no reliable means of relating count data from one survey season to actual population size (Edgar *et al.* 2010) the use of relative population estimates should therefore be used as an approximate guideline and not as an accurate calculation of population size.

Dormice

- 3.25 It is virtually impossible to confirm the absence of dormice from any areas of suitable habitat. However, by ensuring sufficient survey effort, in line with current Natural England guidelines, absence can be suggested with a relatively high degree of confidence. This report recommends mitigation measures (**Section 6.0**) to protect, maintain and enhance hedgerows on site and to maintain connectivity to the wider countryside, where possible. These measures are designed to enhance biodiversity, protect hedgerows which fulfill BAP criteria and protect dormice in the unlikely event that their presence has not been detected during the surveys.

4.0 Results

Hedgerows

- 4.1 **Table 4** lists every hedgerow surveyed within the proposed works area and highlights whether it is likely to be considered ecologically 'important' under the Hedgerow Regulations and UK BAP priority habitat criteria. Hedgerow locations and the centre points of the 30m sections surveyed are shown in **Appendix C**.
- 4.2 Six out of the seven hedgerows present on site were assessed as being of ecological importance under the Hedgerow Regulations 1997 (H1 to H6 inclusive). Five out of seven hedgerows present on site fulfil the criteria for UK Biodiversity Action Plan priority habitats (H1 to H3 inclusive, H5 and H6). Only one hedgerow on site did not fulfil either criteria (H7).

Table 4: *Ecological importance of hedgerows assessed within the proposed development area*

Hedgerow number	Ecologically Important under Hedgerow Regulations?	Reason for 'importance'	BAP habitat
H1	Yes	• Presence of a Schedule 5 species (<i>Anguis fragilis</i>) • Adjacent on east side to public footpath • 4.5 woody species per 30m length • A ditch present along hedge length • at least one standard tree per 50m length • less than 10% gaps	Yes
H2	Yes	• Adjacent on east side to	Yes

Hedgerow number	Ecologically Important under Hedgerow Regulations?	Reason for 'importance'	BAP habitat
		public footpath 6 woody species per 30m length - A ditch present along hedge length - at least one standard tree per 50m length - less than 10% gaps	
H3	Yes	Presence of a Schedule 5 species (<i>Anguis fragilis</i>)	Yes
H4	Yes	Presence of a Schedule 5 species (<i>Anguis fragilis</i>)	No
H5	Yes	- Presence of a Schedule 5 species (<i>Anguis fragilis</i>) - Adjacent on south side to public footpath - woody species per 30m length - A ditch present along >50% of hedge length - at least one standard tree per 50m length - less than 10% gaps	Yes
H6	Yes	6.5 woody species per 30m length - Good connections with other hedgerows - at least one standard tree per 50m length - less than 10% gaps	Yes
H7	No		No

Bat Activity Surveys

- 4.3 Three bat species; common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and a *Myotis* sp. (suspected Daubenton's (*Myotis daubentonii*); were confirmed foraging around or commuting through the site. Activity was mainly confined to the hedgerow boundaries and within the vicinity of these; however, occasional pipistrelle commutes were recorded across both fields. A summary of bat flightlines is illustrated in **Appendix D**. Bat activity was relatively low over the survey period with small numbers of bats recorded on individual surveys.
- 4.4 No bats were recorded emerging from or swarming near (or entering) any of the buildings linked to the proposals.

29th June 2011

- 4.5 Common and soprano pipistrelles were recorded foraging and feeding around the hedgerows within the southern field. Activity was also recorded by both pipistrelle species within the wooded area to the north-west of the southern field. A *Myotis* sp. (suspected Daubenton's *Myotis daubentonii*) was recorded at 2226 commuting from east to west along the tree line to the northern boundary of the southern field. Common and soprano pipistrelles were recorded throughout the survey feeding and foraging around the northern field boundary (H7). In addition *Myotis* sp. (suspected Daubenton's) were recorded foraging along the southern hedgerow boundary of the northern field (H5).

11th August 2011

- 4.6 Activity by common and soprano pipistrelles was recorded around the hedgerow boundaries of the southern field throughout the survey. Activity levels were highest around the wooded area to the north-west of the southern field. A brief pass by a *Myotis* sp. (suspected Daubenton's) was recorded at 2127 along the hedgerow to the north of the southern field (H5). Activity from common and soprano pipistrelles was recorded around the hedgerow boundaries surrounding the northern field. A single pass by a *Myotis* sp. (suspected Daubenton's) was recorded at 2140 along the eastern hedgerow boundary of the northern field (H1). A common pipistrelle was recorded at 2052 commuting across the northern field from the north-eastern corner to the hedgerow at the south-western corner (H4).

2nd September 2011

- 4.7 Activity by common and soprano pipistrelles was constant throughout the dawn survey. Commuting, foraging and feeding behaviour was highest around the hedgerow boundary between the northern and southern fields (H5). In addition, activity was also recorded to the eastern and western boundaries of the northern field (H1 and H6) and the western boundary of the southern field (H4). Activity was predominantly confined to the hedgerows and immediately adjacent habitat. No bats were recorded commuting across either field. Activity continued until 0610. **Table 5** provides a summary of each survey visit.

Table 5: Summary of bat activity recorded during each survey visit.

Survey Date and Type	Recorded Bat Roosts and Building Identification	General Bat Activity on Site
29.06.11 (Dusk)	No bats recorded emerging from any buildings or trees on site.	Common pipistrelles and soprano pipistrelles foraging along hedgerows on-site. Brief pass by <i>Myotis</i> sp. (? Daubenton's).
11.08.11 (Dusk)	No bats recorded emerging from any buildings or trees on site.	Foraging activity by common and soprano pipistrelles and <i>Myotis</i> sp. (? Daubenton's) recorded along the hedgerows within both fields. A common pipistrelle recorded commuting across the northern field.
09.09.11 (Dawn)	No bats recorded entering any buildings or trees on site.	Foraging activity by common and soprano pipistrelles and <i>Myotis</i> sp. (? Daubenton's) recorded along the hedgerows within both fields.

Bat Emergence Surveys

- 4.8 No bats were recorded emerging from or entering 23 St Margarets Rd during the emergence surveys. During the survey on the 5th September a bat was recorded coming from the direction of the house to the south of no.23 in what appeared to be an emerging flight but because it was not actually recorded emerging, roosting confirmation was not possible. The bat was analysed as being a common pipistrelle. During the dawn survey on the 7th September a common pipistrelle was recorded swarming near to the houses to the south of no.23 but was not recorded entering from any of the buildings.

Birds

- 4.9 A total of 29 bird species (**Table 6**) were observed during the surveys. Their locations within the site boundaries on each survey visit are illustrated in **Appendix E**.

Table 6: Table of bird species and abundance recorded during each survey visit.

Species	Visit 1: 22/4/11	Visit 2: 14/5/11	Visit 3: 25/6/11	Visit 4: 27/06/11
Blackbird (<i>Turdus merula</i>)	16	8	7	11
Blackcap (<i>Sylvia atricapilla</i>)	3	0	0	1
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	1	0	0	0
Blue Tit (<i>Cyanistes caeruleus</i>)	5	1	6	11
Bullfinch (<i>Pyrrhula pyrrhula</i>)	0	2	0	0
Carrion Crow (<i>Corvus corone</i>)	2	2	2	5
Chaffinch (<i>Fringilla coelebs</i>)	2	1	0	0
Chiff-chaff (<i>Phylloscopus collybita</i>)	1	0	0	0
Collard Dove (<i>Streptopelia decaocto</i>)	1	1	0	1
Dunnock (<i>Prunella modularis</i>)	0	1	0	4
Goldfinch (<i>Carduelis carduelis</i>)	1	0	2	1
Great Spotted Woodpecker (<i>Dendrocopos major</i>)	1	0	0	0
Green Woodpecker (<i>Picus viridis</i>)	1	0	1	1
Greenfinch (<i>Carduelis chloris</i>)	2	6	4	7
House Martin (<i>Delichon urbica</i>)	0	6	0	11
House Sparrow (<i>Passer domesticus</i>)	0	6	0	11
Jackdaw (<i>Corvus monedula</i>)	5	4	6	0
Long-tailed Tit (<i>Aegithalos caudatus</i>)	0	4	5	0
Magpie (<i>Pica pica</i>)	2	3	2	0
Pheasant (<i>Phasianus colchicus</i>)	0	0	2	0
Robin (<i>Erithacus rubecula</i>)	1	4	4	9
Rook (<i>Corvus frugilegus</i>)	8	0	0	0
Song Thrush (<i>Turdus philomelos</i>)	0	1	0	0
Sparrowhawk (<i>Accipiter nisus</i>)	2	0	0	0
Starling (<i>Sturnus vulgaris</i>)	2	4	0	33
Swallow (<i>Hirundo rustica</i>)	0	3	2	3
Whitethroat (<i>Sylvia communis</i>)	0	1	0	0
Wood Pigeon (<i>Columba palumbus</i>)	1	7	7	4
Wren (<i>Troglodytes troglodytes</i>)	3	5	2	3

- 4.10 Several species were found in very low numbers and were not located on every survey, including blackcap (*Sylvia atricapilla*), black-headed gull (*Chroicocephalus ridibundus*), chiff-chaff (*Phylloscopus collybita*), great spotted woodpecker (*Dendrocopos major*), whitethroat (*Sylvia communis*), song thrush (*Turdus philomelos*) and sparrowhawk (*Accipiter nisus*). Some relatively common species were also found in low numbers, such as chaffinch (*Fringilla coelebs*) and Dunnock (*Prunella modularis*).

- 4.11 The pasture was used as a foraging area for starlings (*Sturnus vulgaris*), especially during July when a number of juvenile birds were noted at the site. A small number of house sparrows (*Passer domesticus*) and a single song thrush (*Turdus philomelos*) were also found to be present on the site.
- 4.12 A number of swallows (*Hirundo rustica*) and house martins (*Delichon urbica*) were observed feeding above the site. Other notable birds found on the site included green woodpecker (*Picus viridis*), whitethroat (*Sylvia communis*) and bullfinch (*Pyrrhula pyrrhula*). A singing male whitethroat (*Sylvia communis*) indicated that there may be a pair utilising the eastern hedge in the southern field (H2). The mature, scrubby nature of the hedgerows provides an ideal habitat for this species. A pair of bullfinches (*Pyrrhula pyrrhula*) was recorded during one of the surveys.
- 4.13 An area of scrub dominated by willow (*Salix caprea*), in the north-west corner of the southern field, seemed to be favoured by several species such as blackcaps (*Sylvia atricapilla*) and green woodpeckers (*Picus viridis*).

