



**LAND AT MAIDSTONE ROAD,  
MATFIELD**

**Protected Species Report**

**For and on behalf of**

**Rydon Homes**

**March 2017**

**CORYLUS ECOLOGY**

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**CONTENTS**

	Page Number
<b>1.0 Introduction</b>	<b>1</b>
<b>2.0 Methodology</b>	<b>3</b>
<b>3.0 Results</b>	<b>7</b>
<b>4.0 Evaluation and Predicted Impacts</b>	<b>12</b>
<b>5.0 Mitigation Strategy</b>	<b>20</b>
<b>6.0 Conclusions</b>	<b>25</b>

**References****Tables (within text)**

Table 1 – Evaluation of Reptile Population Status Based on Counts and Score Given

Table 2 – Index of probability

Table 3 - Peak Reptile Counts

Table 4 - Static Detector Bat Passes Per SMP and Overall Species Assemblage in July

Table 5 - Static Detector Passes Per SMP and Overall Species Assemblage in August

Table 6 - Static Detector Bat Passes Per SMP and Overall Species Assemblage in September

**Figures**

Figure 1 – Reptile and Bat Plan

Figure 2 – Dormouse Plan

Figure 3 – Dormouse and Reptile Mitigation Plan

**Appendices**

Appendix 1 – Reptile Survey Results

Appendix 2 – Dormouse Survey Results

Appendix 3 – Reptile Legislation

Appendix 4 – Dormouse Legislation

Appendix 5 – Bat Legislation

Appendix 6 – Bat Friendly Planting

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## 1.0 INTRODUCTION

- 1.1 Corylus Ecology has undertaken a number of specific protected species surveys to inform a planning application to develop land at Maidstone Road, Matfield, hereinafter referred to as 'the development Site'. These surveys are in relation to recommendations made in the Extended Phase 1 Habitat Survey Report (*Corylus Ecology, August 2016*), which identified potential habitat for reptiles, hazel dormouse *Muscardinus avellanarius* and bats. This report summarises the results of the surveys and includes recommendations for mitigation and compensation.

### *Overview*

#### *Reptiles*

- 1.2 During the initial Site assessment in June 2016 the south-eastern half of the development Site was identified to support optimal reptile habitat comprising tall rough grassland with areas of scattered scrub throughout. The base of the hedgerows and edge of the woodland shaw along the boundaries of the development Site provide good commuting and dispersal opportunities for reptiles. The dense scrub in the north-western half of the development Site are considered to be sub-optimal for reptiles, although the edges provide suitable basking sites with quick refuge opportunities.

#### *Dormice*

- 1.3 During a Site visit in April 2016, evidence considered likely to be from dormouse was found in the form of feeding remains, specifically a number of gnawed cherry stones, within the woodland shaw along the north-eastern boundary of the development Site. The hedgerow, treeline and woodland shaw along the boundaries of the development Site were identified as potential dormouse foraging, commuting and nest building habitat. The dense bramble in the north-western area of the development Site is good for dormouse nest building and offers an additional foraging resource. The bramble scrub extends beyond the north-western boundary of the development Site. The offsite woodland to the north-west of the development Site is considered to be sub-optimal as it largely comprises semi-mature ash with a sparse understorey, however the southern section of the woodland is more suitable supporting mature hazel and oak trees.

#### *Bats*

- 1.4 Habitat suitable for foraging and commuting bats was identified throughout the development Site and wider habitats and has been assessed as having 'Moderate' potential for bats under the Bat Conservation Trust guidelines (Collins, 2016). The tall, tussocky grassland, dense bramble and woodland edge provide opportunities for sustained foraging with the boundary features providing good linear features for commuting bats.

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1.5 The aims of the surveys were to:

- determine the presence/likely absence of reptiles on Site;
- determine the presence/likely absence of dormouse on Site;
- characterise the bat activity around the Site;
- evaluate the importance of any reptile, dormouse and bat populations on Site; and
- suggest appropriate mitigation and compensation where necessary.

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## 2.0 METHODOLOGY

### 2.1 Reptile Presence/likely Absence Surveys

- 2.1.1 A total of 22 heat traps were placed throughout the development Site in areas considered suitable for reptiles, this being the tall grassland and along the edges of the boundary features and dense scrub. The total size of the development Site is approximately 1.4ha. The standard survey guidance for reptiles (Froglife, 1999) recommends ten heat traps per hectare therefore the heat traps provided achieved a density of greater than 10 per ha. Heat traps consisted of heavy gauge green mineral roofing felt cut into approximately 0.7m x 1m rectangles which were placed generally following linear habitat margins and orientated to receive the maximum amount of sunshine.
- 2.1.2 There is some discrepancy regarding the number of surveys required for reptile surveys. The guidance from the Highways Agency Design Manual for Roads and Bridges (DMRB) Vol. 10 Section 4 Part 7 states that *'Estimating population sizes or densities with any degree of accuracy or reliability will always be problematic.....It will be necessary to sample a relatively large proportion of a resident population in order to estimate population sizes accurately and this will be most difficult for common lizards and slow-worms in particular. Given the large survey effort necessary for population estimates to be made for any species, this should be restricted to those situations where, on the basis of the magnitude of predicted impacts and the importance of the population it is clearly warranted.'* The Froglife guidance suggests that a minimum of 7 survey visits under favourable weather conditions are required, whilst the English Nature advice within the Species Conservation Handbook (1994 *et seq.*) states that *'it is difficult to get any reliable opinion of animals in a population in less than 5 to 10 visits'*.
- 2.1.3 Guidance from Froglife advises that, in relation to time of year, *"Reptiles are generally active from March to October, but the most profitable months for surveying tend to be April, May and September. The exact timing however will depend on temperature, rainfall and other climatic patterns"*. Froglife advise further in relation to time of day: *"For the best months indicated above, the best times to search are generally between 8.30am and 11.00am, and between 4.00pm and 6.30pm"*. Other productive times to check are overcast conditions with hazy sunshine, especially when weather conditions are warmer and during sunny conditions after rain. In this regard, further information regarding the time and conditions of each visit to check the heat traps were recorded.
- 2.1.4 For this survey, nine survey visits were undertaken, a decision made due to the habitat types present within this area and the predicted impacts.

#### *Reptile Evaluation Methodology*

- 2.1.5 Local Wildlife Sites (LWS) are sites of importance on a county level, (previously known as SINCS) and there are established criteria for their designation based on their reptile population. The criteria follow guidelines

established by Froglife in identifying Key Reptile Sites and the scoring system is explained in Table 1. The scoring system is based upon the maximum number of adult animals, excluding hatchlings or juveniles, seen under artificial refugia or by general observation by one person, in one day. This is assuming that the refugia are placed at minimum density of 10 per hectare.

<b>Species</b>	<b>Low Population Score 1</b>	<b>Good Population Score 2</b>	<b>Exceptional Population Score 3</b>
Adder	<5	5-10	>10
Grass Snake	<5	5-10	>10
Common Lizard	<5	5-20	>20
Slow Worm	<5	5-20	>20

*Table 1 – Evaluation of Reptile Population Status Based on Counts and Score Given*

2.1.6 A Key Reptile Site is identified when a site meets any of the following thresholds:

- Supports three or more reptile species; or
- Supports two snake species; or
- Supports an exceptional population of any one species; or
- Supports an assemblage of species scoring  $\geq 4$  points using the above system; or,
- Supports a population of adder scoring  $>1$ .

2.1.7 Any other species noted under the refugia were also recorded, principally any amphibian species in terrestrial phase.

## 2.2 Dormouse Surveys

2.2.1 The surveys followed the guidance from Natural England in the Dormouse Conservation Handbook 2<sup>nd</sup> edition (English Nature, 2006). A total of 22 tubes and 32 boxes were installed at approximately 10 metre intervals on the 7<sup>th</sup> of June 2016. They were installed throughout the boundaries of the development Site and along the hedgerow bordering the scrub and grassland. The dormouse survey was extended into the woodland and scrub areas to the north-west of the Site. The tubes and boxes were located in the areas with the best structure to maximise the probability of detecting any population which may be present. Figure 2 shows the locations of the tubes and boxes.

2.2.2 Surveys of the tubes were undertaken on 28<sup>th</sup> June, 2<sup>nd</sup> August, 7<sup>th</sup> September and 16<sup>th</sup> November 2016. The licenced dormouse surveyor was Helen Lucking (licence number 2016-22579-CLS-CLS).

- 2.2.3 Each tube or box was surveyed sequentially. Where a tube could be seen to be empty (i.e. without handling), no further check was made. Where the inside of the tube could not be easily seen, a material 'stuffer' was used to block the entrance and the end of the tube was then pushed back to inspect it for evidence of nesting material or an animal. When nesting material/leaves were found, the tube or box was removed and placed in a large plastic bag for detailed checking. Small plastic bags and 50g Pesola balances were used to weigh any animals found.
- 2.2.4 The same principle is used for boxes, however, due to the small entrance hole being on the reverse of the box, each one was "stuffed" and inspected by sliding across the plywood roof. If any evidence of nesting material was found, the box was removed, placed in a clear plastic sack and carefully inspected.
- 2.2.5 Each survey was carried out in suitable dry weather conditions. All boxes and tubes were checked within one day to ensure no animals found were double counted. The biometric data of any captured dormice or other mammal species, such as wood mouse *Apodemus sylvaticus* and yellow-necked mouse *Apodemus flavicollis*, were taken. Any birds' nests were also noted.

*Index of probability*

- 2.2.6 The Dormouse Conservation Handbook 2<sup>nd</sup> edition (English Nature, 2006) provides an index of probability for the presence, or otherwise, of dormice based on a minimum level of survey effort. A scoring system has been devised in which each month during the active period is given a score; a minimum score of 20 points needs to be reached in order to show reasonable survey effort has been made. The scores for the index of probability are shown below in Table 2:

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

Table 2 – Index of probability



2.2.7 Using fifty nest tubes as standard, and the index of probability table as a value for different months of surveying, a score can be devised as a guide to the thoroughness of a survey, with the aim of achieving 20 points (Chanin and Woods, 2003). Under this methodology, fifty tubes set out for a whole survey season would score 25 points (the sum of the indices for all 8 months), but 25 tubes left out during only April and May would score 2.5 (1+4, divided by 2 because only half as many tubes were installed). Although half of the total score is taken away when using half the standardised fifty tubes, the scoring cannot be 'doubled up' if 100 tubes are used.

