Hartnoll's Farm, Tiverton, Devon:

Protected Species and Hedgerow Assessment Report

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For: Waddeton Park Ltd

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GLOSSARY

BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRoW	Countryside and Rights of Way Act 2000
CWS	County Wildlife Site
EA	Environment Agency
ECOW	Ecological Clerk Of Works
EMP	Ecological Management Plan
EPS	European Protected Species
EOAC	European Ornithological Atlas Committee
EU	European Union
Ha	Hectare
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
NERC	Natural Environment and Rural Communities Act
SSSI	Site of Special Scientific Interest
TN	Target Note
UK	United Kingdom
UWS	Unconfirmed Wildlife Site
WCA	Wildlife and Countryside Act 1981

EXECUTIVE SUMMARY

Engain has undertaken protected species surveys at a proposed development site on land at Hartnoll's Farm, Tiverton, Devon. The site is being considered for a proposed mixed-use development.

Surveys were conducted for bats, breeding birds, dormice, reptiles, badgers, great crested newts, otters and water voles.

Findings

The habitats include mature trees and woodland copses, an intact network of hedgerows, grassland and arable land. The Tiverton Branch Railway Unconfirmed Wildlife Site (ie not yet designated) lies within the site boundary and the Grand Western Canal County Wildlife Site abuts the southern and eastern site boundary.

The site has been found to support dormice, bats and badgers and there is the potential for low numbers of common reptiles and amphibians in hedgerows along the eastern boundary of the site.

Dormice are the key species for consideration on this site. The hedgerows and woodland copses are ecologically important for this species and have been assessed as important under the Hedgerow Regulations 1997.

The site supports a typical farmland bird assemblage of low to moderate diversity including the linnet, which is noted as a species of importance since its recent decline in numbers in the UK.

No signs of otter, water vole, great crested newts, or reptiles were found during the surveys.

Mitigation

New areas of hedgerow and woodland will be created to provide continuous wildlife corridors, particularly in the southern area of the site around the Tiverton Brach Railway UWS.

Dormouse habitat will be specifically protected through retaining and managing the majority of the hedgerows and standard mature trees. This includes the boundary with the Grand Western Canal County Wildlife Site and Local Nature Reserve.

A detailed mitigation strategy and European Protected Species licence will be required prior to carrying out any works that will affect dormouse habitat including for all hedgerows on site and any wooded areas.

Lighting will be minimised and carefully designed to retain dark habitat corridors for wildlife including dormice and bats, particularly to the east of the site and along hedgerows.

Protection measures during construction will be implemented under a Construction Environmental Management Plan (CEMP), which will be produced by the Contractor(s) and agreed with the planning authority. The principles of protection will include pre-commencement ecology survey checks prior to vegetation clearance, exclusion zones near sensitive habitats such as streams and hedgerows and tree root zones, directional construction lighting away from sensitive habitats, pollution prevention measures to protect the stream and pond, and avoidance of works during the breeding bird season and reptile hibernation season in specified locations. Should any trees requires surgery or management, these will be evaluated for use by bats and appropriate precautionary measures will be agreed with the planning authority.

The CEMP will describe the precautionary approach to such works, such as vegetation and tree removal, and the measures to protect wildlife including dormice, bats, badgers and breeding birds.

Biodiversity Enhancement

The landscape proposals provide for significant ecological enhancement that includes new native species planting. Additional enhancement measures will include the following:

- Production and agreement of a long term site ecological management plan particularly for wildlife using hedgerows and woodland areas such as dormice and bats;
- Planting of additional lengths of native hedgerow and planting standard trees to create new wildlife corridors enhancing connectivity both within and leading off site, to benefit species such as dormice, bats and breeding birds, as well as UK BAP species such as hedgehogs;
- The site will be enhanced for wildlife through the creation of native species rich grassland habitat along the hedgerows, particularly benefits breeding birds and UK BAP species such as brown hares; and

- Installation of bat and bird boxes in existing and new trees as well as on buildings close to natural habitat on the site (once new trees established).

Overall, the proposed enhancement will provide a net gain for biodiversity and will contribute to the objectives identified in the Devon Biodiversity Action Plan.