Reptiles

- 4.14 Thirty-four refugia (**Appendix F**) were placed on site on 14th April 2011 and left for four weeks to bed in. A total of 7 surveys were carried out by experienced reptile surveyors during optimum weather conditions. The results of each survey visit are presented in **Table 7** below.

Table 7: Summary of results of reptile surveys

Survey No.	Survey Date	Weather	Method	Location / Refugia ID	Species	Sex	Age	Quantity	Peak Adult Count
Survey Set Up	27.04.11	Start Time: 10:30 Finish Time: 14:30							
1	17.05.11	Start Time: 11:00	Corrugated onduline	To rear of stables	<i>Anguis fragilis</i>	Female	Adult	1	1
		Finish Time: 13:00				Juvenile	Juvenile	1	
		Start temp: 19.0 °C							
		Finish temp: 19.0 °C							
		Wind speed: 2-3 Cloud cover: 95% Rain: None Ground moisture: Dry Observations: grass becoming longer in southern field to east side.							
2	29.06.11	Start Time: 17:00	Wooden board	5	<i>Anguis fragilis</i>	Female	Adult	1	1
		Finish Time: 18:30				Sub-adult	Sub-adult	1	
						Juvenile	Juvenile	1	
		Start temp: 21.0°C Finish temp: 20.0°C Wind speed: 2-4 Cloud cover: 10% Rain: None Ground moisture: Dry Observations: sunny							

3	07.07.11	Start Time: 11:00 Finish Time: 13:15 Start temp: 17.0°C Finish temp: 18.1°C Wind speed: 2-3 Cloud cover: 100% Rain: one heavy shower Ground moisture: wet Observations: Overcast	Felt	25	<i>Anguis fragilis</i>	Male	Adult	1	1
4	13.07.11	Start Time: 10:15 Finish Time: 11:05 Start temp: 19.5°C Finish temp: 16.6°C Wind speed: 0-2 Cloud cover: 90 % Rain: None Ground moisture: Dry Observations: Overcast, warm							0
5	19.07.11	Start Time: 09:15 Finish Time: 10:30 Start temp: 15.6°C Finish temp: 18.3°C Wind speed: 0-1 Cloud cover: 85% Rain: None							0

Ground moisture: dry
Observations: Overcast, sunny
intervals

Start Time: 17:10
Finish Time: 18:50
Start temp: 18.0°C
Finish temp: 18.0°C
Wind speed: 3-4
Cloud cover: 90%
Rain: None
Ground moisture: Dry
Observations: Overcast, warm

6 11.08.11

0

Start Time: 10:00

Finish Time: 11:00

Start temp: 18.0 °C

Finish temp: 21.0°C

Wind speed: 0-1

Cloud cover: 100%

Rain: Light shower overnight

Ground moisture: Damp

Observations:

7 09.09.11

0

Felt

21

*Anguis
fragilis*

Juvenile

Juvenile

1

- 4.15 The site was found to support slow-worm (*Anguis fragilis*). Reptiles were found under artificial refugia in three areas of habitat within the site boundaries, 1) under a wooden board adjacent to the hedgerow on the eastern boundary of the northern field (H1); 2) an area of scrub at the south-western corner of the southern field (H3); and 3) scrub / wooded area to the rear of a stable block at the north-western corner of the southern field (H4 and H5).
- 4.16 In accordance with current guidance (Froglife, 1999; HGBI, 1998) the survey results suggest that the site supports a 'Low' population of slow-worms (*Anguis fragilis*).

Dormouse

- 4.17 Fifty nest tubes were placed within the hedgerows (**Appendix G**) in April 2011 and checked every month from May – September 2011. The results of each survey visit are presented in **Table 8** below.
- 4.18 Despite the presence of suitable hedgerow habitat, no evidence of dormouse presence was found throughout the duration of the surveys.

Table 8: Summary of results of dormouse surveys

Survey No.	Survey Date	Weather	Dormouse / evidence found
Survey Set Up	27.04.11	Start Time: 10:30	
		Finish Time: 14:30	
1	17.05.11	Start Time: 17:00	
		Finish Time: 18:00	
		Start temp: 19.0 °C	
		Finish temp: 19.0 °C	
		Wind speed: 2-3	0
		Cloud cover: 95%	
		Rain: None	
		Ground moisture: Dry	
		Observations: grass becoming longer in southern field to east side	
		Start Time: 17:00	
2	29.06.11	Finish Time: 18:30	
		Start temp: 21.0°C	
		Finish temp: 20.0°C	0
		Wind speed: 2-4	
		Cloud cover: 10%	

		Rain: None	
		Ground moisture: Dry	
		Observations: sunny	
		Start Time: 11:00	
		Finish Time: 13:15	
		Start temp: 17.0°C	
		Finish temp: 18.1°C	
3	07.07.11	Wind speed: 2-3	0
		Cloud cover: 100%	
		Rain: one heavy shower prior to survey	
		Ground moisture: wet	
		Observations: Overcast	
		Start Time: 17:10	
		Finish Time: 18:50	
		Start temp: 18.0°C	
		Finish temp: 18.0°C	
4	11.08.11	Wind speed: 3-4	0
		Cloud cover: 90%	
		Rain: None	
		Ground moisture: Dry	
		Observations: Overcast, warm	
		Start Time: 10:00	
		Finish Time: 11:00	
		Start temp: 18.0 °C	
		Finish temp: 21.0°C	
5	09.09.11	Wind speed: 0-1	0
		Cloud cover: 100%	
		Rain: Light shower overnight	
		Ground moisture: Damp	
		Observations:	

5.0 Analysis and Impact Assessment

Hedgerows

- 5.1 Hedgerows H1 to H6 inclusive have been assessed as ecologically important under the Hedgerow Regulations 1997. Hedgerows H1 to H3 inclusive and hedgerows H5 and H6 qualify as UKBAP priority habitats. Consequently, permission will be required from the local authority to remove any hedgerow, sections of them or if cutting sections through them for access roads of paths.
- 5.2 The development proposes the removal of a section of hedgerow H5 to incorporate an access road as well as some sections of hedgerow for access paths. As this hedgerow is ecologically important under the Hedgerow Regulations 1997, the client will need to apply to the Local Planning Authority for permission in the form of a Hedgerow Removal Notice prior to the removal of these sections of hedgerow. Failure to do this prior to the removal of any section of hedgerow which has been assessed as being of ecological importance, would constitute an offence under the Hedgerow Regulations 1997.
- 5.3 Care will need to be taken if paths are being cut through the hedgerow as protected species including birds and reptiles are known to use them. Hedgerow removal or works should avoid the bird nesting season and if possible be carried out in February as this is the least sensitive time in the year and most of the berries will have been eaten or dropped by then and it is prior to the flowering season. If hedgerow maintenance or removal is carried out during the bird nesting season a suitably trained ecologist should be present so that there will be minimal disturbance.
- 5.4 Reptiles use the hedgerows for foraging and commuting throughout and around the site. Hedgerow work should be carried out under supervision of an ecologist to ensure reptiles or their hibernacula are not harmed. Landscaping on site post construction should maintain the hedgerow and protect it with a suitable 'woodland edge' buffer zone. This woodland edge should be part of a management plan to maintain it this way for reptiles and other species of invertebrate etc.
- 5.5 Particular care should be taken when working on or near the hedgerow to the south-east corner of the site as whitethroats have been recorded nesting here. A large buffer zone should be maintained here between any house and the hedgerow to increase further nesting likelihood for this species of bird.
- 5.6 Bats use the hedgerow for commuting and foraging and therefore there should be no light spillage onto the hedgerow during construction or post construction when the development is complete. No light should be directed onto the hedgerows and they should be maintained dark through appropriate cowling.
- 5.7 Enhancement of hedgerows through infill planting with native species in gaps will benefit a wide range of fauna, enhance connectivity with the wider countryside and increase biodiversity at the site scale. This should be detailed in an appropriate habitat enhancement and management plan for the site that can be conditioned as part of the planning approval.
- 5.8 In the absence of appropriate mitigation, the development proposals could potentially impact upon ecologically important hedgerows resulting in a net loss of foraging and shelter habitat for a range of fauna, and potentially isolate reptile populations on site. The impact upon these hedgerows would be 'high' at the site scale and 'medium' at the landscape scale.

Bats

- 5.9 During the initial Phase 1 survey of the site (PV Ecology, 2011), the mature oak trees to the north-western corner of the southern field (in hedgerow H5) were assessed as having potential to support roosting bats, along with the mature trees to the eastern boundary of the northern field. In addition, the hedgerow boundaries of both northern and southern fields were highlighted as providing foraging and commuting opportunities for bats. It was recommended that a minimum of three bat transect surveys encompassing both fields take place during the period April – September. The surveys were undertaken between 29.06.11 and 09.09.11 covering the maternity season and early autumn period. Foraging activity by common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and *Myotis* sp. (suspected Daubenton's *Myotis daubentonii*) was recorded along the hedgerows (**Appendix D**). Activity was highest along the hedgerow boundary between the northern and southern fields (H5) where there are several mature trees along with a relatively good understory that would in turn have an expectedly good invertebrate population, suitable for bats. A single common pipistrelle (*Pipistrellus pipistrellus*) was recorded commuting across the southern field from north-east to south-west. Pipistrelle bats are known to exist in abundance around housing and therefore the impact of the proposals on them is likely to be low and could benefit this type of bat. The main features for roosting, foraging and commuting bats are being retained in the most and therefore the impact on bat activity with the proposals is low. With suitable planting in place to enhance the biodiversity of the site and in particular moth fauna, there could be an enhancement to bat foraging habitat.
- 5.10 No bats were recorded emerging or entering any of the buildings on site. No bats were recorded emerging or swarming around the mature trees on site in a fashion that would indicate roosting. However, as bats were recorded foraging around the site, recommendations for enhancements and construction activities as part of this proposed development have been made in **Section 6.0**.
- 5.11 There are high numbers of potential bat roosts in the vicinity of the site in other buildings adjacent to the paddocks.
- 5.12 Due to the proximity of the buildings being used to access the site, a further precautionary measure would be to demolish the buildings outside of the time of year that bats are most susceptible to disturbance, if present – during hibernation (November – February) and during the maternity season (May – August) in case time allows building deterioration to become suitable for roosting bats. A licensed bat ecologist should be present in case any bats are found and Natural England should be contacted if bats are discovered on site while the ecologist is present or at other times during construction.
- 5.13 The removal of or work to any trees on site highlighted as having bat roosting potential, for access paths or roads, will be avoided and the trees and hedges (used for foraging) will be protected during the construction phase of the development.
- 5.14 The site proposals also make extensive recommendations for increasing bat roosting potential in the new buildings, for all the building roosting species recorded during the bat surveys. New roosts suitable for pipistrelle bats should be created near to the eastern side of the proposed northern field, in an area close to their flight line.
- 5.15 Ditch clearance will help in increasing freshwater invertebrate diversity and will have an overall benefit ecologically for bats.
- 5.16 Hedgerow buffers along the eastern hedgerow will increase connectivity to the wider countryside and enhance bat foraging habitat.