## 2.3 Bat Surveys

### *Static Monitoring Surveys*

2.3.1 Wildlife Acoustic SM3/4 detectors were set at Static Monitoring Points (SMP's) with a total of two SMP locations in areas of the development Site which comprise habitat suitable for bats which will be lost to the proposals. The detectors were set out for five nights in July, August and September 2016. The location of the SMP's are shown on Figure 1

### *Bat Sound Analysis*

2.3.2 The sonograms were subsequently up-loaded onto Anlook software, analysed and compared to identification parameters given in Parsons and Jones 2000 and Russ, 1999 & 2013 and also compared with library recordings made by the surveyors. It should be noted that it is not always possible to identify each bat pass to species level due either to poor recordings of their echolocations or due to similarities between echolocations of bat species not allowing confidence of identification. It should also be noted that bats will vary their echolocation in different habitats and their calls may therefore not always resemble 'typical' echolocation calls. Where identification has not been possible suggestions of likely bat species have been provided.

### 3.0 RESULTS

#### 3.1 Reptile presence/likely absence survey

3.1.1 Common lizard *Zootoca vivipara* was recorded during the survey; Table 3 provides a summary of the number of adult and sub-adult animals recorded on each survey date; peak counts are shown in bold. The full data including juveniles recorded and weather conditions are included in Appendix 1. The locations where common lizard were recorded are shown on Figure 1.

Date	Common lizard
05/06/2016	3
09/06/2016	1
11/07/2016	1
03/08/2016	<b>6</b>
16/08/2016	0
06/09/2016	1
08/09/2016	1
21/09/2016	0
28/09/2016	1

*Table 3 - Peak Reptile Counts*

3.1.2 Adult and sub-adult common lizard were recorded on six of the nine surveys, with a peak count of six adult and sub-adults on 3<sup>rd</sup> August 2016. The peak count for common lizard equates to a 'Good' population under the Key Reptile Site Criteria and results in two points (see Table 1; Froglife 1999).

3.1.3 Juvenile common lizard were recorded on four of the nine surveys, with a peak count of three on 28<sup>th</sup> September 2016. These results confirm breeding within the local common lizard population in the 2016 season.

3.1.4 The adult, sub-adult and juvenile common lizard were recorded throughout the grassland in the south-eastern area of the development Site:

- In the north-east of the development Site, along the edge of the woodland shaw (mat 6, 7, 8, 9).
- Along the south-eastern boundary (mat 3).
- In the south, to the west of the access gate (mat 17).
- Along the north-western edge of the grassland (mat 14).
- In the central area of the grassland, under mat 21 and mat 18.

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*Incidental records*

- 3.1.5 High numbers of bank/field voles were seen during the course of the reptile surveys.
- 3.1.6 Evidence of badger in the form of latrines and mammal tracks were found in the development Site during the reptile surveys. The latrines were found near to the eastern, northern and western boundaries. Mammal tracks were noted running through the tall grassland and into the dense scrub in the north-western half of the development Site. No badger setts were found inside the development Site boundary during the survey.

**3.2 Dormouse Surveys**

- 3.2.1 No confirmed evidence of dormouse was found during the surveys in June and August. During the September survey empty dormouse nests were found in Tube 12 and Tube 14 in the hedgerow which forms the boundary between the scrub and grassland in the development Site. In Tube 7 along the edge of scrub in the wider survey area an active adult female dormouse was found with five young (pinks with eyes closed); the female ran out of the tube before any biometric information could be recorded. In box 18 an active non-breeding adult male dormouse was found; the male weighed 20.5g. In box 20 an active dormouse and dormouse nest was found, however the dormice escaped before the biometric information was taken. In box 21 an active adult female dormouse came out from the nest with at least four very young babies seen in the nest; the adult dormouse weighed 18g and was post-lactating and the young had eyes closed/beginning to open and orange fur developing but were not weighed or handled and were left within the nest. In box 23 an empty dormouse nest was found. In box 25 a dormouse nest containing an active male juvenile dormouse weighing 14.5g with testes scrotum was found.
- 3.2.2 During the November survey empty and old dormouse nests were found in tube 7 and tube 8 along the edge of the dense scrub in the wider survey area. In tube 9 in the cherry trees along the south-western boundary of the development Site a dormouse was seen running out of the tube. The same empty dormouse nests were found in tube 12 and tube 14. Empty dormouse nests were found in boxes 14, 16, 18, 20 and 21 within the woodland shaw along the north-eastern boundary. In box 23 along the north-eastern boundary, six active dormice were found and included: one adult post-lactating female weighing 27.5g, one non-breeding juvenile male weighing 11g, one male with just testes scrotum weighing 16g, one juvenile male weighing 12g and two non-breeding juvenile females both weighing 12g. Three of the animals had white tips to their tails.
- 3.2.3 Regarding other mammals recorded during the survey, evidence of *Apodemus* sp. was found tube 4, 6, 13, 16, 18, 19 and 20. In tube 22 in the cherry trees along the south-western boundary three wood mice were found and included: two non-breeding females weighing 15.5g and 18.5g and one non-breeding male weighing 17g. In box 25 along the north-eastern boundary an active male yellow necked mouse with testes scrotum and weighing 26.5g was found.

3.2.4 In tube 5 a pygmy shrew *Sorex minutus* was found; the pygmy shrew weighed 2.5g.

### 3.3 Bat Static Monitoring Surveys

*5<sup>th</sup> – 9<sup>th</sup> July*

3.3.1 A total of 288 bat passes were recorded with at least six bat species identified. Out of the six species listed in Table 4 below, all were recorded at SMP 2, whilst at SMP 1 only 45kHz pipistrelle, 55kHz pipistrelle and noctule were recorded.

Species	SMP1	SMP2	Total %
<b>45kHz pipistrelle</b>	65	187	87.5%
<b>55kHz pipistrelle</b>	10	7	5.9%
<b>Noctule</b>	2	7	3.1%
<b>Serotine</b>		6	2.1%
<b>Long-eared bat</b>		2	0.7%
<b><i>Myotis</i> species</b>		2	0.7%
<b>TOTAL</b>	<b>77</b>	<b>211</b>	

*Table 4 - Static Detector Bat Passes Per SMP and Overall Species Assemblage in July*

3.3.2 The most frequently recorded bat species was 45kHz pipistrelle bat contributing 87.5% of the total bat passes recorded in July. The second most commonly recorded bat was 55kHz pipistrelle, however this species only forms 5.9% of the species assemblage recorded in July. Noctule, long-eared bat, *Myotis* species and serotine were recorded in similarly low numbers.

3.3.3 Bat activity was significantly greater at SMP 2 than at SMP 1 with 73% of total bat passes recorded at SMP 2; this is largely by 45kHz pipistrelle with 74% of total passes. 45kHz pipistrelle was also the dominant bat species recorded at SMP 1 and on the first survey night was the only species recorded at this location. Additionally, on one of the survey nights there was just one 45kHz pipistrelle pass recorded at SMP 1 and on another occasion only two bat passes were recorded. Activity by 55kHz pipistrelle was somewhat equal between the two SMP locations. Activity by noctule was largely at SMP 2.

3.3.4 The earliest pass by a 45kHz pipistrelle was ten minutes after sunset at SMP 1. Early passes by 45kHz pipistrelle were recorded on three occasions at SMP 1 with passes ranging between ten and 22 minutes after sunset. There were no early passes by other bat species.

2<sup>nd</sup> – 6<sup>th</sup> August 2016

- 3.3.5 A total of 275 bat passes were recorded with at least five species of bat identified. All identified bat species listed in Table 5 below were recorded at SMP 1, however unidentified *Nyctalus* and *Pipistrellus* bat species were also recorded at SMP 2.

Species	SMP1	SMP2	Total %
<b>45kHz pipistrelle</b>	47	194	88.6%
<b>Noctule</b>	7	9	5.8%
<b>Serotine</b>	5	3	2.9%
<b>55kHz pipistrelle</b>	1	6	2.5%
<b><i>Myotis</i> species</b>	1		0.4%
<b><i>Nyctalus</i> species</b>		1	0.4%
<b><i>Pipistrellus</i> species</b>		1	0.4%
<b>TOTAL</b>	<b>61</b>	<b>214</b>	

Table 5 - Static Detector Passes Per SMP and Overall Species Assemblage in August

- 3.3.6 The most commonly recorded bat species was 45kHz pipistrelle (88%). Noctule was the second most frequently recorded species, however the total number of passes by this species is not significantly higher than the total number of passes by serotine or 55kHz pipistrelle in relation to the total number of passes by 45kHz pipistrelle (241) over the survey period. A single pass by *Myotis* species, *Nyctalus* species and *Pipistrellus* species was recorded over the survey period.
- 3.3.7 Similarly to July, bat activity was largely at SMP 2 with 78% of total bat passes recorded at this location. 45kHz pipistrelle bat accounts for 80% of total bat passes recorded at SMP 2; on one occasion this species was the only bat species recorded at SMP 2. Activity on SMP 1 was much less with only three passes by pipistrelle bats on the first night, and on the third night there was a total of three passes by pipistrelle bats and serotine.
- 3.3.8 There were early passes by 45kHz pipistrelle on three occasions at SMP 1; the earliest pass was recorded 31 minutes after sunset and the other two passes were recorded 32 minutes after sunset. There was an early pass by noctule on one of the survey nights, recorded 16 minutes after sunset. There were no early passes by other bat species.

13<sup>th</sup> – 17<sup>th</sup> September 2016

- 3.3.9 There was a total of 544 passes recorded in September, the highest level of bat activity recorded over the entire survey period. The greatest species diversity was also recorded in September with at least eight

confirmed species of bat identified. All bat species listed in Table 6 below were recorded at both SMP locations.