1 INTRODUCTION

1.1 Engain was instructed by the Waddeton Park Ltd, to undertake protected species and hedgerow surveys at Hartnoll's Farm a proposed development site within the Tiverton Eastern Urban Extension, Devon.

1.2 Surveys were conducted for bats, breeding birds, dormice, reptiles, badgers, otters and water voles and hedgerows.

1.3 This report presents the legislative and policy context of these protected species, describes the methodologies used for survey and evaluation of data, findings of the protected species surveys, evaluates the current status of species using the site, assesses the potential effect of the use of the developed area upon protected species, and provides recommendations for any additional ecological investigation and/or mitigation where necessary. This report also provides recommendations for ecological enhancement of the site.

2 LEGISLATION AND POLICY

Relevant Legislation

2.1 Dormice (*Muscardinus avellanarius*), all British bats (*Chiroptera*), otters (*Lutra lutra*) and great crested newts (*Triturus cristatus*) are European Protected Species (EPS) under the Habitat Regulations[1]. It is an offence to:

- Deliberately capture or kill a EPS;
- Deliberately disturb a EPS 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; and
- Damage or destroy a breeding site or resting place of a EPS.

2.2 An EPS licence is required to carry out an otherwise unlawful action affecting these species. A licence will only be granted if the following tests can be met:

- The consented operation must be for "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment";
- There must be "no satisfactory alternative"; and
- The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their range.

2.3 The Birds Directive[2] is also implemented through the Wildlife and Countryside Act 1981[3] (as amended). In addition, the Wildlife and Countryside Act 1981 provides protection to other habitats and species at a national level. The Countryside and Rights of Way Act 2000 (CRoW)[4] adds additional enforcement, making offences arrestable, increasing time limits for some prosecutions and increasing penalties.

2.4 Badgers (*Meles meles*) and their setts are protected under the Protection of Badgers Act 1992[5] as amended by The Hunting Act 2004[6].

2.5 The Hedgerow Regulations 1997[7] protect hedgerows that are important ecologically, historically and in landscape terms. It is illegal to remove or

destroy an important hedgerow without permission from the relevant local planning authority.

2.6 The Natural Environment and Rural Communities Act (NERC) 2006[8] extends the biodiversity duty set out in the CRoW Act to public bodies and statutory undertakers to take due regard to the conservation of biodiversity. Planning authorities should ensure that there is no net loss of biodiversity on a site and are committed to achieve an overall net gain for biodiversity.

Relevant Policy

2.7 The National Planning Policy Framework (NPPF)[9] sets out the Government's policies for the protection and enhancement of biodiversity through the planning system. The NPPF encourages the planning system to contribute to and enhance natural and local environments, through minimising the impacts on biodiversity and providing net gains in biodiversity where possible.

2.8 Local planning authorities should follow key principles to ensure that the potential impacts of planning decisions on biodiversity conservation are considered. Circular 06/05: Biodiversity and Geological Conservation[10] provides administrative guidance on the application of the law relating to planning and nature conservation and complements the NPPF.

2.9 The UK Post-2010 Biodiversity Framework[11] is the UK Government's response to their renewed commitment to the Convention on Biological Diversity, following a summit in Nagoya, Japan in 2010, which identified targets to halt biodiversity loss. The UK Framework identifies the requirements to galvanise and complement the strategies for England, Scotland, Ireland and Wales, in pursuit of the targets.

2.10 The Natural Environment White Paper and Biodiversity 2020: A strategy for England's wildlife and ecosystem services[12], are the country level strategies for England. The 56 habitats and 943 species of principle importance listed under Section 41 of the NERC Act are those identified as requiring action in the UK Biodiversity Action Plan[13] and continue to be regarded as conservation priorities in England under the UK Framework.

2.11 Local Biodiversity Action Plans (BAPs) give valuable information on local conservation priorities. Devon Biodiversity Action Plan[14] is the local BAP relevant to this site.

3 SITE LOCATION AND GENERAL DESCRIPTION

Site Location

3.1 The site is located to the east of Tiverton, mid-Devon approximately 2 km to the east of the town centre. The Ordnance Survey grid reference for the centre of the site is SS 983 128.