- 5.17 Bat tubes, bricks and access points suitable for pipistrelles and *myotis sp.* bats will be incorporated into houses in suitable locations near to known flight paths in areas they are likely to be used.
- 5.18 Bats use the hedgerow for commuting and foraging and therefore there should be no light spillage onto the hedgerow during construction or post construction when the development is complete. No light should be directed onto the hedgerows and they should be maintained dark through appropriate cowling. Similarly light spillage should not take place onto roost areas in the proposed new houses.
- 5.19 The impact on bats in the absence of mitigation could be medium to high due to the potential loss of commuting corridors, foraging areas and roosts. However, with mitigation and enhancements in place, the impact on bats could be low – negligible. Feeding areas can be created and enhanced, commuting features maintained and enhanced, roosts protected and enhanced and new roosts created on site.
- 5.20 Landscaping proposals will include measures to maintain and enhance suitable bat foraging habitat on site – these will include hedgerow buffers mimicking woodland edge habitat to increase connectivity and foraging opportunities through increasing invertebrate diversity. Although garden planting cannot be assured with residential housing proposals, basic planting in gardens will use hedgerows with native species planting to increase biodiversity and connectivity for a range of species of bats. Landscaping on site should enhance the current boundaries and seek to further protect the agricultural land to the east of the site. This can be achieved through supplementary hedgerow planting with native species and woodland edge planting to buffer the hedgerow and add protection from destructive activities (litter and pollution etc). The new residential gardens would be enhanced for bats by using native species planting or wildlife beneficial planting. Residential houses should be ordered and positioned so that new flight paths can be created across the site – this can be achieved by planting new hedgerows from west to east so that over time a new wildlife corridor will be created.
- 5.21 The details of the site scale enhancements should be detailed in a Biodiversity Enhancement and Management Plan and this should include the considerate management of the open space areas.

Birds

- 5.22 A total of 29 bird species were observed during the surveys, representing species typical of sub-urban areas and farmland. Some relatively common species were also found in surprisingly low numbers (chaffinch *Fringilla coelebs* and dunnoek *Prunella modularis*), although the reasons for this are unclear.
- 5.23 The pasture was used as a foraging area for starlings (*Sturnus vulgaris*), especially during July when a number of juvenile birds were noted at the site. Although starlings are now considered threatened and are now Red Listed and a conservation priority, the availability of playing fields and agricultural fields nearby should provide alternative feeding areas if development is carried out at the site.
- 5.24 A small number of house sparrows (*Passer domesticus*) was also found to be present on the site and, like the starling, are Red Listed due to an historical decline in numbers. The loss of the horse paddocks may reduce the number of available seeds for this species in the immediate area, though there is suitable habitat nearby.
- 5.25 The only other Red Listed species found during the surveys was a single song thrush (*Turdus philomelos*). This species has declined seriously in numbers, especially on

farmland (RSPB, 2011). Given that numbers of song thrushes are showing smaller declines in gardens than on farmland it is unlikely that any future development will negatively affect this species to a great extent.

- 5.26 A number of swallows (*Hirundo rustica*) and house martins (*Delichon urbica*) were observed feeding above the site. Both of these are Amber Listed as species of conservation concern. It is possible that the loss of the paddocks could remove a foraging area for these species. New nest sites should be created by the provision of a number of nest boxes or locations in suitable areas.
- 5.27 Other notable birds present on site included green woodpecker (*Picus viridis*), whitethroat (*Sylvia communis*) and bullfinch (*Pyrrhula pyrrhula*). Green woodpecker numbers have declined in the last few decades and, as a result, the species is Amber Listed. Green woodpeckers are typically found in areas that have an abundance of ants. Ant nests were observed within areas of short turf within the site boundaries and are likely to provide a foraging resource for this species. As only one individual bird was seen during any one visit it is not possible to determine whether green woodpeckers are breeding on the site. It is considered unlikely that green woodpecker populations are likely to be detrimentally effected by the development at the landscape scale as adjacent gardens and playing fields provide some suitable habitat for this species, with optimal habitat areas present within the wider countryside.
- 5.28 A singing male whitethroat indicated the possibility of a mating pair utilising the eastern hedge in the southern field (H2). The mature, scrubby nature of the hedgerows provides an ideal habitat for this species. Given that this species along with many other farmland birds is in decline (Amber List) it will be necessary to ensure that this length of hedgerow has a buffer (large garden) between it and any proposed development.
- 5.29 A pair of bullfinches was recorded during one of the surveys. This formerly Red Listed species is now currently Amber Listed as there has been some evidence of and a recovery in recent years. Providing the hedgerows are retained, this species should be not be threatened by any development and planting of native garden shrubs and trees (e.g. ash *Fraxinus excelsior* and birch *Betula sp.*) within the site landscape plan may increase food resources for this species.
- 5.30 In the north-west corner of the southern field is an area of scrub dominated by willow (*Salix caprea*) that appeared to be favoured by several species such as blackcaps (*Sylvia atricapilla*) and green woodpeckers. Efforts should be made to retain all or part of this area within the development plans. If this is not available then willow trees should be planted in a clump on site to mitigate for the loss of this habitat.
- 5.31 The development can enhance nesting opportunities for a range of bird species including house sparrows and starlings. These nest sites can be designed into buildings in appropriate locations to increase the available nesting habitat. Both these bird species have been shown to forage on short turf associated with residential lawns and therefore larger gardens should be pin-pointed for nearby nesting locations.
- 5.32 Nesting opportunities for swallows to mitigate for the loss of the stable areas should be constructed. These can be incorporated into car ports or garages through small openings to allow direct flight access. The openings should measure approximately 300mm X 150mm and allow access into a ridged roof building. Swallows tend to roost up against wooden beams but are known to roost against metal and masonry. They are faithful to their sites. Buildings on site should not be demolished during the swallow nesting season that can run from April – October inclusive.

- 5.33 Landscaping on site should seek to incorporate native species planting to encourage a range of bird species to the site. The details of the site scale enhancements should be detailed in a Biodiversity Enhancement and Management Plan and this should include the considerate management of the open space areas.

Reptiles

- 5.34 The surveys confirmed the presence of slow-worm (*Anguis fragilis*) within the proposed development site. Reptiles were found in three areas of hedgerow and scrub habitat at the borders of the site boundaries (H1, H3 and the junction of H4 and H5). However, due to the suitability of other connected habitat areas elsewhere within the site boundaries, it cannot be assumed that reptiles are absent from other areas of similar habitat surrounding the extent of the site. However, the majority of the site consists of short-sward, horse-grazed grassland of low suitability for reptiles and therefore the most suitable areas for reptiles are boundary areas, hedgerow bases and bramble patches against hedgerows.
- 5.35 The site contains approximately 0.25ha of reptile habitat. The current site proposals illustrate indicative landscaping which could potentially reduce scrub habitat at the north-west corner of the southernmost field and result in a net loss of habitat at the site scale. The site is connected to the wider landscape of agricultural fields through a network of hedgerows, allowing reptiles to access habitat in surrounding areas. Consequently, in the absence of appropriate mitigation, loss of, fragmentation of, or damage to hedgerow habitat on-site as a result of the proposed development and associated landscaping could potentially isolate the on-site reptile population and prevent their dispersal to the wider countryside. In the absence of appropriate reptile mitigation measures, the proposed development and associated landscaping would risk contravening current legislation protecting these species from harm and injury.
- 5.36 Measures required to mitigate the impact of the proposed development on reptiles and avoid contravention of current protected species legislation are presented in **Section 6.0**.

Dormice

- 5.37 The results of the surveys suggest that dormice are unlikely to be present within the proposed development site. Although historical records do exist for dormice within the 10km grid square SZ79 that contains the development site, it is unlikely that the species is present in the hedgerows on site and, if still present on Hayling Island, it is more likely that it is present in the woodland to the east of the site. Consequently the proposed development presents a 'low' risk to this species. If dormice are present on the island in the woodland to the east then a breeding population would be relatively isolated there due to the sub-optimal connectivity to the development site.
- 5.38 The access provision for the development within the southern field involves the removal of an approximately 5-8m section of hedgerow H5 which forms the southern boundary of the northern field. Whilst connectivity and structural diversity of the small hedgerow section that will be affected is relatively poor and unlikely to support dormice, it is possible that dormice may use this hedgerow as a commuting corridor between woodland patches and would be prevented from doing so if the development reduced connectivity of hedgerow habitats on site with the wider countryside. It will be therefore be necessary to incorporate appropriate enhancement measures to maintain habitat connectivity between the site and the wider landscape and to employ a precautionary

approach to the removal of the section of hedgerow for the proposed access road. As this hedgerow has been assessed as 'important' under the Hedgerow Regulations 1997, permission in the form of a Hedgerow Removal Notice will be required from the Local Planning Authority in advance of the removal of any sections of this hedgerow.

- 5.39 Planting of trees with a wide canopy, like oak, at each side of the road cutting through the hedgerow would offer future habitat connectivity for arboreal species like dormice.