Species	SMP1	SMP2	Total %
45kHz pipistrelle	222	197	77
55kHz pipistrelle	33	27	11
Long-eared bat	14	3	3.1
Noctule	8	9	3.1
<i>Myotis</i> species	7	3	1.8
Nathusius' pipistrelle	6	3	1.7
Serotine	4	4	1.5
Leisler's bat	2	1	0.6
<i>Nyctalus</i> sp.	1		0.2
<b>TOTAL</b>	<b>297</b>	<b>247</b>	

Table 6 - Static Detector Bat Passes Per SMP and Overall Species Assemblage in September

- 3.3.10 As in July and August, bat activity was dominated by 45kHz pipistrelle with this species contributing 77% to the total number of bat passes. 55kHz pipistrelle was the second most recorded species (11% of total bat passes). The total number of passes by noctule, long-eared bat, *Myotis* species, serotine, Leisler's bat and Nathusius' pipistrelle bat were low and somewhat equal over the survey period, with each species contributing between a range of 0.6% - 3.1% to the total number of bat passes.
- 3.3.11 The majority of bat activity was recorded at SMP 1, however the activity between the two SMP locations (54.6% at SMP 1 and 45.4% at SMP 2) did not differ significantly when compared to previous survey periods. The fairly equal levels of bat activity is reflected by activity by 45kHz pipistrelle bat and 55kHz pipistrelle bat also being comparable between the two locations. Activity by long-eared bat, *Myotis* species and Nathusius' pipistrelle bat was mainly at SMP 1. At SMP 2 on the final survey night there was a total of three bat passes and these were by 45kHz pipistrelle, 55kHz pipistrelle and serotine.
- 3.3.12 There were early passes by 45kHz pipistrelle bat on three of the survey nights and these were all at SMP 1. On two of the occasions there was a pass by 45kHz pipistrelle bat 24 minutes after sunset and a third 28 minutes after sunset. There was a relatively early pass by a noctule bat on one occasion, some 15 minutes after sunset.

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## 4.0 EVALUATION AND PREDICTED IMPACTS

### 4.1 Overview

- 4.1.1 Surveys to establish the presence / likely absence of reptiles and dormice and the activity levels and diversity of bats have been completed at the development Site off Maidstone Road, Matfield, Kent in 2016.
- 4.1.2 The proposals for the development Site include the construction of 20 residential dwellings with a new access road created along the south-eastern boundary and an attenuation basin the southern corner.

### 4.2 Reptiles

- 4.2.1 One common species of reptile, common lizard, was recorded at the development Site. The peak count of six common lizard equates to a Good population and scores two points; this does not qualify the Site as a Key Reptile Site under the Froglife Criteria. The development Site is considered to be of **Neighbourhood Importance** for its reptile population.
- 4.2.2 The common lizard were recorded throughout the south-eastern area of the development Site, which is predominately tall, tussocky grassland with patches of low bramble scrub. The north-western area of the development Site comprises impenetrable scrub which is sub-optimal for common lizard. The offsite adjacent habitats to the north-west of the development Site are considered to be of sub-optimal quality for reptiles consisting of dense scrub and woodland.

#### *Common Lizard Ecology*

- 4.2.3 Common lizard often survive in loose colonies arranged along features such as road embankments, or within large areas of suitable habitats, for example, on sunny banks or hillsides. Common lizards occur in a wide range of different habitats across the United Kingdom and Ireland and are considered the most widespread of the British reptiles. Despite being widespread however, their habitat requirements result in a patchy distribution. Adequate common lizard habitat may be described as undisturbed ground that is topographically diverse with fairly dense but short vegetation less than 0.5 metres high, open to the sun and with at least a few exposed areas or promontories that be used for basking (Beebee & Griffiths, 2000).

#### *Reptile Population Estimates*

- 4.2.4 In the experience of the surveyors, to derive an indication of the size of the population which may be present, the proportion of the total population recorded during a standard presence / likely absence survey may be suggested to be in the region of 10%. This would equate to approximately 60 common lizard. There was also evidence of breeding recorded for this species.

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*Likely Impacts*

- 4.2.5 The south-eastern area of the development Site is considered to support optimal reptile habitat consisting of tall, tussocky grassland with patches of low bramble scrub. These habitats are suitable for common lizard foraging, commuting and basking; the more open areas of the grassland are good for basking and foraging whilst the scattered scrub provides quick refuge opportunities. The boundaries of the south-eastern area of the development Site provide sheltered habitat corridors. The dense continuous scrub which dominates the north-western area of the development Site is sub-optimal for common lizard. The grassland in the south-eastern area will be permanently lost to the proposals to allow for residential development therefore the direct and long-term impacts will be the loss of optimal reptile habitat. A small area of the dense scrub in the north-east of the development Site will also be permanently lost to the proposals. The woodland shaw along the north-eastern boundary and the line of cherry trees along the south-western boundary of the development Site, which are linked to the wider area, will be retained. The hedgerow along the south-eastern boundary will be temporarily lost during the works and then replanted. The offsite adjacent dense scrub and woodland to the north-west of the development Site are sub-optimal for reptiles, however the edges provide some opportunities for sheltered commuting and foraging.
- 4.2.6 Suitable reptile habitat in the development Site will be lost in the proposals. All common reptile species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) against intentional death or injury therefore whilst no EPS licencing requirement exists for common reptile species, the planning authority would need to be reassured that the proposals would not impact on reptiles. A mitigation strategy is outlined in Chapter 5 below.

### **4.3 Dormice**

- 4.3.1 The presence / likely absence surveys for dormice confirmed that dormice are present on the development Site and wider surveyed area, with active adult and juvenile dormice and nests found. Evidence of dormouse breeding within the development Site and wider surveyed area has been recorded, with active adult females with active young found. In September a female with five pink babies i.e. with no fur and a female with at least four young with eyes closed/beginning to open and orange fur developing were found. In addition, three active dormice including an adult male, a juvenile male and unidentified dormouse were found in September. In November a post lactating active female with five active juveniles were found, as well as one active unidentified dormouse.
- 4.3.2 The dormice were found in habitats within the development Site and in habitats within the wider surveyed area including:



- Along the woodland shaw which forms the north-eastern boundary of the development Site and extends into the wider surveyed area;
- in tubes along the south-eastern scrub edge, within the development Site and adjacent to the grassland;
- in a tube at the northern end of the cherry trees along the south-western boundary of the development Site; and,
- in tubes along the north-western edge of the dense scrub in the north-western area of the development Site and wider surveyed area.

4.3.3 A total of 32 boxes and 22 tubes were installed early June and surveys were completed in July, August, September and November which scores 20 points using the index of Probability (see Table 2). Furthermore as dormice have been recorded within the Survey Area then sufficient survey effort has been undertaken to prove presence.

#### *Population Estimates*

4.3.4 It is not possible to estimate dormouse population density through presence / likely absence surveys. Adult dormice are estimated to live in densities of around only ten per hectare even in the best habitats. It is considered that woodlands which cover between 2 – 20ha have a 'possible' probability of dormice being present, however dormice are more likely to occur in woodlands of at least c.20ha (English Nature). Small woods which support dormice are usually well connected to larger areas of suitable dormouse habitat (English Nature, 2006). The Survey Area for dormice covers approximately 4.5ha and there is suitable dormouse habitat throughout.

4.3.5 The woodland shaw along the north-eastern boundary of the development Site and which borders the north-eastern and north-western boundary of the adjacent woodland (as shown in Figure 2) comprising abundant coppiced hazel and other suitable food plants, dense/continuous bramble scrub and hedgerow are all considered to be optimal dormouse habitat. Historic aerial images reveal that this woodland shaw was present in 1990 and prior to this in 1940 and 1960 there was a hedgerow bordering orchards. The woodland in the north-western area of the wider surveyed area is sub-optimal, in 1960 it was covered in orchard trees and by 1990 it had been clear felled and appeared to be a grassy field. The southern area of the woodland appears to have been clear felled prior to 1960 but by 1990 the area was covered with woodland/scrub. The southern area now supports a canopy of mature oak and hazel and is considered to be of better quality for dormice than the northern half of the woodland which is predominately semi-mature planted ash.

4.3.6 The desk study showed that the nearest dormouse record is from 708m to the west of the Survey Area, in Cinderhill Wood ancient woodland. Cinderhill Wood is some 508m to the west of the edge of the wider

surveyed area. The woodland and scrub habitats within the development Site and immediately adjacent which were included within the Survey Area are relatively isolated from other areas of suitable dormouse habitat. There is some apparent connectivity between the Survey Area and Cinderhill Wood via hedgerows, with a hedgerow extending northwards from the northern tip of the Survey Area and then westwards towards Cinderhill wood. The nearest area of ancient woodland to the wider Survey Area is 386m to the north and there is a hedgerow linking this woodland and the Survey Area. Between the 1940's and 1960's the area around Matfield was widely used as orchards with hedgerows between but with very few areas of woodland present. The only woodland apparent from the aerial images are the two areas of ancient woodland mentioned above. It is therefore likely that the dormice were able to persist in the hedgerows which would have been subject to less intensive management during this time and the orchards which provided fruit as food during the late summer. The area of woodland in the south of the Survey Area adjacent to Chestnut Lane which had developed by 1990 would have supported displaced dormice when the orchards within the development Site and the Survey Area to the north were cleared and as the woodland and scrub has developed the dormouse population has developed.

- 4.3.7 Dormice were only found in the woodland shaw along the north-eastern boundary and in the dense scrub in the north-west of the development Site and centre of the Survey Area. Whilst they have not been recorded in the southern area of the woodland it is considered likely that they are present but due to the high tree canopy of the woodland area the dormice did not find the dormouse boxes. The diversity of habitats within the development Site and wider Survey Area which included the adjacent scrub and woodland provide suitable sites for summer and winter dormouse nests, and the range of plant species present in these habitats provide food resources for foraging dormice throughout the year.
- 4.3.8 A total of 12 dormouse nests have been recorded; five nests have been recorded in the development Site and seven have been recorded in habitats outside the development boundary. In September a dormouse nest with young was found in box 21 and in November empty nests were found in B14, B16 and B21 and six individual dormice were found in box 23. Due to the proximity of these boxes to each other it is likely that the nests found supported this single family of dormice. Similarly, in September a dormouse nest with young was recorded in tube 7 and in November empty dormouse nests were found in tube 7 and tube 8 and a dormouse was seen running out of tube 9 therefore it is likely that these nests also supported a single family of dormice. It is considered that the dormouse population recorded is likely to be small – medium. It is considered that the dormouse population within the Survey Area is of **Local Importance**.