General Description

3.2 The site is bounded to the north by Post Hill and an unnamed road to the west. The Grand Western Canal and Country Park creates the southern and eastern boundary. Hartnoll's Business Park and Hartnoll's Farm itself are located in the north-western area of the site and on the eastern boundary respectively, These are not included within the survey site. There are three neighbouring residential properties at the north western boundary area of the site.

3.3 In a broader context the site area is well connected to the wider landscape by the adjacent canal, hedgerows, woodland and tributaries of the River Lowman to the west. The wider landscape consists of arable and cattle grazed farmland.

3.4 The soil at the site consists of two types of soil: freely draining slightly acid loamy soils; and loamy and clayey floodplain soils (UK Government's Countryside Geographic Information website (MAGIC))[15].

4 METHODOLOGY

4.1 The following section describes the methodologies used for the data search and field surveys.

Evaluation of Existing Ecological Records

4.2 A data search of existing ecological records for the site and the immediate surrounding land (to within a radius of 2 km for protected and notable species and non-statutory designated sites and 5 – 8 km for statutory designated sites) was conducted in April 2013 as part of an ecological appraisal of the site.

4.3 During this process, Devon Biodiversity Records Centre has been contacted to obtain records for protected and notable species and information on sites with non-statutory conservation designations.

4.4 A review of web-based information, including the UK Government's Countryside Geographic Information website (MAGIC) was undertaken for information on sites with statutory designations, in conjunction with an assessment of site plans and aerial photographs.

4.5 A review of the National Biodiversity Network[16] was conducted in 2013 for records of white-clawed crayfish.

Dormouse Survey

4.6 Setting out nest tubes is an established method to help identify the presence or likely absence of dormice. Survey guidance[17] provides an index score for each month that nest tubes are left out. A minimum survey effort index score of 20 is required to assume absence.

4.7 150 nest tubes were installed within the site and suitable connected habitat in late April 2013. They were spaced at approximately 20 m intervals within suitable habitat (hedgerows and on the branches of small trees in woodland), at least 1.5 m above ground level. The nest tubes were left on site throughout the year and checked by licenced dormice ecologists during September, October and November 2013. Appendix 1 shows the location of dormouse nest tubes. Nest tubes have now been removed from the site.

4.8 Data recorded during the nest tube inspections includes the number of dormice observed using the nest tubes, nest tube number, whether nests are present and whether nest tubes are being used by other species. If dormice were present then biometric measurements including sex, activity (active/torpid), breeding condition and number of young would be recorded.

4.9 Nest tubes are left undisturbed if small, pink, furless young are present.

Bat Surveys

Tree Inspection

4.10 The tree inspections were undertaken on 4 March 2014 by an experienced ecologist.

4.11 The methodology of the tree inspection follows the Bat Conservation Trust (BCT) Bat Surveys: Good Practice Guidelines 20012[18] and the Bat Workers' Manual (Joint Nature Conservation Committee (JNCC), 2004)[19].

4.12 The trees on site were inspected visually during daylight hours externally for evidence of previous usage and current suitability for bats. This involved searching for features e.g. broken limbs, cracks in bark, woodpecker holes and hollow cavities that could be used by bats and for evidence of bats including urine or oil stains, feeding signs (e.g. moth wings), droppings, social calls or direct observation of bats.

4.13 Trees with no potential for bats have no cracks or crevices that could be used to roost within. Trees with a low potential for bats have few cracks or crevices that could be used by individual bats. Trees with a medium potential for bats have a mix and greater occurrence of features such as crevices, loose bark, woodpecker holes, limb loss and niches. Trees with a high potential for bats have features many features suitable for bats including cavities, crevices, loose bark, woodpecker holes, limb loss and niches that have potential to support maternity roosts and larger numbers/colonies of bats.

4.14 A million-candle power spotlight and a pair of Nikon 8 x 36 binoculars were used to assist a thorough external visual inspection of the trees.

4.15 Inspection for other signs of bats, including bat droppings, urine stains, and feeding signs, were also noted in or at the base of trees. Attributing droppings to bats (rather than mice or other small mammals) is generally straightforward, owing to the dry dusty/crumbly texture of bat droppings. Assigning droppings to a particular species of bat is, however, more difficult can only be indicative rather than definitive unless the droppings are analysed by an accredited laboratory for their genetic material.