6.0 Requirements and Recommendations

Measures Required to Mitigate Against the Effects of the Proposed Development Hedgerows, trees and dormice

- 6.1 Approval by the Local Planning Authority in the form of a Hedgerow Removal Notice must be granted prior to any removal works on any hedgerows on site.
- 6.2 Loss of any section of BAP hedgerow must be mitigated for by the planting of a similar area (at least) of new native species hedgerow.
- 6.3 Dormice were not recorded using the site, however, a precautionary approach will be taken as best practice.
- 6.4 The recommended approach for removing any sections of hedgerow would be to undertake any necessary cutting of the section of hedgerow to a height of 450mm, using hand-tools. The cutting must be completed during the winter months to avoid the dormouse breeding season and impacting on nesting birds. Root and stump removal and the use of heavy machinery will be avoided between November and May as this can kill dormice hibernating at ground level. Heavy machinery can then be used and roots and stumps removed between May and November. The removal of the section of hedgerow for access will be supervised by an ecologist. In the unlikely event that a dormouse is encountered during the removal of the hedgerow section, all works will ease immediately until an ecologist has reviewed the impacts of the proposals and assessed the need for a European Protected Species licence, accordingly.
- 6.5 All other retained hedgerows and associated trees will be protected during and post-development to avoid loss of connectivity to the wider countryside. This will mean a stand-off zone of at least 2m between the hedgerow base and construction activity, unless an arboriculturalists report asks for further protection measures (eg. Crown radius protection) or unless this advice conflicts with the reptile protection areas (see below). The use of fencing (e.g. Heras or similar) should be used to mark a clear boundary between the hedgerows and buffer areas and the rest of the construction site during the construction phase of the development.
- 6.6 A vegetative buffer of 1m will be retained at the borders of the site within the development. Hedgerow gaps will be planted with native hedgerow species including hazel (*Corylus avellana*) to increase structural diversity and increase the availability of food resources for dormice. Areas of proposed additional hedgerow planting will be incorporated in the proposals to mitigate for the loss of the approximately 10m section for access. Hedgerow planting will consist of native species planting (an indicative list is provided in **Appendix K**) and will link directly with existing hedgerow to ensure that

connectivity is maintained with the wider landscape, particularly with wooded areas to the east.

- 6.7 Once the section of hedgerow at H5 has been removed for the access road, a native, broad-leaved tree with a spreading canopy (e.g. English oak *Quercus robur*) will be planted at the end of the hedgerow, at either side of the access road. These trees, in time, will establish and create a 'green-link' over the access road, through overlapping canopies – suitable for arboreal species as well as maintaining connectivity for others. The trees should be managed to allow the canopies to spread and overlap.
- 6.8 The area of willow being removed will be mitigated for by the planting of a new area of willow trees on site, in a garden or open space area (**Appendix M**).
- 6.9 In order to maintain hedgerows in a suitable condition suitable, intensive management should be avoided. Hedgerows will be managed on a rotational basis ensuring that no more than one-third of each hedgerow is managed in any one year. This management will be detailed in a Biodiversity Enhancement and Management Plan.

Bats

Precautionary approach for potential roosts

- 6.10 The mature Oak trees (*Quercus sp.*) bordering the site will be retained and protected during the development. No lighting will be installed near to or directed onto the retained trees.
- 6.11 Demolition of the buildings on site will take place under a watching brief by a suitably trained and licensed ecologist in case any bats are subsequently found. If any bats are found then Natural England will be contacted for further advice to determine the need for a European Protected Species licence.

Maintain and enhance foraging habitat and habitat connectivity

- 6.12 No bat roosts were recorded within the proposed development site boundary therefore a Natural England licence is not required. However, bats were recorded using the site for foraging the development should seek to provide additional roosting opportunities for bats within the area.
- 6.13 The retention and enhancement of the majority of ecologically important hedgerows, with associated mature trees and a vegetative buffer will benefit foraging bats by increasing invertebrate species diversity at the site boundaries. These areas will be enhanced through the planting of native tree, shrub and forb species (suggested species are included in **Appendix K** however this will need to be detailed in a Habitat Enhancement and Management Plan) to mimic woodland edge conditions.
- 6.14 The landscape proposals will maintain and enhance border vegetation, where possible, at the site boundaries. The protection and enhancement of these areas will ensure connectivity with the wider countryside and protection of foraging areas., provide foraging cover and enhance invertebrate prey diversity.
- 6.15 Artificial lighting will be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible and must avoid being directed at retained and enhanced areas of vegetation. Lighting will incorporate shields and/or hoods to avoid illumination of wide areas and will not exceed 2000 lumens (150W). Movement sensors and timers will be fitted to security lights to reduce the amount of time areas are

illuminated for and security lighting on residential properties will consist of porch lighting where possible. Lighting will not be directed onto the hedgerows, mature oak trees, ditches or any of the new bat roosts to be installed/created.

Bat roost creation

- 6.16 A total of 9No. Schwegler woodcrete bat boxes (a mixture of 1FD, 1FF and 1FS; **Appendix J**) will be erected in suitable mature trees within the site boundaries prior to the commencement of site clearance and building construction. The boxes must be fitted in accordance with the manufacturer's instructions. Indicative locations are illustrated in **Appendix I**.
- 6.17 In excess of the guidelines set out in *Biodiversity Positive: Eco-towns biodiversity worksheet* (Town and Country Planning Association, 2009), the proposals will include provisions to enhance roosting habitat at the site scale for a range of bat species. A minimum of one in five new buildings will incorporate features for crevice-dwelling bats (such as pipistrelles). Such features will include gaps in soffit boxes, specialised bat tiles (**Appendix J**) and integrated bat roost boxes.
- 6.18 In line with the guidance above, the proposed development will incorporate the following:
- A total of 6No. new dwellings will incorporate access suitable for serotine bats (*Eptesicus serotinus*). Access will consist of a series of a 25mm² gap at the top of the gable-end brick walls or a similar size gap under fascia boarding leading to the area at the top of a cavity wall. These roosting points will be adjacent to areas of open green space and woodland edge planting, allowing serotines to emerge into an area of suitable foraging habitat in the larger gardens proposed on site. Indicative locations of the access points are illustrated in **Appendix I**.
 - A total of 20No. new residential dwellings in close proximity to boundary hedgerows and ditches will incorporate roosting features suitable for crevice dwelling bats. Roosting features will consist of 5No. Schwegler 1FR bat tubes, 5No. Schwegler 2FR bat tubes, and 10No. bat access slates (e.g. Morris slate – **Appendix I**) or similarly suitable crevice roosting points. Bat boxes are illustrated in **Appendix J**.

Birds

- 6.19 in order to avoid contravention of protected species legislation, vegetation and building removal will not be undertaken during bird nesting season (1st March until 01st August, 1st October for swallows (*Hirundo rustica*)) unless prior inspection by an ecologist concludes that there are no nesting birds present. If the presence of nesting birds is confirmed, any works which may disturb them will be delayed until the young birds have fledged the nest of their own accord.
- 6.20 Hedgerows will be protected, where possible, as outlined above. They will be retained within the development landscape plan and enhanced through supplementary native planting where possible.
- 6.21 Landscaping on site should seek to incorporate native species planting to encourage a range of bird species to the site – these will include species with fruit and berries suitable for bullfinches etc. Birds such as starlings and green woodpecker would benefit from provision of significant areas of lawn/grass within the development plans. The details of

the site scale enhancements should be detailed in a Biodiversity Enhancement and Management Plan and this should include the considerate management of the open space areas.

- 6.22 The ditch will be cleared and access will be created to it so that there are opportunities for species like little egrets. Suitable flight space will be created into the cleared ditch. This cleared ditch will be present towards the middle of the hedgerow dividing the two fields.

Nesting areas

- 6.23 Nest sites for house sparrows and starlings will be designed into buildings in appropriate locations to increase the available nesting habitat for these species. Four sparrow terraces and four starling boxes will be incorporated into new housing on site, in suitable locations and detailed in a Habitat Enhancement and Management Plan.
- 6.24 Nesting opportunities for swallows to mitigate for the loss of the stable areas will be constructed. These can be incorporated into car ports or garages through small openings to allow direct flight access. The openings will measure approximately 300mm X 150mm and allow access into a ridged roof building. Swallows tend to roost up against wooden beams but are known to roost against metal and masonry. Two suitable nesting sites for swallows will be created with the proposals.

Reptiles

- 6.25 The majority of the site is currently heavily grazed by horses thus rendering it sub-optimal for reptiles. Therefore, provided boundary vegetation and associated base-level vegetation is retained within the development proposals, a translocation is not considered necessary and the following measures will ensure any reptiles present on site are not harmed during the development process. Mitigation measures and are illustrated in **Appendix H**.
- 6.26 Reptile mitigation will consist of the following measures:
- An enhanced reptile and conservation area;
 - Habitat creation and enhancement; and
 - Long-term habitat management.

The measures are discussed in further details below and illustrated on the Annotated Reptile Mitigation Overview Plan in **Appendix H**.

- 6.27 An area of existing hedgerow, at the side of the development site will be retained and enhanced to act as a reptile conservation area, and be managed considerably as a conservation area in the long-term for reptiles and biodiversity in general.
- 6.28 A 1m buffer of marginal vegetation between the hedgerow bases and the short-sward grassland will be retained around the site boundary. In addition, an area of marginal vegetation/taller grass at the north-west corner of the southern field within the proposed development boundary will be created. This will be approximately 4m from the hedge boundary and contain enhancement measures for reptiles.
- 6.29 Enhancement measures will include the provision of seven reptile hibernacula, one on each hedgerow on site. This will consist of a 0.75m x 0.75m wide x 0.5m deep pit dug in to the ground, filled with a base layer of gravel for drainage, followed by a layer of rubble, topped with brash and grass cuttings and capped with turf, leaving small holes

where reptiles can gain access to the hibernacula (see **Appendix H**). Also a minimum of seven (one on each hedgerow) brash/log piles at hedgerow bases will be created under supervision of a suitably experienced ecologist. The vegetation will be allowed to develop as this will provide shelter and foraging opportunities for reptiles and connectivity to the wider landscape.