#### *Likely Impacts*

- 4.3.9 The optimal habitats within the development Site are the dense scrub in the north-western area and the boundary features including the woodland shaw, line of cherry trees and hedgerow. This habitat extends to some 0.68ha. The woodland shaw and cherry trees will be retained. However, the proposals will result in

the loss of some dormouse habitat. An area of approximately 0.25ha of dense scrub in the north-western area will be permanently lost to the proposals to allow for the development of residential houses. In its current condition this scrub habitat is optimal for dormice. The remaining 0.29ha of this scrub habitat will be retained to the north-west of the proposed development. Some additional sections of scrub will be lost along the south-east corner, however, no dormice have been recorded in this area or along the hedgerow along the south-eastern boundary to date. The loss of this habitat is considered to be a major adverse impact to dormice within the Site. Taking the wider Survey Area into context this would be a loss of approximately 5.5% of the dormouse habitat. Without mitigation the impact in terms of loss of would be a moderate adverse impact to dormice of Local Significance.

- 4.3.10 The hedgerow along the south-eastern boundary around Long Lees will be temporarily lost to the proposals as it will be removed during the works and replaced with a new hedgerow once the works have been completed. A small section the hedgerow along the south-eastern boundary, towards the southern end, will be permanently lost through the proposals to allow for a new access road into the development Site, however, this is not considered to result in fragmentation as it does not lead to any further habitat for dormice. The long-term indirect effects are likely to be an increase in disturbance and artificial lighting near to the boundary features and predation by domestic cats.
- 4.3.11 The areas of optimal dormouse habitat have been found to support a breeding dormouse population, and these will be directly impacted by the proposals through habitat removal therefore the project will require a European Protected Species (EPS) licence from Natural England to allow the removal of dormouse habitat.
- 4.3.12 The Habitats Regulations 2010 (as amended) places an obligation on the Local Planning Authorities to consider the three European Protected Species licensing tests when considering a planning application which impacts on European Protected Species. The three licensing tests, which Natural England also has to apply later when considering a licence application, are (i) whether there are imperative reasons of overriding public interest for the planning application; (ii) whether there are any satisfactory alternatives; and (iii) whether the species' favourable conservation status has been maintained.
- 4.3.13 It is considered that the third test may be met if any loss of habitat could be appropriately mitigated for by providing an area of suitable replacement habitat. The mitigation for dormice would be detailed within the licence method statement to be submitted to Natural England. Chapter 5 of this report outlines mitigation which has been incorporated into the design of the scheme.

#### **4.4 Bats**

- 4.4.1 At least eight species of bat have been confidently identified through static surveys of the development Site during the surveys in 2016 including:

- 45kHz pipistrelle
- 55kHz pipistrelle
- Nathusius' pipistrelle
- Noctule
- Leisler's
- Long-eared bat
- Serotine
- *Myotis* sp

4.4.2 Passes by bats from the *Myotis* genus which could not be identified to species level were recorded. Natterer's bat were not confirmed as present as no recordings provided clear enough sonograms to see that the end frequencies were below 25kHz, a parameter which is considered to be an indicative feature of the Natterer's call (*pers comm.* D. Hill and G. Jones, 2006). Other *Myotis* species are considered likely to have been recorded, including whiskered/Brandt's *M. mystacinus / brandtii* and Daubenton's bat *M. daubentonii* however, there is no reliable way of specifically determining whether such other *Myotis* species are present on the development Site without catching the bats. Whiskered/Brandt's bats are relatively widespread species which would be expected to occur in the habitats of the development Site and the surrounding countryside. Daubenton's bat is also a widespread species which is commonly associated with water; there are two ponds within a 250m radius of the development Site therefore this *Myotis* species would also be expected to occur in the habitats of the development Site and the surrounding countryside. Taking these species into consideration would mean that up to ten species could be present.

#### *Activity*

4.4.3 Over 15 nights of survey a total of 1,107 bat passes were recorded over the two static detectors. This equates to 73.8 passes per night over the two detectors or 36.9 passes per detector per night which is considered to reflect a low level of bat activity. The highest level of activity was recorded in September (544 passes, 49% of total bat activity), whereas in July and August activity levels were similar with 26% of total bat passes recorded in July (288) and 25% of total bat passes recorded in August (275). When taking into consideration the length of time between sunset and sunrise the number of passes per night recorded by the two detectors is as follows: July 7.6 passes per hour, August 6.28 passes per hour and September 10.56 passes per hour. In July and August bat activity was highest at SMP 2, whereas in September activity was relatively equal between the two locations. SMP 1 is located in the south-east corner of the scrub and SMP 2 is at the eastern end of the woodland shaw along the north-eastern boundary. These habitats are good for foraging bats and provide suitable linear features for bats commuting through the landscape.

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*Diversity*

- 4.4.4 The greatest diversity of bat species was also recorded in September, with at least eight species of bat identified. Leisler's bat and Nathusius' pipistrelle bat were only recorded during the September survey. Activity by Nathusius' pipistrelle later in the season ties in with recent research about this species migrating across large distances from mainland Europe to the UK during late summer and autumn (BCT, 2015). There was an increase in activity by long-eared bat, 55kHz pipistrelle and *Myotis* species in September, whilst activity by noctule and serotine remained steady throughout the survey period.
- 4.4.5 The total number of passes at both SMP 1 and SMP 2 in every survey month was dominated by 45kHz pipistrelle bat and this species contributed 82.4% to the total bat passes recorded over the survey period. Furthermore on three occasions over the survey period 45kHz pipistrelle bat was the only bat species recorded at one of the static locations. In July and September the second most frequent species recorded was 55kHz pipistrelle and in August the second most frequent species was noctule. However, in all three survey months the total number of passes by the second most frequently recorded bat species did not differ significantly with the total number of passes by the third most frequently recorded bat species when compared to the difference in total number of passes by 45kHz pipistrelle.

*Early passes*

- 4.4.6 The mean emergence time for 45kHz pipistrelle has been calculated as 25 minutes after sunset (Davidson-Watts and Jones, 2006). There were infrequent early passes by 45kHz pipistrelle bat across the survey period with the earliest pass recorded some 10 minutes after sunset in July; other passes ranged between 19 and 31 minutes after sunset. It is considered likely that there is a roost of this species nearby but that the development Site is not regularly used as a commuting corridor for this species from roost to foraging habitat.
- 4.4.7 Regarding early passes by other bat species, noctule were recorded 15 and 16 minutes after sunset on two occasions. However, noctule bats are fast flying species and typically have median emergence times of five to ten minutes after sunset (Altringham, 2003) therefore it is not considered likely that there is a roost close to the Site. Nonetheless, noctule were recorded in every single survey month as either the second or third most commonly recorded bat species therefore the data is suggestive of noctule regularly using the habitats onsite for commuting through the landscape.

*Survey Summary*

- 4.4.8 Overall, the surveys suggest that a diverse number of bat species (eight minimum) are using habitats within the development Site, however general activity was low. The development Site supports good quality foraging habitat in the form of tall grassland and dense scrub and the boundary features offer good linear features for commuting bats as well as further foraging opportunities, however, the Site lacks water habitats. The adjacent offsite habitats consist of woodland with scrub therefore provides some shelter for sustained

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foraging. The development Site is situated within a landscape which is good for bats with a diverse range of habitats present including woodland, waterbodies, heathland and good quality semi-improved grassland, as well as some urban habitat which may provide some roosting opportunities; these habitats are interlinked via a network of tree lines and hedgerows. Taking all factors into account the development Site is considered to be of **Neighbourhood Importance** for its bat assemblage.

#### *Impact Assessment*

- 4.4.9 The proposals will result in the permanent loss of grassland and a small area of the scrub that have been found to be used by foraging bats, albeit that the level of activity is low. The boundary features of the development Site will largely be retained, apart from a small section of the hedgerow along the south-eastern boundary. The long-term impacts will include the loss of a foraging resource, an increase in artificial lighting and noise and the potential loss or disruption of connectivity between habitats in the wider landscape. Without mitigation the impact in terms of loss of would be a moderate adverse impact to bats of Neighbourhood Significance. It is considered that the impacts of the proposals can be minimised through the mitigation and habitat enhancements/creation measures which are outlined in Chapter 5.

## **4.5 Badgers**

- 4.5.1 During the reptile surveys evidence of badger in the form of latrines and mammal tracks were noted within the development Site. No badger setts have been found within the development Site, although the dense scrub may conceal any potential badger setts. No further surveys are required, but if a badger sett is uncovered once the development Site is cleared, the project ecologist should be informed. Due to the suitability of the habitat in the development Site for badger it is recommended to carry out an update survey immediately prior to the onset of works so that any newly created setts can be identified.

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## 5.0 MITIGATION STRATEGY

### 5.1 Overview

- 5.1.1 For clarity, from this point on the development Site will be referred to as two separate areas, namely the 'Development Area' and 'Ecology Zone'. The 'Development Area' refers to the larger eastern area of the development Site which will be impacted by the proposed works. The Ecology Zone is located in the west of the development Site and it is proposed that the area will be enhanced to support dormice and reptiles. With regard to dormice a detailed method statement will be required for the EPS licence but the general principles of that licence will be based on the recommendations made in this report.
- 5.1.2 The Ecology Zone will be subject to a long-term management plan and will be included within the Landscape and Ecological Management Plan (LEMP) which will be a site wide management plan to ensure the long-term continuity of retained and created habitats.
- 5.1.3 The requirements for dormouse mitigation is usually for at least like for like replacement of habitat. The alternative is that where there is poor or sub-optimal habitat present that management of these areas is carried out to improve those habitats and increase the carrying capacity by improving the habitat available. For common lizard, the aim of mitigation is to provide alternative suitable habitat within the Site and for the animals to be moved out of the development area and into the receptor. Suitable common lizard habitat may be described as undisturbed ground that is topographically diverse with fairly dense but short vegetation less than 0.5 metres high, open to the sun and with at least a few exposed areas or promontories that can be used for basking (Beebee & Griffiths, 2000). Based on the size of the Ecology Zone (1.4ha) it is considered possible that this can be enhanced significantly for dormice to satisfy the requirements of Natural England whilst also providing sufficient habitat for common lizards.
- 5.1.4 The level of mitigation for dormice will follow recommendations set out in English Nature's Dormouse Conservation Handbook (2006) and would likely include supervised vegetation clearance using hand tools which will likely be undertaken in winter. Details of timings are set out below.