Bat Transect Surveys

4.16 The survey methodology is informed by the BCT Bat Surveys Good Practice Guidelines 2012 and the Bat Workers Manual (JNCC, 2004).

4.17 In order to determine the possible use of the habitats by bats and due to the large size of the site and relatively good habitat quality, six dusk transect surveys were conducted. The transect surveys were conducted on 4 June, 25 June, 9 July, 29 August, 26 September, and 8 October 2013. A pre-dawn transect survey was conducted on the 27 September 2013.

4.18 In general the survey conditions were fair with marginal cloud and light winds. The dusk transect surveys commenced just before sunset and continued for up to 3 hours after sunset.

4.19 Three experienced ecologists carried out each of the surveys. Each observer followed a transect along the field edges to cover the full footprint of the proposed development, and any suitable connected habitat. Appendix 2 shows the three transect routes walked.

4.20 Visual observations were supported by the use of ultra-sonic bat detectors. A combination of heterodyne and frequency division hand held detectors (BATBOX Duet, Wildlife Acoustics EM3+ and Anabat detectors) were used, which detect ultrasonic bat calls. The frequencies were recorded for analysis and verification.

4.21 Walked transect surveys using a bat detector are a technique for gauging general activity at a site and the likely value of the sites for bats, identifying key areas of activity and for identifying the use of the site by different species of bats throughout the active season.

Static Datalogger Surveys

4.22 To supplement the transect surveys, three static data loggers (Anabat) were left on site for between 5 and 7 consecutive nights each month from May to October to record bat activity between sunset and sunrise. The locations of the static data loggers are shown on the plan in Appendix 2.

Table 1: Details on the bat survey schedule including weather conditions.

Date	*Time*	*Weather conditions*	*Temp. (°C)*
04/06/2013	21:20 - 11:50	Wind: 2, Rain: 0, Cloud: 0	14
25/06/2013	21:32 - 00:02	Wind: 1, Rain: 0, Cloud: 8	10 - 15
09/07/2013	21:39 - 00:00	Wind: 0, Rain: 0, Cloud: 0	22
29/08/2013	20:15 - 22:35	Wind: 2, Rain: 0, Cloud: 6	16
26/09/2013	19:04 - 21:40	Wind: 1, Rain: 0, Cloud: 8	15
27/09/2013	05:37 - 07:07	Wind: 0, Rain: 0, Cloud: 8	12
08/10/2013	18:33 - 21:02	Wind: 3, Rain: 1, Cloud: 8	16

Data Analysis

4.23 The recorded data was downloaded from recorders to sound analysis software (AnalookW and BatScan) to allow the display of bat call sonograms, which, with pulse length and repetition rates, has assisted with the verification of the bat species.

Badger Survey

4.24 Badger surveys were conducted in conjunction with hedgerow surveys on 14 May 2013 and were updated on 10 July 2013. The survey conditions were good and an experienced ecologist carried out the survey. The survey followed Mammal Society Guidelines[20], including a thorough search of the site and surrounding 50 m to record all setts within the site boundary and any setts

outside on the perimeter of the boundary (where access permitted). A search for signs of badgers e.g. tracks, latrines, hairs and snuffle holes was also conducted throughout the site.

Reptiles

4.25 The reptile survey was based on the methodologies detailed in the Herpetofauna Worker's Manual[21] and the Froglife Advice Sheet[22]. The survey methodology was agreed with NE and the County Ecologist.

4.26 Reptile mats were put out on site on 5 June 2013 and seven checks were conducted between 19 June and 30 September 2013 in suitable conditions. Approximately 50 artificial reptile refugia (roof felt squares), used by reptiles for basking and shelter, were located in areas of favourable habitat, such as potential basking sites and edges within scrub-grassland mosaics. Appendix 1 at the back of this report provides the location of the refugia mats.

4.27 After placement, the felt squares were left for three weeks for reptiles to acclimatise to them before being checked.

Breeding Bird Survey

4.28 Breeding bird surveys were undertaken by experienced ecologists and ornithologists on the 24 April, 29 May and 14 June 2013. Weather conditions were suitable for surveying during each site visit.