- 6.30 Following the creation of the 1m buffer, all areas of grassland/ruderal vegetation outside the prescribed vegetation buffer detailed above will be strimmed to a height of <20mm and arisings removed from site. This will ensure the habitat remains sub-optimal for reptiles thus preventing colonisation during the construction phase.
- 6.31 Grass / ruderal areas will be maintained at <20mm with a 1m vegetation buffer until the commencement of development works. An alternative option to maintaining the short sward would be to undertake a topsoil strip of the grass / paddock areas outside the vegetative buffer. The topsoil strip will be supervised by a suitably qualified ecologist. Any individual reptiles found during the soil strip will be moved by the ecologist to areas of suitable habitat outside the development boundary. Should a large population of reptiles be found during the soil strip, work will stop immediately and the need for a reptile translocation exercise assessed accordingly.
- 6.32 It is recommended that the horses remain on-site for as long as possible prior to development as their presence will help maintain the sward-height at a sub-optimal level for reptiles. However, if this is not possible, continued strimming and /or mowing or topsoil stripping will be necessary to maintain sward-height at <20mm until development is ready to commence.
- 6.33 Any vegetation cleared as part of the development will be used to create brash and compost piles for reptile foraging and shelter at the bases of hedgerows and border vegetation.
- 6.34 Reptiles have an affinity for sheltering under piles of rubble. Therefore all demolition materials will either be removed from site immediately, stored on raised pallets or on areas of hard standing at least 5m from grassed areas / hedgerow.
- 6.35 All construction materials will be stored on pallets on areas of hard standing at least 5m from grassed areas / hedgerow.
- 6.36 Reptile hibernacula (see **Appendix G** for specifications) and brash/log piles will be constructed at intervals along the hedgerow bases and areas of dense planting (illustrated in **Appendix F**) to increase foraging, egg-laying and refuge habitat. These can be a range of different sizes to add to the diversity for reptiles.
- 6.37 Two purpose built under-road reptile hibernacula/crossing points will be constructed under the footpaths on the eastern side of the site (design illustrated in **Appendix G**; indicative location depicted in **Appendix H**) to facilitate reptile dispersal. This will maximise connectivity between areas of habitat within the site boundaries managed for wildlife and the wider landscape.
- 6.38 Gaps of approximately 10cm will be incorporated beneath border fencing to facilitate the movement of reptiles and other wildlife (hedgehogs) between the site and areas of suitable habitat within the wider landscape.
- 6.39 Planting schemes within residential gardens will include areas of dense planting and a high proportion of native shrubs, forbs and herbs within border planting. Gardens will be encouraged to have compost areas – these are of benefit to reptiles.

- 6.40 The proposed bridge facilitating vehicular access over the ditch dividing the north and south fields will ensure a minimum of 0.5m wide riparian habitat buffer on either side of the stream to allow reptiles to disperse along the stream boundaries.
- 6.41 Whilst it is recognised that the management of residential gardens cannot be controlled, an appropriate management scheme for habitats and plants in communal areas will be adopted – a detailed Biodiversity Enhancing Landscape scheme or Habitat Enhancement and Management Plan could be conditioned to ensure site design is suitable for reptiles. The use of inorganic fertilizers, herbicides and pesticides will be avoided in communal areas. A relaxed cutting regime for shrubs, hedges and grassland will help to re-create a more natural habitat structure for a range of wildlife species to shelter and forage. A relaxed cutting regime of shrubs, hedges and grassland will encourage flower and seed production and species diversity in grassland swards. Maintenance of shrubs and hedges should be carried out in late winter to avoid disturbance to nesting birds.
- 6.42 Management of non-residential areas will maintain a 1m grassland buffer between any hedgerow bases and areas of mown or amenity grassland. The grassland buffer will be cut once or twice a year using hand-held tools (strimmer, brushcutter, etc.) and be left uncut over the winter period to encourage structural diversity of the sward height. These hedgerow and grassland buffers will facilitate the movement of reptiles and other wildlife around the development site to disperse into areas within the site managed for wildlife (attenuation/detention basins), around the perimeter of the development site, allow dispersal to residential gardens both on-site and adjacent to the site boundaries, and facilitate dispersal to and from areas of suitable habitat within the wider landscape.

Other Species

- 6.43 The mitigation measures above must be carried out in conjunction with the additional mitigation measures contained in Section 6.0, of the *Extended Phase 1 Ecological Assessment* (PV Ecology, August 2012).

Further Measures Recommended to Mitigate against the Effects of the Proposed Development

Biodiversity Enhancement

- 6.44 In accordance with the Natural Environment and Rural Communities Act (2006) and Planning Policy Statement 9 (PPS9) (ODPM, 2005) the master planning process should seek to incorporate measures to further the conservation of protected species and biodiversity in general.
- 6.45 Please refer to Section 6.0, of the *Extended Phase 1 Ecological Assessment* (PV Ecology, August 2012) for further measures recommended to further enhance biodiversity at the site scale.

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Appendices

Appendix A: Site Location Plan and Site Aerial

Figure 1: Site location plan. Promap Ordnance Survey 1:10000; Licence number 100020449. = Site extent.

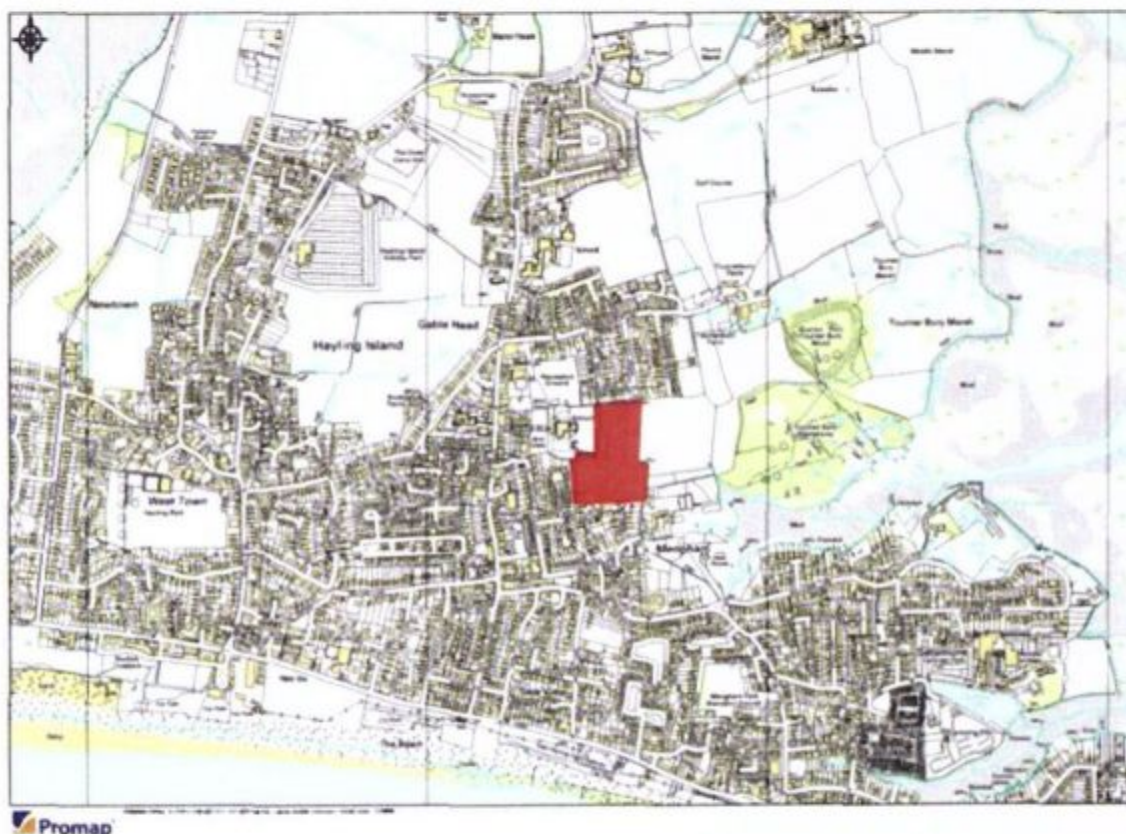


Figure 2: Aerial Photograph of the Site depicting site boundary



Appendix B: Development Proposals Plan



Appendix C: Hedgerow Locations and Survey Sections



Hedgerow number	Survey point	Grid reference at mid-point
H1	H1(i)	SZ 72613 99632
	H1(ii)	SZ 72610 99549
H2	H2(i)	SZ 72639 99477
H3	H3(i)	SZ 72500 99403
	H3(ii)	SZ 72601 99409
H4	H4(i)	SZ 72436 99421
H5	H5(i)	SZ 72600 99516
	H5(ii)	SZ 72473 99534
H6	H6(i)	SZ 72499 99642
	H6(ii)	SZ 72497 99571
H7	H7(i)	SZ 72549 99684