### 5.2 Dormouse Mitigation Strategy

- 5.2.1 The area of optimal dormouse habitat to be lost to the proposed development is approximately 0.25ha: this is the dense scrub (see Figure 3). The Ecology Zone is proposed as the mitigation area for both dormice and reptiles. This will result in the loss of a further 0.16ha of scrub which will be opened up to provide tussocky grassland habitat for common lizards. The scrub habitat within the Ecology Zone whilst being optimal for dormice during the survey period will in time develop and become over-mature with less fruiting occurring, so the aim is to create and manage the scrub within this area in a cycle to ensure that heavily fruiting areas of scrub are created successively. This rotational management will also benefit common lizard

as it will create a mosaic scrub habitat with areas of shorter vegetation for partially exposed basking and denser areas for shelter.

*Enhancement of Ecology Zone and Buffer Areas*

- 5.2.2 Areas of the Ecology Zone will need to be cut back to open up areas of over mature scrub. The Ecology Zone has been divided into 9 sections (Figure 3). Area 1 is an area of over mature blackthorn scrub which currently does not produce much fruit and creates a dark shaded zone of dead wood. This area along with areas 2 and 3 would be the first to be cut back in year 1. The enhancement of areas of poor dormouse habitat will compensate for the area of better quality dormouse habitat which will include the reptile receptor site. Areas A will be enhanced for common lizard see section 5.3
- 5.2.3 In year 7 areas 4, 5 and 6 would be cut back and in year 14 areas 7, 8 and 9 would be cut back. These areas would be left to re-vegetate naturally in the intervening period. Within this block of scrub there are a small number of trees, along an old field boundary. These trees will be retained and dormouse boxes will be installed on these trees. Two areas will be left as permanent refuges and not be managed during this 14 year period. In addition, within the cleared areas new fruiting trees will also be planted, these will include cherry, apple, pear and wild service tree. Along the boundary of the Ecology Zone and the proposed development, a species rich hedgerow with trees will be planted. Species planted in this hedgerow will include: hazel, hawthorn, wild service tree and crab apple.
- 5.2.4 The woodland shaw would be left un-managed to ensure the continuity of areas of taller tree canopy and a more diverse woodland belt. It is likely that the cherry trees along the south-west boundary will need to be brought into management and be cut back on a regular basis.
- 5.2.5 The hedgerow along the south-eastern boundary around Long Lees will be replanted with a diverse range of native, fruit/nut and flower producing species to benefit dormice, as well as other small mammals and invertebrates. The species planted will be similar to those currently present including hawthorn, hazel, cherry plum, field maple and dog-rose. Honeysuckle *Lonicera periclymenum* should also be planted at regular intervals along the hedgerow as these plant species provide good nesting material for dormice, as well as other mammals and birds and also help to thicken the vegetation.
- 5.2.6 Hedgerows will be managed infrequently (3 to 5 years) and on a rotation. This type of management will ensure that the availability of flowers and fruits for dormice is not reduced drastically through cutting whilst also preventing the hedgerows from becoming overgrown and gappy.



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*Clearance of Development Area*

- 5.2.7 The scrub across the Development Area would be cleared using hand tools under the supervision of the ecologist holding the licence and/or their accredited agents. Natural England tend to prefer that vegetation clearance where dormice are present is undertaken in late winter and then the area left until spring to allow animals to move from where they are hibernating on their own accord once they are awake. The vegetation would be cut down and any animals found will be relocated to a nest box in a suitable area of the Ecology Zone. The cutting would begin from the south-eastern edge of the scrub area and move north-westwards towards the north-western boundary where the scrub adjoins the woodland in the adjacent area. Loose material such as leaves would be carefully swept or raked to check for any ground nests.
- 5.2.8 Additional nest tubes and boxes will be installed within the Ecology Zone and the buffer zones to provide nesting places for displaced animals. Any dormice found on the ground or in any of the tubes before clearance would be relocated into the buffer area or the retained woodland shaw and placed in a wooden dormouse nest box at ground level.

**5.3 Common lizard Mitigation Strategy**

- 5.3.1 A reptile relocation exercise is needed with reptiles moved from the development area into a receptor area in the Ecology Zone. Once this has been completed the whole development area would be subject to a destructive search. This would be undertaken in the spring/summer months when both reptiles and dormice are active to ensure that none hibernate within the works area.

*Receptor Area*

- 5.3.2 A proposed Receptor Area is located in Zone A within the ecology zone. Zone A is adjacent to the proposed development and it will be possible to create suitable conditions for common lizard here. The scrub edge will provide good opportunities for basking and commuting. In its current state Zone A comprises dense bramble scrub which is not suitable reptile habitat therefore will need to be enhanced. Enhancement will include management of the scrub to create a more diverse structure of habitats including shorter vegetation, such as tussocky grassland, to create basking opportunities. One hibernacula and four log piles would be created in the Receptor Area.

*Habitat Connectivity*

- 5.3.3 The Receptor Area will be directly connected to the wider Ecology Area. The rotational management of the Ecology Area will create a scrub habitat with good structural complexity, with areas of tall mature scrub and other areas of shorter vegetation, that is suitable for common lizard as well as dormice. The boundary features of the development Site are to be retained and this will provide a link between the Ecology Zone including the Receptor Area and the wider Survey Area. A 1m grassy corridor should be retained along the boundaries of the development area, where possible. This will provide suitable habitat in which reptiles can

forage and shelter. The base of the hedgerows would also support a range of other species including small mammals.

## 5.4 Bat Mitigation and Enhancement Plan

### *Lighting*

5.4.1 The development Site is situated in a rural environment therefore experiences minimal light levels. It is considered that inappropriate positioning and lighting of smaller lighting features such as bollard lights could have a detrimental impact on the local bat assemblage. It is recommended that the boundary features of the development Site and the Ecology Zone are designated as light-sensitive zones and any lighting within these zones should be low impact. Lighting options include low bollard lighting with downward facing shields to prevent light spill updates, and the use of infrared motion sensor lights on the outside of houses to minimise times that lights are on.

5.4.2 The following points take into account best practice guidance which should be incorporated into the lighting design (Bat Conservation Trust, 2014).

- Do not provide excessive lighting. Use only the minimum amount of light needed for safety.
- Avoid using reflective surfaces under lights.
- Minimise the spread of light, particularly along the woodland shaw, hedgerows, tree line and scrub habitats. The spread of light should be kept near to or below the horizontal. Flat cut-off lanterns are best. Eliminate any bare bulbs and upward pointing lighting.
- Reduce the height of lighting columns. Light at a low level reduces impact. However, higher mounting heights allow lower main beam angles, which can assist in reducing glare.
- Use temporary close-boarded fencing until planted vegetation matures, such as any new planting that is incorporated into the landscaping design and along the boundaries of the development Site.

#### **Technical specifications:**

- Use narrow spectrum bulbs to lower the range of species affected by lighting. Use light sources that emit minimal ultra-violet light and avoid the white and blue wavelengths of the light spectrum to avoid attracting lots of insects. Lighting regimes that attract lots of insects result in a reduction of insects in other areas like parks and gardens that bats may be using for foraging.
- Lights should peak higher than 550nm or use glass lantern covers to filter UV light. White LED lights do not emit UV but have still been shown to disturb slow-flying bat species

5.4.3 The existing treeline and woodland shaw that will be retained should be protected from pollution, lighting and damage during the works using temporary screen barriers.

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*Roosting features*

- 5.4.4 Roosting features for bats can be provided in the new buildings. These can be in the form of dedicated bat boxes that can be fitted in wall cavities or externally mounted boxes. These boxes would be positioned close to the eaves or gable apex on the southern and/or western elevations of units 1 - 4 near the south-western boundary and the garage structure for unit 5. Suitable bat boxes include the Habibat ([www.habibat.co.uk](http://www.habibat.co.uk)) or the Ibstock enclosed bat box ([www.ibstock.com/sustainability-ecozone.asp](http://www.ibstock.com/sustainability-ecozone.asp))

*Planting and Habitat Creation*

- 5.4.5 Where possible in the areas where landscape planting will be provided, native and species-rich planting should be incorporated into the proposals, including where new flower beds are created. Herbaceous planting should include nectar-rich species, selecting a combination that flower through spring, summer and later summer. Suitable species include angelicas, lavenders, majoram, rosemary, sweet cicely, fennel and feverfew. Appendix 5 includes a list of bat friendly plant species.
- 5.4.6 The proposals also include the construction of an attenuation basin in the southern corner. It is not known yet whether this will be seasonally wet or whether it will permanently hold water, however, when wet this basin will provide potential foraging habitat for bats in the local area.

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## 6.0 CONCLUSIONS

- 6.1 Protected species surveys at Maidstone Road, Matfield have been undertaken in 2016 for reptiles, dormice and bats.

### *Reptiles*

- 6.2 A 'Good' population of common lizard was recorded during the surveys. A detailed mitigation strategy will be required and this will follow best practice guidance for reptile mitigation. Reptiles will need to be relocated out of the works area. An on-Site Receptor Area has been identified within the Ecology Zone in the north-western part of the development Site.

### *Dormice*

- 6.3 The tubes and boxes were installed in June 2016 and four surveys have been carried out in July, August, September and November 2016. Confirmed evidence of dormice including breeding has been recorded. The nests were found in the woodland shaw along the north-eastern boundary, the edge of the scrub bordering the grassland in the centre of the development Site and in the adjacent habitat in the wider survey area to the north-west of the development Site.
- 6.4 An EPS Licence from Natural England will be required to permit the loss of the scrub vegetation within the development Site. A mitigation strategy for the clearance of the development Site has been provided; this details the time of year that clearance works can be undertaken and the method of vegetation clearance under ecological supervision once a licence has been granted.
- 6.5 Habitat creation and enhancements are to be provided in the Ecology Zone in the north-western part of the development Site whilst the woodland shaw, the hedgerow along the south-east boundary and the cherry trees along the south-west boundary will all be retained/replanted. It is considered that this will retain sufficient habitat and connectivity to the wider countryside to maintain the favourable conservation status of dormice.