4.29 The survey methodology was based on territory mapping (Bibby *et al* 1992[23]) as used for the British Trust for Ornithology's (BTO) Common Bird Census. Standard BTO species codes and symbols were used to identify birds and denote breeding activity, sex and age where relevant. The breeding bird assessment criteria are based on those suggested by the European Ornithological Atlas Committee (EOAC 1979[24]) and birds are grouped into four categories:

- Confirmed breeder (B) (e.g. recently fledged young observed, adult birds carrying food for young);
- Probable breeder (Pr) (pair in suitable habitat, territory defended, agitated behaviour or nest building);
- Possible breeder (Po) (birds observed in suitable habitat or singing male recorded); and

- Birds that were considered not to be using the site for breeding were categorised as 'non-breeders' (N) (e.g. flying over the site, migrant, habitat not suitable).

4.30 To provide adequate information to determine the likely status of breeding birds on the site, three surveys were undertaken. Surveys were carried out between 06:00 and 09:00 and were undertaken in favourable conditions avoiding poor weather such as heavy rain or strong wind that may have affected the results.

4.31 Birds were identified by sight and sound, using 8 x 32 binoculars as required. On each occasion, a fixed route was walked that enabled all of the habitats of the site to be examined. This included all large open fields as well as the hedgerows dividing the fields and around the periphery of the site. The route involved walking immediately alongside most of the hedgerows and allowed close observations to be made.

Otter and Water Vole Survey

4.32 These surveys were conducted on 5 September 2013 during good weather conditions. The survey methods follow the National Rivers Authority[25] guidelines.

4.33 The otter and water vole surveys were conducted along ditches which connect to Ailsa Brook to the west.

4.34 The bankside habitat of these riparian areas was evaluated in terms of their potential ability to support otters and water voles. A search for signs of otters and water voles was conducted along the watercourses. The search for signs of otters included spraints (otter dung), sprainting opportunities (rocks, logs or ledges otters leave spraints on to mark territories), footprints, holts (otter den), laying-up site (daytime or occasional resting place) and feeding remains. The search for signs of water voles included droppings, latrines (piles of droppings), burrows, feeding signs (characteristic gnawed vegetation), tracks, runs and lawns (areas of nibbled grass outside of burrows).

Great Crested Newt Survey

4.35 A presence/absence survey was conducted by suitably experienced and licenced ecologists. The survey methods follow Natural England[26] and Froglife[27] guidelines.

4.36 One pond (a widened wet ditch referred to as Shamel's End) within the site and the Grand Western Canal adjacent to the site were identified as having some potential for great crested newts and other amphibians. No further suitable waterbodies were identified within 500 m of the site.

4.37 The presence/absence survey used three survey methods per visit; torch survey, bottle trapping and egg searching. Four survey visits were carried out at Shamel's End between mid-May and mid-June 2012 under suitable conditions. Two surveys were carried out at the canal before this waterbody was scoped out due to unsuitability.

Hedgerow Assessment

4.38 Hedgerow surveys were conducted on 14 May 2013 by an experienced ecologist. Under the Hedgerow Regulations 1997 a hedgerow is deemed to be ecologically important if:

- It contains, or records exist that it has contained, protected species of birds, animals or plants, listed on schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981;
- It contains certain red data book species that are listed as endangered, extinct, rare or vulnerable including birds, plants, invertebrates or stoneworts;
- It runs along a public right of way and includes at least four woody species, in an average 30 m length and has at least two associated features; and
- The hedgerow includes at least five woody species in an average 30 m length, combined with three or more associated features, further woody species or contains one or more particularly uncommon woody species which are detailed within the Hedgerow Regulations.

4.39 The survey data was used to assess the ecological value and status of each hedgerow on site according to the Hedgerow Regulations 1997, the UK Biodiversity Action Plan (BAP) and the Devon BAP. Hedgerows with five or more species within an average 30 m length are classed as species-rich.

Limitations and Assumptions

4.40 Due to an equipment malfunction, static dataloggers for recording bats were only placed on site at two locations (Appendix 2, locations 1 and 3) during August 2013. It is considered that this has not adversely affected the adequacy of the survey data for informing a planning application.

4.41 Trees in the south western area of the site have not been surveyed in detail for bat roost potential under the current scope. These trees will be retained and incorporated within the country park area of the site.

5 FINDINGS

5.1 The following section describes the protected species survey findings and information collated from the data search. Appendices 1 to 8 provide plans of the key habitats and evidence of protected species present on the site and should be referred to throughout this section.