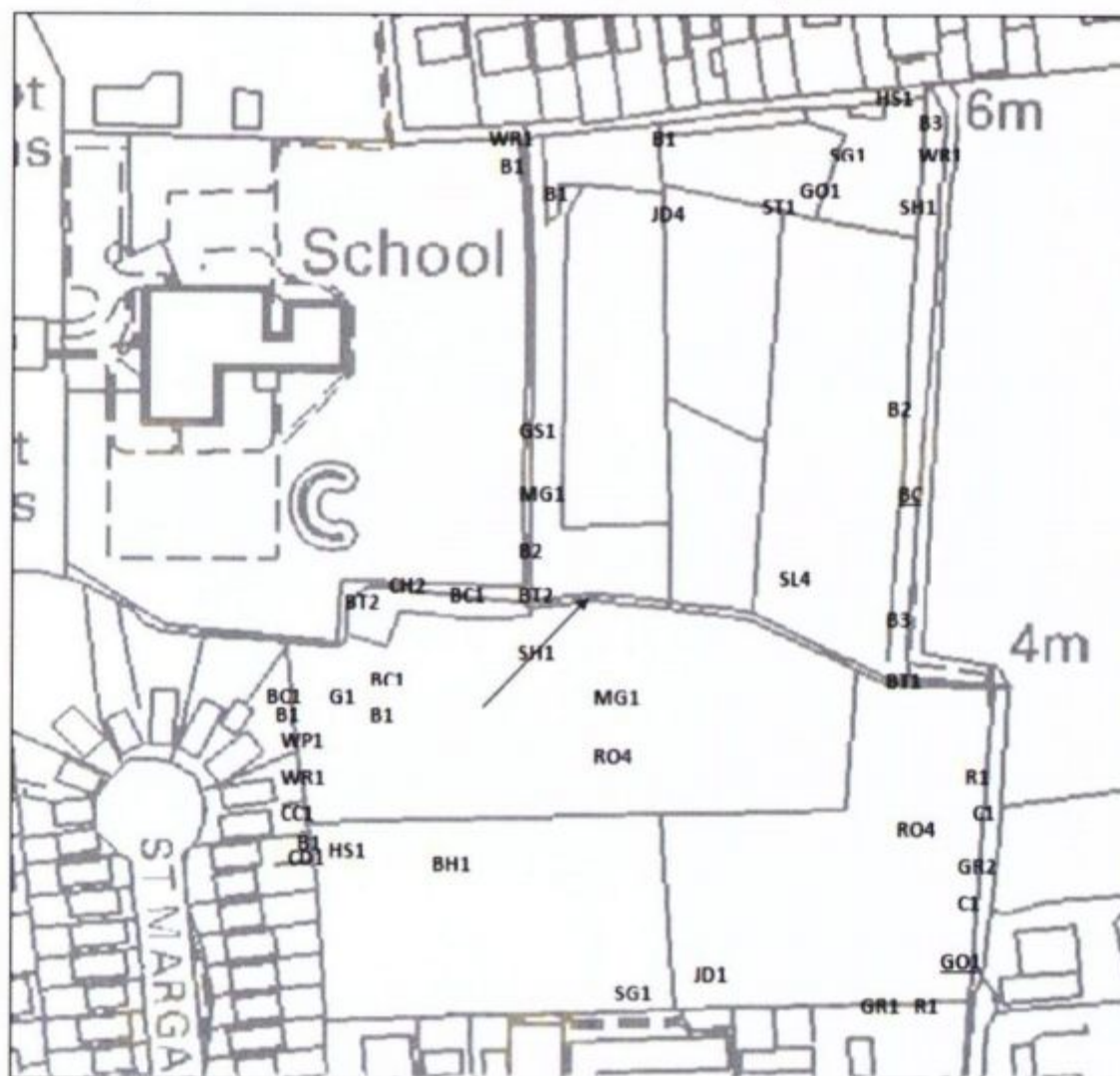
Appendix D: Bat Activity Location Plan



-  Survey 3 (09.09.11)
-  Survey 2 (11.08.11)
-  Survey 1 (29.06.11)
-  Site Boundary

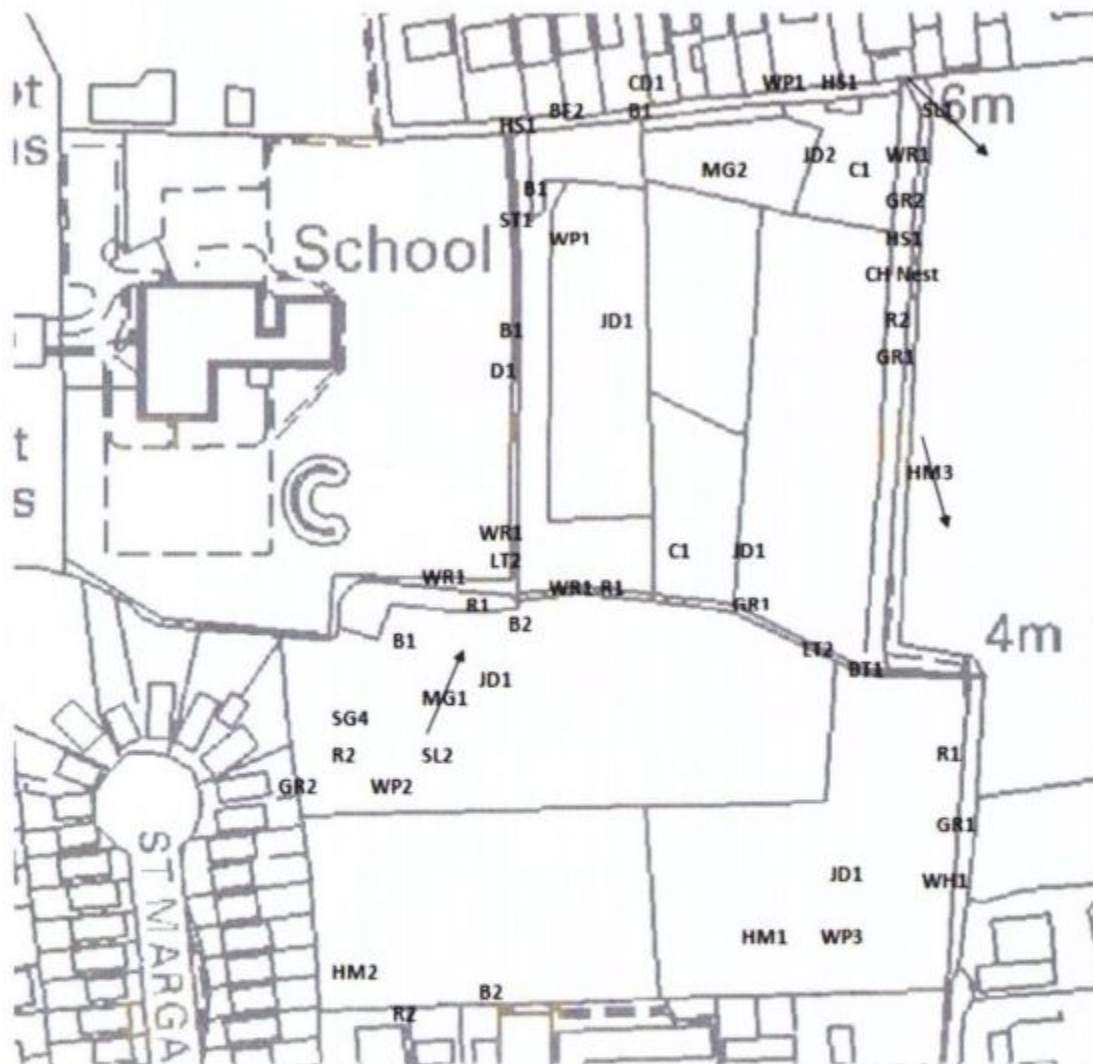
Appendix E: Bird Activity Location Plan

5.1 Survey One: 22/04/2011 9.10-10.30 Weather- fine conditions, light wind



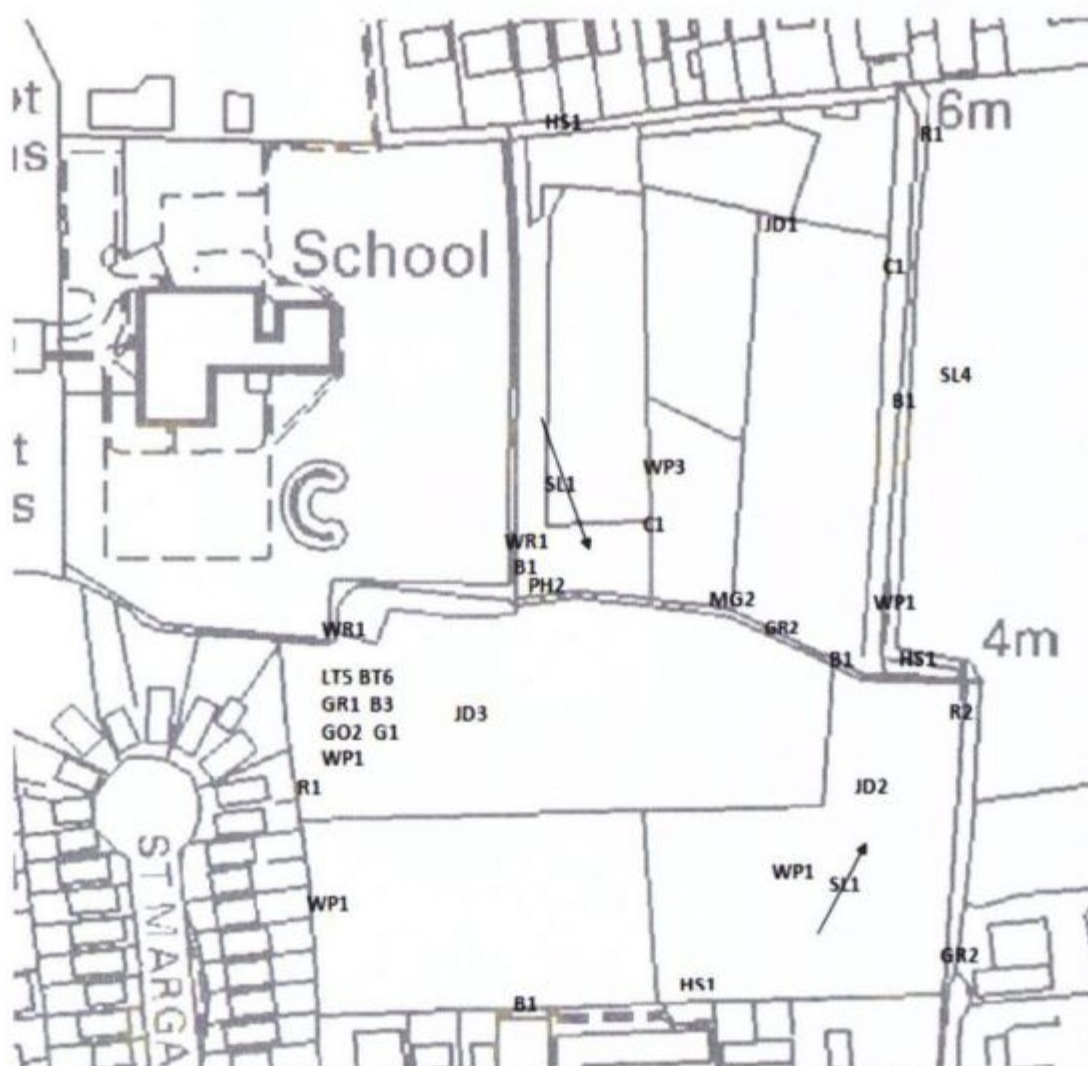
Code	Species	Code	Species	Code	Species	Code	Species	Code	Species
B	Blackbird	CH	Chaffinch	G	Green Woodpecker	MG	Magpie	ST	Song Thrush
BC	Blackcap	CC	Chiff-chaff	GR	Greenfinch	PH	Pheasant	WH	Whitethroat
BH	Black-headed Gull	CD	Collard Dove	HM	House Martin	R	Robin	WP	Wood Pigeon
BT	Blue Tit	D	Dunnock	HS	House Sparrow	SH	Sparrowhawk	WR	Wren
BF	Bullfinch	GO	Goldfinch	JD	Jackdaw	ST	Starling	RO	Rook
C	Carrian Crow	GS	S. Woodpecker	LT	Long-tailed Tit	SW	Swallow		