### *Bats*

- 6.6 The bat activity surveys suggest that a diverse number of bat species (eight minimum) are using the development Site as commuting or foraging routes, however general activity around the development Site was relatively low. A sensitive lighting strategy is recommended to protect the boundary features of the development Site. Integrated bat boxes should be incorporated into the new dwellings and generous native planting is also recommended.

### *Badger*

- 6.7 Badger latrines and mammal tracks have been found in the grassland and dense scrub within the development Site. No setts have been identified onsite however the impenetrable scrub may be concealing any potential

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setts. It is recommended that a walkover survey of the development Site is completed immediately prior to the onset of works. The development Site will be cleared under the supervision of an ecologist due to the presence of reptiles and dormice and if a badger sett is uncovered then the ecologist will be able to take appropriate measures and stop work.

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Key

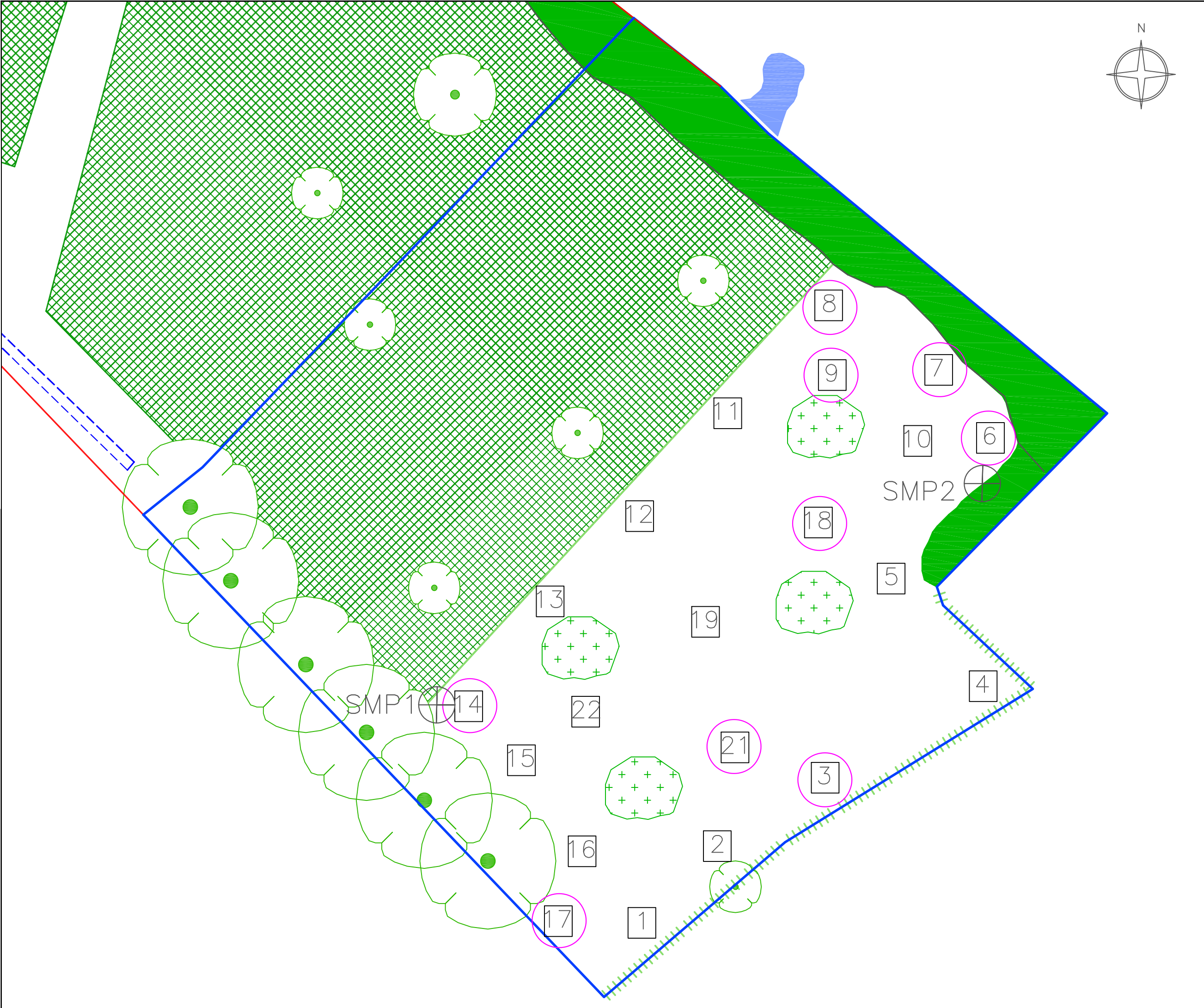
 Survey Area

 Development Area

 Reptile Felt

 Location of Reptile

 Location of Bat Static Monitoring Device



revision	description	date	checked by

Corylus Ecology Ltd, Unit A3, Speldhurst Business Park, Went Farm, Langton Road, Speldhurst, Kent TN3 0NR  
 Corylus Ecology is the trading name of Corylus Ecology Ltd registered in England, No 5005553, Registered Office: Herwood House, Herwood, Ashford, Kent TN24 8DH

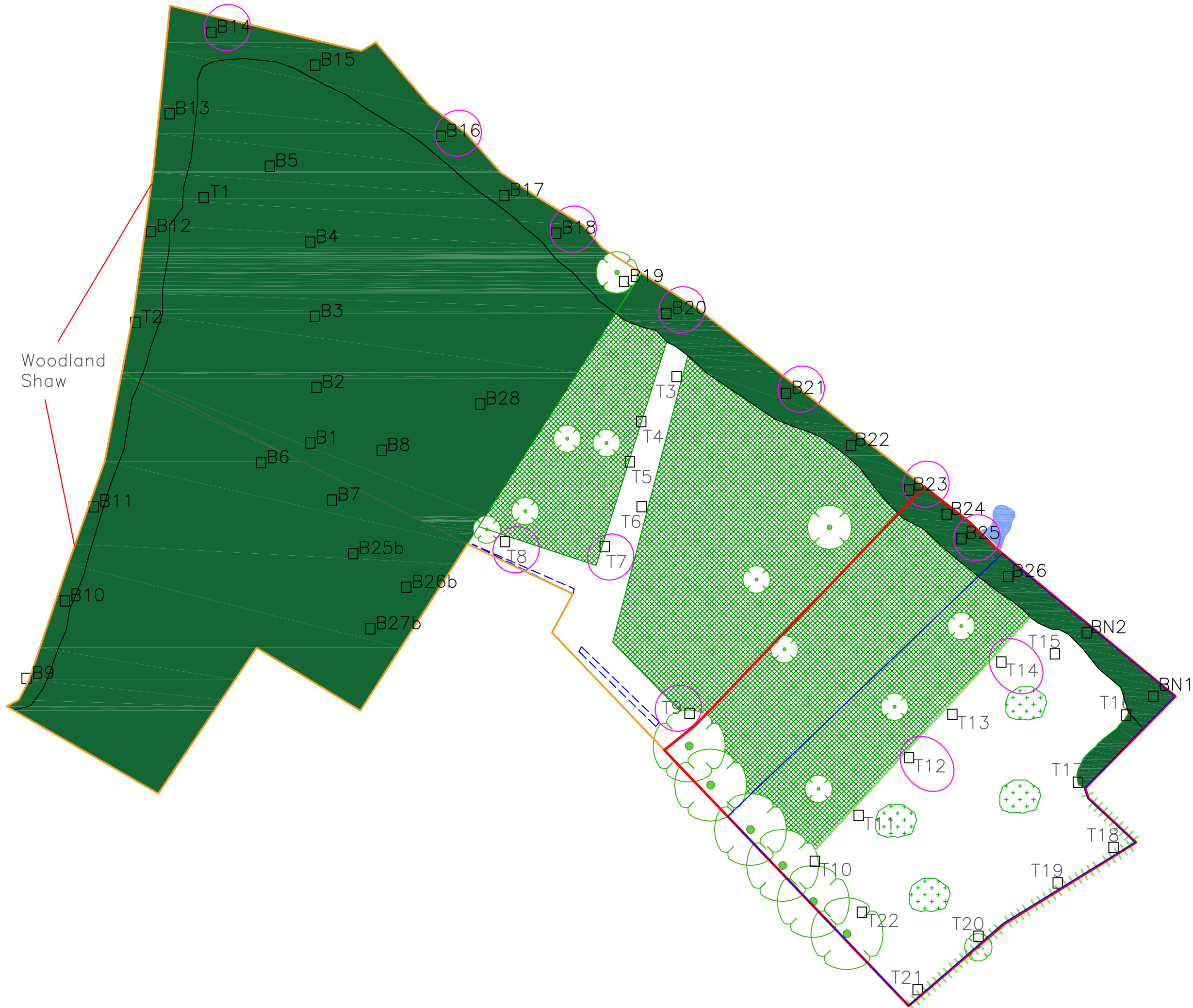


Project:  
**Maidstone Road, Matfield**

Title:  
**Reptile Plan and Bat Survey Plan**

status		drawing no. <b>Figure 1</b>			
scale	size	date	drawn	checked	
NTS	A3	16.02.2017	LR	HL	