Data Search

Designated Sites

5.2 There are two statutory designated sites within 2 km of the site. Tidcombe Lane Fen (SS91/077) Site of Special Scientific Interest (SSSI) is located approximately 800 m to the west of the site. The SSSI is approximately 7 ha in area and contains wet woodland and fen meadow vegetation, which is nationally scarce and rare in Devon. Over 100 species of flowering plants have been recorded within the site.

5.3 The Grand Western Canal Country Park (Local Nature Reserve and County Wildlife Site) is located adjacent to the southern and eastern boundary of the site. The canal is approximately 51.4 ha in area. The site is designated for waterfowl and bird species, hedgerows, bankside vegetation, otters, orchids and insects.

UK Biodiversity Action Plan (BAP) Records

5.4 The UK BAP (*) and LBAP (**) both list the following species that are relevant to the habitats within and adjacent to the proposed site.

- House sparrow (*Passer domesticus*)*;
- Bullfinch (*Pyrrhula pyrrhula*)*;
- Starling (*Sturnus vulgaris*)*;
- Song thrush (*Turdus philomelos*)*;
- Yellow hammer (*Emberiza citronella*)*;
- Linnet (*Carduelis cannabina*)*;
- Skylark (*Alauda arvensis*)*;
- Barn owl (*Tyto alba*)**;
- Brown hare (*Lepus europaeus*)* **;
- Hedgehog (*Erinaceus europaeus*);

- Harvest mouse (*Micromys minutus*)*;
- Dormouse (*Muscardinus avellanarius*)* **;
- Otter (*Lutra lutra*)* **;
- Water vole (*Arvicola amphibious*)* **;
- Bat species* **;
- Golden hair lichen (*Teloschistes flavicans*)**;
- Primrose (*Primula vulgaris*)**;
- Fresh water pearl mussel (*Margaritifera margaritifera L.*)**;
- White clawed crayfish (*Austropotamobius pallipes*)* **; and
- Great crested newt (*Triturus cristatus*)*.

Habitats

5.5 The habitats within the site that are of particular value to protected species include the hedgerows (particularly the species-rich native hedgerows and Devon banks), mature trees, field margins and ditches. Arable fields are of some value for foraging birds and mammals.

Dormice

5.6 Dormouse nests were found within six separate nest tubes placed on site during the surveys. These nests were firmly woven balls of green or browned dead leaves occasionally mixed with honeysuckle (*Lonicera periclymenum*) bark. No individual dormice were found during the surveys.

5.7 Appendix 1 shows the locations of nest tubes and of dormouse signs found.

5.8 Historical records of dormice were returned from immediately adjacent to the proposal site along the Grand Western Canal and from the gardens of nearby residential properties.

Bats

5.9 Bat transect surveys and activity surveys using static data loggers have been carried out at the site during 2013. An assemblage of ten species have been recorded across the site including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), Leisler's (*Nyctalus leisleri*), whiskered (*Myotis mystacinus*), serotine (*Eptesicus*

serotinus), Daubenton's (*Myotis daubentonii*), greater horseshoe, lesser horseshoe and other unidentified myotis species. The full results of the bat surveys are shown in Appendix 3.

5.10 Throughout the survey period moderate levels of bat activity were recorded, with bats using the site for foraging and commuting. Key areas of bat activity on site are the hedgerows, primarily those with trees interspersed within them. Mature trees within the hedgerows and at field corners and the woodland belt along the historic railway line towards the south of the site are key foraging habitats for bats.

5.11 Overall the diversity of bat species recorded during the transect surveys was high, however the species recorded showed some seasonal variation (Appendix 3). Common pipistrelles were the most frequently recorded bat species with a minimum of 45% of the recordings being accounted to them. The counts varied from 45% of the total counts on 9 July to 71% on 26th September.

5.12 Soprano pipistrelles were the second most frequently recorded bat species. They were responsible for between 18% of the recordings on 26 September and 37% of the total recordings on 29 August.

5.13 Myotis bat species comprised a moderate proportion (25%) of bat recordings during the 9 July survey, in comparison to 2% of the recordings on 26 June and 29 August.