5.2 Survey two: 14/05/2011 10.30-11.45 Weather-dry fine conditions, light wind

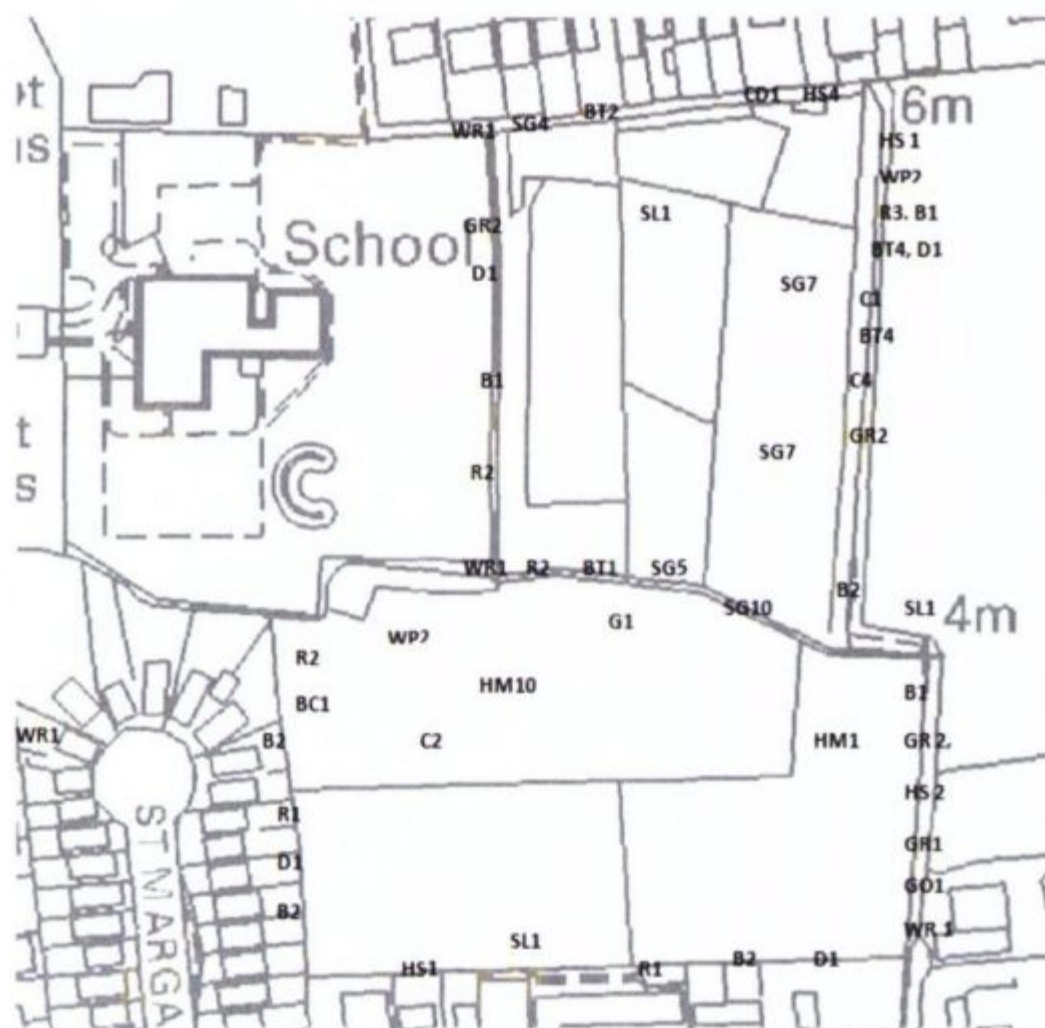


Code	Species	Code	Species	Code	Species	Code	Species	Code	Species
B	Blackbird	CH	Chaffinch	G	Green Woodpecker	MG	Maggie	ST	Song Thrush
BC	Blackcap	CC	Chiff-chaff	GR	Greenfinch	PH	Pheasant	WH	Whitethroat
BH	Black-headed Gull	CD	Collard Dove	HM	House Martin	R	Robin	WP	Wood Pigeon
BT	Blue Tit	D	Dunnock	HS	House Sparrow	SH	Sparrowhawk	WR	Wren
BF	Bullfinch	GO	Goldfinch	JD	Jackdaw	SG	Starling		
C	Carrion Crow	GS	Great S. Woodpecker	LT	Long-tailed Tit	SW	Swallow		

5.3 Survey three: 27/05/11 9.45-11.10 Weather-fine conditions, fairly windy (4-5)



5.4 Survey four: 25/06/2011 10.05-11.25 Weather-fine, warm and moderate wind



Code	Species	Code	Species	Code	Species	Code	Species	Code	Species
B	Blackbird	CH	Chaffinch	G	Green Woodpecker	MG	Magpie	ST	Song Thrush
BC	Blackcap	CC	Chiff-chaff	GR	Greenfinch	PH	Pheasant	WH	Whitethroat
BH	Black-headed Gull	CD	Collard Dove	HM	House Martin	R	Robin	WP	Wood Pigeon
BT	Blue Tit	D	Dunnock	HS	House Sparrow	SH	Sparrowhawk	WR	Wren
BF	Bullfinch	GO	Goldfinch	JD	Jackdaw	SG	Starling		
C	Carriion Crow	GS	Great S.Woodpecker	LT	Long-tailed Tit	SW	Swallow		

Appendix F: Reptile Refugia Location Plan



Appendix G: Dormouse Tube Location Plan



REPTILE HIBERNACULA



All UK native reptiles are protected under UK legislation and two of which are protected under European legislation. As such they are a material consideration under planning law.

Creating foraging and hibernation areas for reptiles can be simple and inexpensive to design and incorporate into a wide range of landscapes. Below are some simple instructions to provide reptiles with hibernation areas within your garden or development plans. The ideal location for your hibernacula is on a south-facing aspect on well-drained soil. The size and shape of the hibernacula can be varied slightly to fit different areas:

1. Dig a 2m x 2m pit in to the ground to a depth of 0.5m and stockpile the turf and soil;
2. Line the pit with sand, gravel and rubble to aid drainage (Fig 1);
3. Layer logs and thick braches in a non-uniform arrangement leaving plenty of gaps and holes (Fig 2);
4. Cover the logs with brash, branches, twigs and grass cuttings (Fig 3);
5. Cover over the brash with the soil from the excavation and top with turf, leaving small holes (approximately 15mm²) at ground level for reptiles to gain access (Fig 4)
6. Allow the vegetation to grow up around the hibernacula to provide plenty of cover and foraging habitat.

There are 6 different species of reptiles in the UK, each with different habitat requirements. Once we have established which reptile species are present, our expert team will be on hand to advise on every stage of your project from planning and timing to design and implementation.

Reptiles form an integral part of our ecosystem and are fascinating creatures. Incorporating reptile-friendly features into your design can enhance biodiversity, help safeguard our local wildlife, contribute towards Eco-homes credits, improve your chance of gaining planning permission and contribute towards community health and wellbeing.

To find out more about reptiles and planning contact us at info@pv-ecology.com or call our office on 01794 368698.



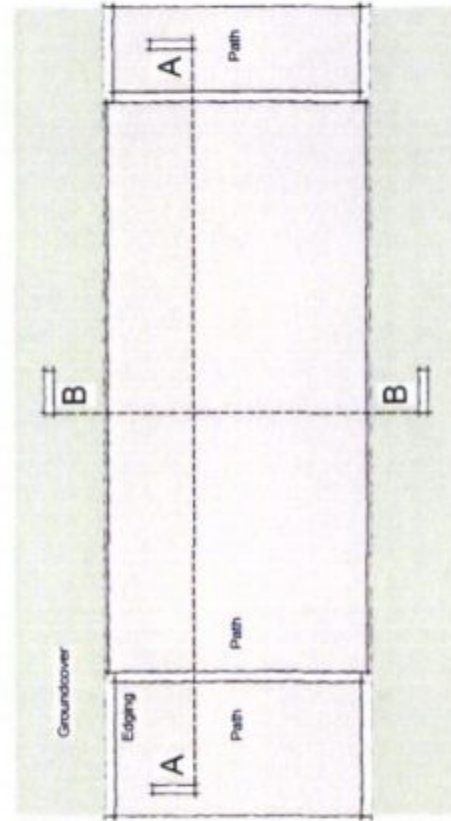
www.pv-ecology.com

info@pv-ecology.com

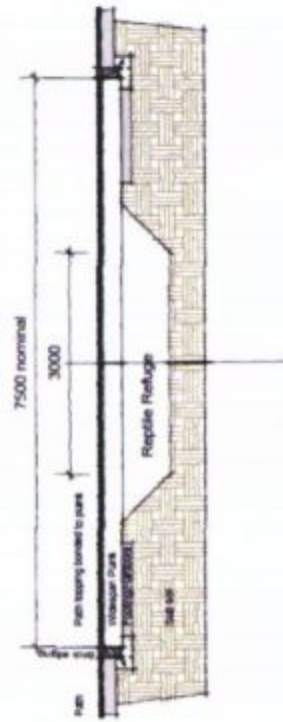
HAMPSHIRE 01794 368 698 • DORSET 01202 840405 • BERKSHIRE 01635 40184

Under-Road Reptile Hibernacula Design

Refuge to be layered with sand, gravel, rubble, logs and brush as per the Reptile Hibernacula Design above.