CAD filename  
 Figure\_1.dwg



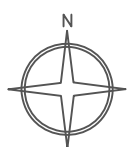
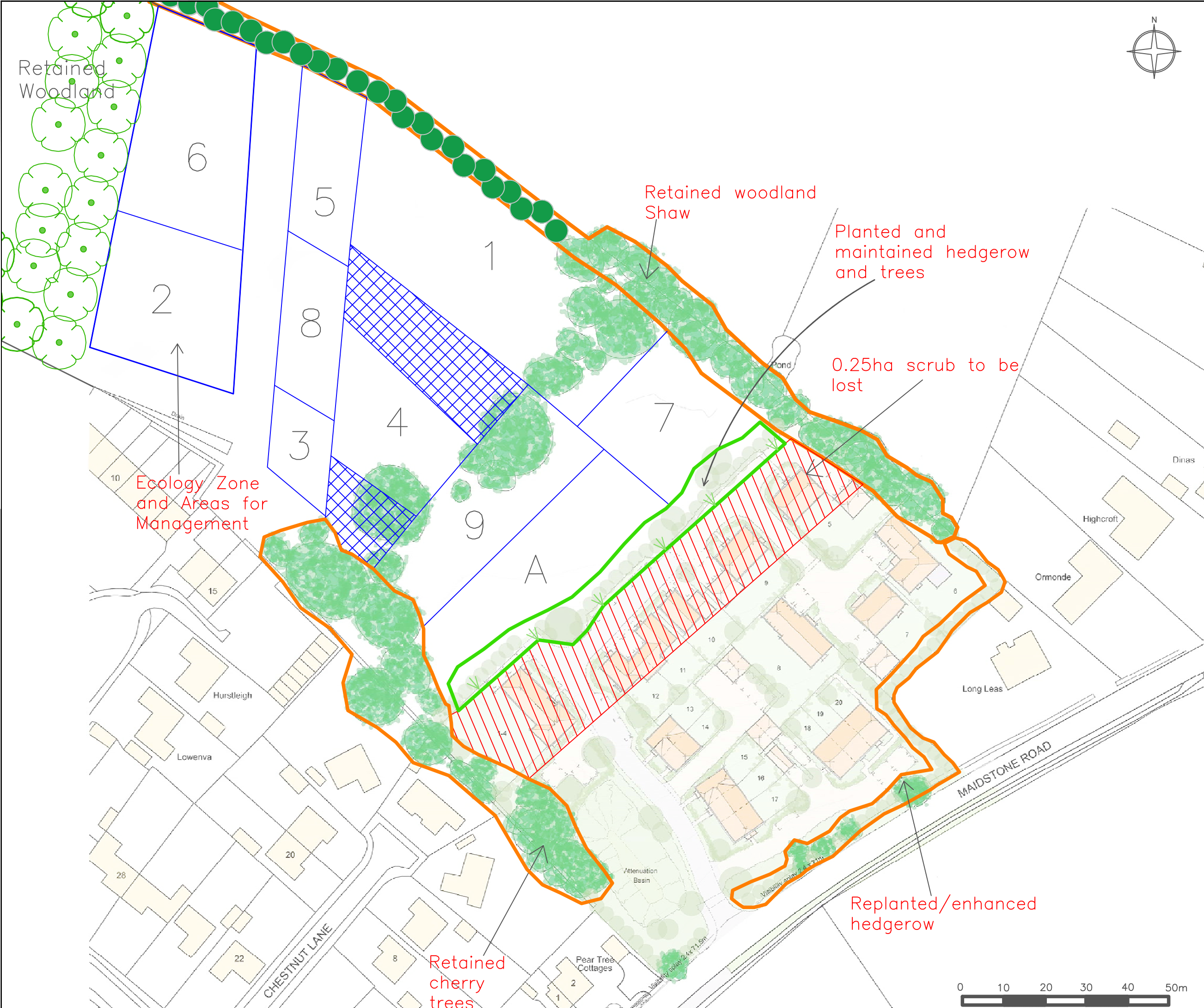
Key

	Survey Area
	Site Boundary
	Development Area
	Dormouse Box
	Dormouse Tube
	Location of Dormouse

Woodland Shaw

revision	description	date	checked by
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<b>Project:</b> <b>Maidstone Road, Matfield</b>			
<b>Title:</b> <b>Dormouse Plan</b>			
<b>status</b>		<b>drawing no.</b> <b>Figure 2</b>	
<b>scale</b> NTS	<b>size</b> A3	<b>date</b> 16.02.2017	<b>drawn</b> LR
<b>checked</b> HL		<b>checked</b> HL	
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- Key
- Ecology zone
  - Habitat to be lost
  - Species Rich Hedge with Trees
  - Habitat to be created
  - Habitat to be retained/enhanced
  - 1 Ecology Zone Number
  - Permanent refuge area for dormice
  - A Reptile Mitigation Area

Ecology Zone and Areas for Management

Retained woodland Shaw

Planted and maintained hedgerow and trees

0.25ha scrub to be lost

Replanted/enhanced hedgerow

Retained cherry trees

MAIDSTONE ROAD

CHESTNUT LANE



revision	description	date	checked by

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Project: <b>Land at Maidstone Road, Matfield</b>				
Title: <b>Dormouse and Reptile Mitigation Plan</b>				
Status		drawing no. <b>Figure 3</b>		
scale <b>NTS</b>	size <b>A3</b>	date <b>24.03.2017</b>	drawn <b>LR</b>	checked <b>HL</b>
CAD filename Figure_1.dwg				

Appendix 1. Reptile Survey Results

Date	Species	Adder	Common lizard	Slow worm	Grass Snake	Tv/Th	Toad	Frog	Other	Weather conditions		
05/06/2016	Male									Time	15:30	
	Female									Temp	19°C	
	Adult Unknown									Cloud %	70%	
	Sub		3							Rain	Dry	
	Juv									Wind	BF1	
	<b>TOTAL</b>		<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
09/06/2016	Male								3 x bank field vole	Time	10:30	
	Female									Temp	19°C	
	Adult Unknown									Cloud %	60%	
	Sub		1							Rain	Dry	
	Juv		1							Wind	BF2	
	<b>TOTAL</b>		<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
11/07/2016	Male									Time	9:15	
	Female									Temp	17°C	
	Adult Unknown		1							Cloud %	80%	
	Sub									Rain	Dry	
	Juv									Wind	BF3	
	<b>TOTAL</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
03/08/2016	Male									Time	17:25	
	Female									Temp	20°C	
	Adult Unknown		6							Cloud %	40%	
	Sub									Rain	Dry	
	Juv		1							Wind	BF2	
	<b>TOTAL</b>		<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
16/08/2016	Male								voles x2	Time	9.40	
	Female									Temp	17°C	
	Adult Unknown									Cloud %	50%	
	Sub									Rain	Dry	
	Juv									Wind	BF2	
	<b>TOTAL</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
06/09/2016	Male									Time	13.45	
	Female								voles x 6	Temp	20.5°C	
	Adult Unknown		1							Cloud %	100%	
	Sub									Rain	Dry	
	Juv									Wind	BF1	
	<b>TOTAL</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
08/09/2016	Male								Voies x 3	Time	10:30	
	Female									Temp	19°C	
	Adult Unknown									Cloud %	60%	
	Sub		1							Rain	Dry	
	Juv		1							Wind	BF2	
	<b>TOTAL</b>		<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
	<b>PEAK</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			

**Appendix 2 – Dormouse Survey  
Results**

Tubes	28/06/2016	02/08/2016	07/09/2016	16/11/2016
<b>Wider Surveyed Site</b>				
T1	E	couldn't locate	couldn't locate	E
T2	E	E	E	E
T3	E	E	E	E
T4	E	E	slat out	<i>Apo</i> feeding remains
T5	E	small mammal droppings	pygmy shrew 2.5g A	E
T6	E	E	E	<i>Apo</i> nest E
T7	E	E	Dormouse nest. A F ran out 5 x young pink eyes closed. 16:45	old dm nest E
T8	E	E	<i>Apo</i> nest	old dm nest E
B1	E	E	E	E
B2	E	E	E	E
B3	E	E	E	E
B4	E	E	E	E
B5	couldn't locate	couldn't locate	E	E
B6	E	E	E	E
B7	E	E	E	E
B8	E	E	E	E
B9	E	E	E	E
B10	moss nest E	E	E	E
B11	E	E	E	E
B12	E	E	E	E
B13	E	E	E	E
B14	E	E	E	dm nest E
B15	E	E	E	E
B16	E	E	beginnings of <i>Apo</i> nest	dm nest E
B17	E	E	E	E
B18	E	E	DM M 20.5g A NB 17:46hrs	dm nest E
B19	E	E	E	E
B20	E	E	DM nest DM ran out	dm nest E
B21	E	E	DM nest DM F 18g A PL, with at least 4 young with eyes closed/just opening but orange fur developing	dm nest E
B22	E	E	E	E
B25b	E	E	E	E
B26b	E	E	E	E
B27	E	E	E	E
B28	E	E	E	E
<b>Development Site</b>				
B23	E	E	DM nest E	DM F PL A 27.5g white tail tip

Appendix 1 Cont. Reptile Survey Results cont.

Date	Species	Adder	Common lizard	Slow worm	Grass Snake	Tv/Th	Toad	Frog	Other	Weather conditions		
21/09/2016	Male									Time	10:00	
	Female									Temp	14°C	
	Adult Unknown									Cloud	100%	
	Sub									Rain	Dry	
	Juv									Wind	BF2	
	<b>TOTAL</b>		0	0	0	0	0	0	0			
	<b>PEAK</b>		0	0	0	0	0	0	0			
28/09/2016	Male									Time	10:00	
	Female									Temp	18°C	
	Adult Unknown		1							Cloud	50%	
	Sub									Rain	Dry	
	Juv		3							Wind	BF2	
	<b>TOTAL</b>		0	4	0	0	0	0	0			
	<b>PEAK</b>		0	1	0	0	0	0	0			

				DM M NB A juv 11g DM F NB A juv 12g white tail tip DM M A just TS 16g DM F NB A juv 12g DM M A juv 12g white tail tip
B24	E	E	E	E
B25	E	E	DM nest. DM M 14.5g A juv but just TS 17:28hrs	YNM M TS 26.5g
B26	E	E	E	E
BN1	E	E	E	E
BN2	E	E	E	E
B27	E	E	E	E
B28	E	E	E	E
T9	E	E	E	dormouse ran out
T10	E	E	green leaves	E
T11	E	E	E	old leaves going mouldy
T12	E	E	dormouse nest E	dormouse nest E
T13	E	E	<i>Apo</i> ran out	old <i>Apo</i> nest
T14	E	E	dormouse nest E	dormouse nest E
T15	E	E	E	E
T16	E	E	E	<i>Apo</i> feeding remains
T17	E	E	E	E
T18	E	cant find	E	<i>Apo</i> feeding remains
T19	Small amount shredded green leaves	wood mouse nest	E	<i>Apo</i> feeding remains
T20	E	E	E	Start of <i>Apo</i> nest
T21	E	on ground replaced	E	E
T22	E	wood mouse escaped	E	3 x woodmice: F, NB, 15.5g M, NB, 17g F, NB, 18.5g

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### Appendix 3 – Reptile Legislation

All British reptiles are afforded legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) largely as a consequence of a national decline in numbers due to habitat loss. Under the terms of the Act, it is an offence to intentionally kill or injure a reptile and accordingly in order to avoid committing an offence under the Act, appropriate mitigation techniques need to be incorporated for reptiles occurring within development sites. Mitigation methods for reptiles may include trapping and relocation of animals to a suitable receptor site, combined with the exclusion of the development site through the use of reptile fencing. Measures to enhance habitats for reptiles include the provision of hibernacula and appropriate management to improve foraging areas may also be required.