5.14 Two greater horseshoe bat passes and four lesser horseshoe bat passes were recorded on 25 June and one lesser horseshoe was recorded on 8 August. No other horseshoe bats were recorded during the other five transect surveys. Lesser horseshoe bat recordings comprised 0.002% of the total bat passes recorded during all surveys. Greater horseshoe bat passes comprised 0.0003% of the total bat passes.

Tree Inspections

5.15 Overall 56 trees were identified on site as being of high, moderate or low potential for roosting bats. The tree survey results and plan are shown in Appendix 4.

Breeding Birds

5.16 Mapped results for each breeding bird survey visit are shown in Appendix 5. Breeding designations for all species recorded during the survey along with policy and legal status, BTO mapping codes and conservation status are also listed in Appendix 5.

5.17 Moderate numbers of common and widespread farmland birds were found at the site. In total 29 species were recorded on the site during the surveys using the hedgerows, trees, field margins and arable land on site. Woodpigeon (*Columba palumbus*), blackbird (*Turdus merula*), carrion crow (*Corvus corone*), rook (*Corvus frugilegus*), wren (*Troglodytes troglodytes*) and chaffinch (*Fringilla coelebs*) were the most frequently recorded.

5.18 Six UK BAP and Section 41 bird species have been recorded, four of which are classed as probable (linnet (*Carduelis cannabina*), song thrush (*Turdus philomelos*) and dunnock (*Prunella modularis*)) or possible breeders (bullfinch (*Pyrrhula pyrrhula*)) on site.

5.19 Of the confirmed, possible or probable breeders on site, two species (linnet and song thrush) are of 'red' status on the Birds of Conservation Concern (BOCC) list.

5.20 Eight species were recorded as non-breeders on site as they were only recorded flying over the site or feeding within grasslands and arable fields; these include herring gull (*Larus argentatus*) and sparrowhawk (*Accipiter nisus*).

5.21 Records received from Devon Biodiversity Records Centre show a moderate assemblage of bird species within 2 km of the site, including grey partridge (*Perdix perdix*), goldfinch (*Carduelis carduelis*) and spotted flycatcher (*Muscicapa striata*) for which there is some potential on site.

Reptiles

5.22 No reptiles have been found on site during the surveys. Potential remains for low numbers of common reptiles, most likely grass snakes and slow worms to occasionally move into the eastern edge of the site from the Grand Western Canal. Full results of the reptile survey are shown in Appendix 6.

5.23 Devon Biodiversity Records Centre provided records of slow worm and grass snake within 2 km from the site boundary.

Badgers

5.24 There are currently four active badger setts present on site including one main sett, an annexe or subsidiary sett and two outlier setts. The descriptions and locations of these setts are provided in a separate confidential letter and accompanying plan submitted to the planning authority. Several badger tracks, snuffle (foraging) holes and latrines were also found on site.

5.25 Devon Biodiversity Records Centre provided several records of badgers within 2 km of the site.

Otters and Water Voles

5.26 No evidence of otters or water voles was found during the surveys along the wet ditches on site.

5.27 There are several recent records of otters within 2 km of the site including along the Ailsa Brook just west of the site. No records of water voles were returned.

Great Crested Newts and Other Amphibians

5.28 One common frog (*Rana temporaria*) was found within the Shamel's End pond on 30 May 2012.

5.29 No further signs of amphibians were found during the newt surveys.

5.30 The surveys demonstrate the likely absence of great crested newts from the site. There is very little suitability for other amphibians within the majority of the site boundary due to the lack of standing water features. Small numbers of common amphibians such as common toad (*Bufo bufo*) and common frog (*Rana temporaria*) may hibernate or forage within grassland, scrub or woodland at the site and may move into the site from the Grand Western Canal.

5.31 Devon Biodiversity Records Centre provided one record of palmate newt (*Lissotriton helveticus*), a smooth newt (*Lissotriton vulgaris*), common toad and

several records of common frog within 2 km from the site boundary. Results in Appendix 7.

Hedgerow Assessment

5.32 There are 27 hedgerows within the site boundary. Twelve form the site perimeter whilst fifteen internal hedgerows form field boundaries. There are 21 species-rich native hedgerows within the site, which are considered ecologically important due to their diverse flora and associated features such as connecting hedgerows, woodlands or earth banks and ditches. The results of the hedgerow survey are shown in Appendix 8.