Plan of footpath



Section on A



Section on B

CLIENT: City of Sydney
PROJECT: Land off Northcote Lane, Northcote
DRAWING: Reptile Refuge
SCALE: 1:50 @ A3, 1:100 @ A4, 1:200 @ A5
DATE: July 13, 2011
#

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Appendix J: Bat Boxes and Bat Access Slates



Schwegler 1FD Bat Box



Schwegler 1FF Bat Box



Schwegler 1FS Bat Box



Schwegler 1FR Bat Tube

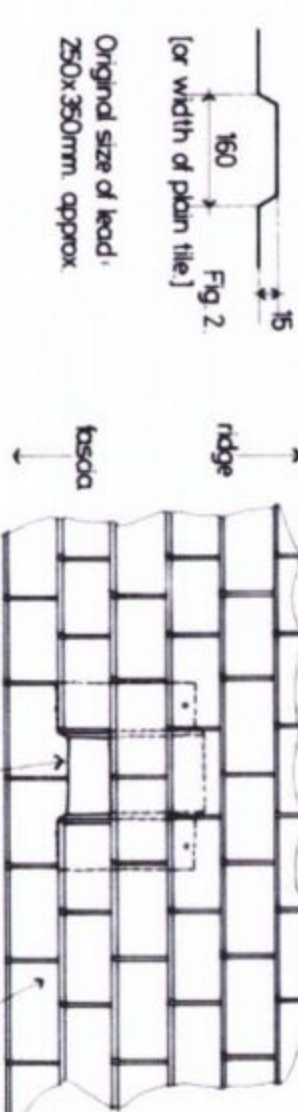
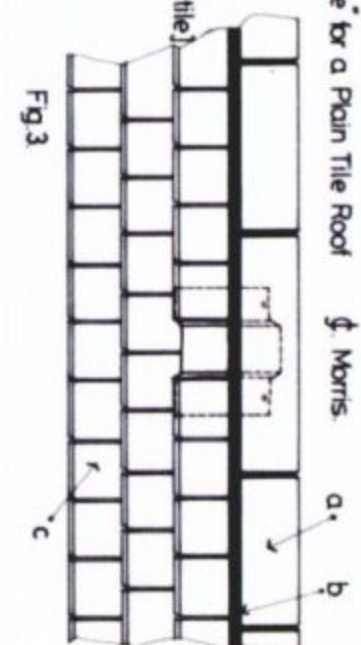
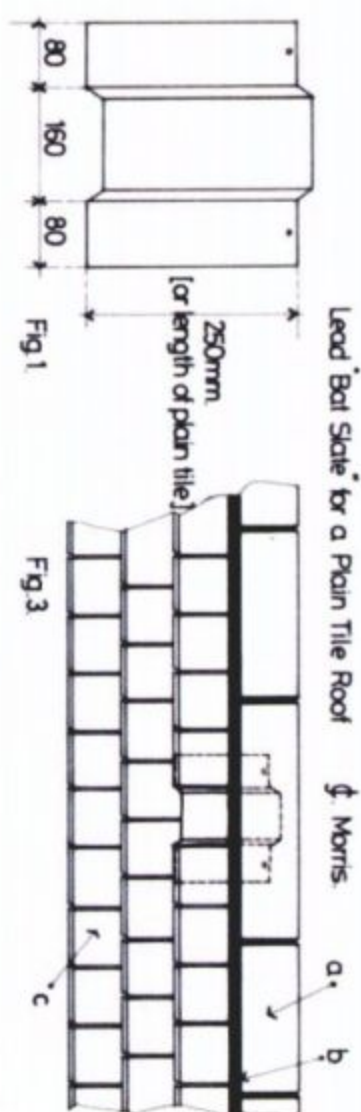


Schwegler 2FR Modular Bat Tube

Details of these can be found via the following links:

- www.alanaecology.com
- www.wildcareshop.com

Morris Bat Slate



No reproduction in any form without permission.

Bat Slat for a Profiled Tile Roof

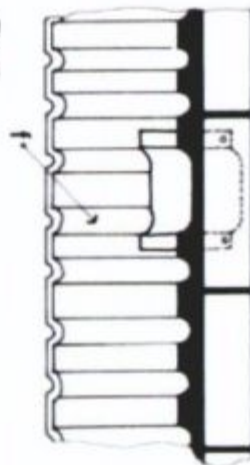


Fig 5

Bat Slat for a Slate Roof

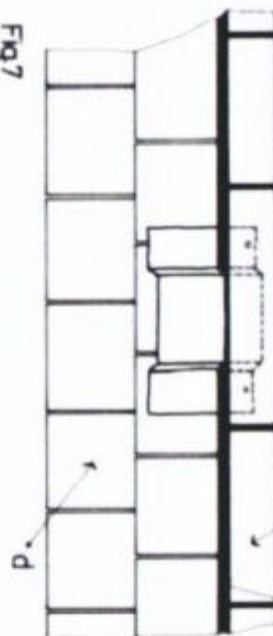


Fig 7

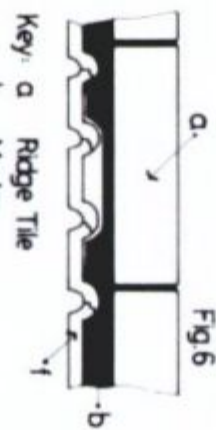


Fig 6

- Key:
- a Ridge Tile
 - b Mortar
 - c Plain Tile
 - d Slate
 - e Modified Ridge
 - f Profiled Tile

© Morris.

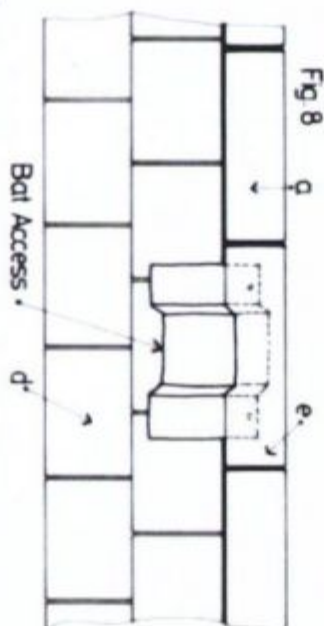


Fig 8

Bat Access



Fig 9. Batstones can be fitted in the middle of a slate roof but more lead and considerably more labour is involved.



Fig 10. To allow bats into the loft, a hole may be cut in the roofing felt. The hole needs to be cut adjacent a rafter or wall to enable the bats to crawl in and out.

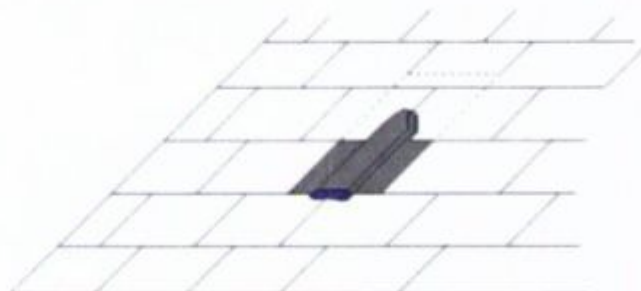


Fig 11. Steep pitched roofs

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Appendix K: Suggested Species Planting List for Woodland Edge Habitat

Common Name	Latin Name
Tree Layer	
Ash	<i>Fraxinus excelsior</i>
Beech	<i>Fagus sylvatica</i>
Crab apple	<i>Malus sylvestris</i>
Hazel	<i>Corylus avellana</i>
Holly	<i>Ilex aquifolium</i>
Oak	<i>Quercus robur</i>
Rowan	<i>Sorbus aucuparia</i>
Hornbeam	<i>Caprinus sp.</i>
Field Maple	<i>Acer campestre</i>
Shrub Layer	
Spindle	<i>Euonymus europaeus</i>
Dogrose	<i>Rosa canina</i>
Dogwood	<i>Cornus sanguinea</i>
Hawthorn	<i>Crataegus monogyna</i>
Blackthorn	<i>Prunus spinosa</i>
Base Layer	
Bugle	<i>Ajuga reptans</i>
Butcher's Broom	<i>Ruscus aculeatus</i>
Common Dog Violet	<i>Viola riviniana</i>
Devilsbit Scabious	<i>Succisa pratensis</i>
English Bluebell	<i>Hyacinthoides non-scripta</i>
Foxglove	<i>Digitalis purpurea</i>
Ground Ivy	<i>Glechoma hederacea</i>
Herb Robert	<i>Geranium robertianum</i>
Oxe-eye Daisy	<i>Leucanthemum vulgare</i>
Red Campion	<i>Silene dioica</i>
Stinking Hellebore	<i>Helleborus foetidus</i>
Wild Daffodil	<i>Narcissus pseudonarcissus</i>
Wood Anemone	<i>Anemone nemorosa</i>
Wood Betony	<i>Stachys officinalis</i>
Wood Sage	<i>Teucrium scorodonia</i>
Wood Vetch	<i>Vicia sylvatica</i>

Appendix L: Relevant Protected Species Legislation

Bats

These species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Conservation of Habitats and Species Regulations 2010*. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such animal;
- deliberately disturb any such animal, including in particular any disturbance which is likely:
 - to impair its ability to survive, breed, or rear or nurture their young;
 - to impair its ability to hibernate or migrate;
 - to affect significantly the local distribution or abundance of that species; or
- damage or destroy a breeding site or resting place of any such animal; or
- intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

- Greater horseshoe bat (*Rhinolophus ferrumequinum*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*);
- Bechstein's bat (*Myotis bechsteinii*);
- Barbastelle (*Barbastella barbastellus*);
- Greater mouse-eared bat (*Myotis myotis*).

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favorable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

Dormouse (*Muscardinus avellanarius*), European otter (*Lutra lutra*) and Great Crested Newt (*Triturus cristatus*)

These species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Conservation of Habitats and Species Regulations 2010*. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such animal;
- deliberately disturb any such animal, including in particular any disturbance which is likely:
 - to impair its ability to survive, breed, or rear or nurture their young;

- to impair its ability to hibernate or migrate.
- to affect significantly the local distribution or abundance of that species; or
- damage or destroy a breeding site or resting place of any such animal; or
- intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

Nationally Protected Species

Badger (*Meles meles*)

The *Protection of Badgers Act 1992* consolidates previous legislation (including the *Badgers Acts 1973 and 1991 Badgers (Further Protection) Act 1991*). It makes it a serious offence to:

- kill, injure or take a badger;
- attempt to kill, injure or take a badger; or
- to damage or interfere with a sett.

The 1992 Act defines a badger sett as "*any structure or place which displays signs indicating current use by a badger*".

Breeding Birds

With certain exceptions¹, all wild birds, their nests and eggs are protected by section 1 of the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 subject to various controls.

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- intentionally or recklessly disturb the dependent young of any such bird.

¹ Some species, such as game birds, are exempt in certain circumstances

Reptiles

The four widespread² species of reptile that are native to Britain, namely common or viviparous lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix helvetica*), are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally kill or injure any of these species.

Water vole (*Arvicola amphibius*)

The water vole is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and is afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally kill, injure, or take (handle) any a water vole (in England only);
- intentionally or recklessly damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection; or
- intentionally or recklessly disturb water voles while they are using such a place

² The other native species of British reptile (sand lizard and smooth snake) receive a higher level of protection under the *Habitats Regulations 1994* and (in England and Wales only) the *Wildlife and Countryside Act 1981* (as amended). However, the distribution of these species are restricted to only a very few sites. All marine turtles (*Cheloniidae* and *Dermochelyidae*) are also protected.

Appendix M: Biodiversity Mitigation and Enhancements