Mitigation for the more common British reptiles and amphibians does not require a licence from Natural England but would typically be agreed in consultation with the local planning authority.

Despite the range of their distribution and the diversity of habitats in which they may be found, the national status of the slow worm is not considered favourable. The slow worm is considered to have undergone a long term decline since the 1930's. Currently the largest threat has been identified as loss of habitat, in particular, due to a shift in planning policy towards the development of brown field sites (English Nature, 2004).

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## Appendix 4 - Dormouse Legislation

Dormice receive the same level of protection as bats and great crested newts in the United Kingdom. The Wildlife and Countryside Act 1981 (WCA) (as amended) transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The 1981 Act was recently amended by the Countryside and Rights of Way (CRoW) Act 2000 and the more recent Habitats Regulations amendments (2010). Dormice are listed under Schedule 5 of the 1981 Act, and is therefore subject to the provisions of Section 9, which makes it an offence to:

- Intentionally kill, injure or take a dormouse [Section 9(1)];
- Possess or control any live or dead specimen or anything derived from a dormouse [Section 9(2)]
- Intentionally or recklessly disturb a dormouse while it is occupying a structure or place which it uses for shelter or protection [Section 9(4)(b)];
- Intentionally or recklessly obstructs access to any structure or place which a dormouse uses for shelter or protection [Section 9(4)(c)]; and
- Sell, offer for sale, possess or transport for the purpose of sale or publish advertisements to buy or sell a dormouse [section 9(5)].

Dormice are also included on Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive). As a result of the UK ratifying this directive, dormice are protected under The Conservation of Habitats and Species Regulations 2010 (The Conservation Regulations). Annex IV of the Habitats Directive requires member states to construct a system of protection as outlined in Article 12, this is done through Part 3 of the Regulations whereby Regulation 41 makes it an offence to:

- Deliberately capture or kill a dormouse [Regulation 39(1)(a)];
- Deliberately disturb a dormouse in such a way as to be likely to significantly affect i) the ability of any significant group of animals of that species to survive, breed or rear or nurture their young, OR ii) the local distribution of that species. [Regulation 39(1)(b)]; and
- Damage or destroy a breeding site or resting place of a dormouse [Regulation 39(1)(d)].

Dormice are a UK BAP Priority Species and a Red Data Book species for UK and Kent (Waite, 2000). They are also on the UK Biodiversity Steering Group Short List of Globally Threatened/Declining Species. The population is suggested to be declining due to changes in woodland management (reduction of food sources and viable habitat) and fragmentation of woodland leaving unviable populations (Harris *et al*, 1995).

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In 2001 the dormouse population in the United Kingdom was estimated in the region of 500,000 (Macdonald and Tattersall, 2001). More recently the latest data published by the JNCC (Battersby, 2005) indicates that the present UK population may be as low as 40,000. Although declining in the UK, dormice are believed to be widespread in southern counties (from Devon to Kent) but with only a patchy distribution. The Red Data Book for Kent describes Kent as one of the strongholds for dormice and that they have been recorded from suitable woodland throughout the county (Waite, 2000). Population densities are generally thought to be a maximum of 10 adults per hectare, even in good habitats.



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## Appendix 5 – Bat Legislation

All British bat species receive legal protection in the United Kingdom. The Wildlife and Countryside Act 1981 (WCA) (as amended) transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The 1981 Act was recently amended by the Countryside and Rights of Way (CRoW) Act 2000 and the more recent Habitats Regulations amendments (2010). All British bat species are listed under Schedule 5 of the 1981 Act, and is therefore subject to the provisions of Section 9, which makes it an offence to:

- Intentionally kill, injure or take a bat [Section 9(1)];
- Possess or control any live or dead specimen or anything derived from a bat [Section 9(2)]
- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection [Section 9(4)(b)];
- Intentionally or recklessly obstructs access to any structure or place which a bat uses for shelter or protection [Section 9(4)(c)]
- Sell, offer for sale, possess or transport for the purpose of sale or publish advertisements to buy or sell a bat [section 9(5)]

Bats are also included on Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive). As a result of the UK ratifying this directive, all British bats are protected under The Conservation of Habitats and Species Regulations 2010 (The Conservation Regulations). Annex IV of the Habitats Directive requires member states to construct a system of protection as outlined in Article 12, this is done through Part 3 of the Regulations whereby Regulation 41 makes it an offence to:

- Deliberately capture, kill or injure a bat [Regulation 41(1)(a)];
- Deliberately disturb a bat in such a way as to be likely to significantly affect i) the ability of any significant group of animals of that species to survive, breed or rear or nurture their young, OR ii) the local distribution of that species. [Regulation 41(1)(b) and 41(2)];
- Damage or destroy a breeding site or resting place of a bat [Regulation 41(1)(d)].

Under the law, a roost is any structure or place used for shelter or protection. This could be any structure, for example, any building or mature tree. Bats use many roost sites and feeding areas throughout the year. These vary according to bat age, condition, gender and species, as well as season and weather. Since bats tend to re-use the same roosts for generations, the roost is protected whether the bats are present or not.

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In addition, four species, the two horseshoes, barbastelle and Bechstein's are included within Annex II of the Habitats Directive for which Member States are required to designate Special Areas for Conservation (SAC's) for their protection.

The UK is a signatory to the Agreement on the Conservation of Bats in Europe, established under the Bonn Convention. The Fundamental Obligations of Article III of this Agreement require the protection of all bats and their habitats, including the identification and protection from damage or disturbance of important feeding areas for bats.

# Which plants should I choose?

Bat-friendly gardeners should aim to plant a mixture of flowering plants, vegetables, trees and shrubs to encourage a diversity of insects, which in turn may attract different bat species. Flowers that bloom throughout the year, including both annuals and herbaceous perennials, are a good idea: night-flowering blossoms attract night-flying insects. Trees and shrubs provide food for insects and roosting opportunities for bats.

Approximate flowering periods are listed below, although they may vary according to area and weather conditions!

## Flowers for borders

- \*Aubretia (spring to early summer)
- \*Candytuft (summer to autumn)
- \*Cherry pie (summer to autumn)
- Corncockle
- Cornflower
- Corn marigold
- Corn poppy
- \*Echinacea
- English Bluebell (spring)
- \*Evening primrose (summer to autumn)
- Field poppies (summer)
- \*Honesty (spring)
- \*Ice plant 'Pink lady' (early autumn)
- Knapweed (summer to autumn)
- Mallow (summer to autumn)
- \*Mexican aster (summer to autumn)
- \*Michaelmas daisy (summer to autumn)
- \*Night-scented stock (summer)

- Ox-eye daisy (summer)
- \*Phacelia (summer to autumn)
- \*Poached egg plant (summer)
- Primrose (spring)
- Red campion (spring)
- \*Red valerian (summer to autumn)
- Scabious (summer)
- St John's wort (spring)
- \*Sweet William (summer)
- \*Tobacco plant
- \*Verbena (summer to autumn)
- \*Wallflowers (spring to early summer)
- Wood forget-me-not (spring)
- Yarrow (early summer)



Plants marked \* are hybrids or exotics that may be useful in the garden



## Herbs (both leaves & flowers are fragrant)

- Angelica
- Bergamot (summer to early autumn)
- Borage (spring to early autumn)
- Coriander (summer)
- English marigolds
- Fennel (summer to early autumn)
- Feverfew (summer to autumn)
- Hyssop (summer to early autumn)
- Lavenders
- Lemon balm
- Marjoram (summer)
- Rosemary (spring)
- Sweet Cicely (spring to early summer)
- Thyme (summer)

## Things to remember

- Pesticide-free gardens tend to be better for wildlife and bats.
- Wherever possible, try to choose native plants and trees.
- Never dig up plants from the wild. Buy native plants from reputable suppliers who breed their own stock.
- Use peat-free compost or peat-substitutes such as coir. Peat extraction is unsustainable and seriously damages our unique bog habitats. Gardeners can help by reducing the demand for this product.
- Creating a range of habitats such as a pond, vegetable garden and hedgerow makes your garden more attractive to insects and in turn bats.
- Add a seat, put your feet up and watch your garden come to life!
- Hedge and tree lines are important to help bats navigate.
- Use lighting sensitively in your garden and do not point it at a bat box or roost.

## Trees, shrubs & climbers

Bramble (climber)

\*Buddleia (shrub)

Common alder  
(suitable for coppicing)

Dog rose (climber)

Elder (small)

English oak (large gardens only)

Gorse (shrub)

Guelder rose (shrub)

Hawthorn (suitable for coppicing)

Hazel (suitable for coppicing)

Honeysuckle (native honeysuckle)

Hornbeam

Ivy (climber)

\*Jasmine (night-scented)

Pussy willow (suitable for coppicing)

Rowan

Silver birch



## Wild flowers for pond edges & marshy areas

Bog bean

Bugle

Creeping Jenny (spring to summer)

Flag iris

Hemp agrimony (summer)

Lady's smock (spring to summer)

Marsh mallow

Marsh marigold (spring)

Marsh woundwort

Meadowsweet  
(summer to early autumn)

Purple loosestrife (summer)

Water avens

Water forget-me-not  
(summer to autumn)

Water mint (summer to autumn)