5.33 The woody species present within the hedgerows are diverse with frequent hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), field (*Rosa canina*) and dog rose (*Rosa arvensis*) and pedunculate oak (*Quercus robur*), occasional English elm (*Ulmus europeaus*), alder (*Alnus glutinosa*) and spindle (*Euonymus europeaus*) also occur.

5.34 Native bluebells (*Hyacinthoides non-scripta*) protected under Schedule 5 of the Wildlife and Countryside Act 1981 is present within the ground flora of hedgerow 2. Other woodland ground flora species present at the base of the hedgerows are lords and ladies (*Arum maculatum),* hart's tongue fern (*Asplenium scolopendrium*), red campion (*Silene dioica*) and male fern (*Dryopteris filix-mas*).

5.35 All of the hedgerows on site are important habitats for dormice, bats, small mammals and breeding birds and therefore all hedgerows will be retained and protected where possible. The species rich, intact hedgerows are particularly important as they provide abundant food sources, shelter and commuting corridors for wildlife.

6 EVALUATION, MITIGATION AND ENHANCEMENT

6.1 This section describes the ecological value and sensitivities of the site for protected species, and provides recommendations for mitigation and enhancement related to the proposed development.

Dormice

6.2 Dormice are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2011[28] making dormice an European Protected Species (EPS).

6.3 Nest tube surveys demonstrate presence and absence and cannot give an accurate representation of the population density of dormice across the site. However, due to the moderate number of nests found and the wide spread of nests across the site it is considered that dormice are present within all suitable connected habitat, but likely at higher densities within larger, species rich, Devon hedges, particularly within the hedgerows along Manley Lane and at lower density within species poor, more uniform, defunct or disturbed hedgerows such as those along Post Hill.

6.4 Connecting habitat exists between suitable on and off-site habitat in the form of an established network of Devon hedges with occasional fragmentation by narrow lanes. Woodland fragments are small and scarce in the immediate surroundings of the site and it is considered that the local hedgerow network is the main habitat used by the population of dormice found here.

6.5 In order to satisfy Habitat Regulations tests, there will be no net loss and, wherever possible, an enhancement to the conservation status of the dormouse population at this site. The majority of the hedgerow network will be retained, buffered with additional planting and managed for the benefit of dormice. Connectivity between hedges on and off-site is maintained to allow dormice to continue to move through and off the site into the wider landscape.

6.6 The total area of suitable dormouse habitat on-site is approximately 1.125 ha. Suitable habitat comprises woodland fragments, linear hedgerow habitat or lines of trees and scrub. Based on the Natural England guidelines, this habitat

is likely to support 1 or 2 individual dormouse territories. The Grand Western Canal is a significant barrier to dormice moving south or south-east although a good woodland and hedgerow corridor is present along the length of the canal.

6.7 Some interruption of hedgerow corridors will occur on site as part of the proposals and disturbance effects will increase around residential areas. Overall, suitable habitat for dormice will be at least doubled in area overall with new woodland and hedgerow planting, particularly in the southern part of the site furthest from the new development. The new areas of planting will be well connected with the existing corridor along the Grand Western Canal Hedgerows that are retained outside of curtilage will be managed in perpetuity for wildlife, according to a Dormouse Mitigation Plan and Ecological Management Plan to be agreed with the local authority and Natural England.

6.8 A Natural England license will be required to disturb, damage and destroy any sections of hedgerow or lines of trees on site as these may be places of shelter used by dormice. Where such suitable vegetation is to be removed or significantly isolated (ie with a gap greater than 5 m between suitable connecting habitat created), a phased clearance will be carried out under license to allow dormice to migrate to retained and newly created habitat. The sections of hedgerow to be removed will be cut to 0.5 m during late winter, under supervision of a licensed dormouse ecologist and leaving the hedgerow base undisturbed. Dormouse nest boxes will be installed in optimal retained habitat and created habitat prior to vegetation clearance works. Nest boxes must be installed at such a time as to support and encourage a migration of dormice upon emerging from hibernation during the spring. Boxes should be installed during August preceding the winter clearance period at the latest.

6.9 These mitigation, compensation and enhancement measures will be conditioned within the planning consent. Management measures will be detailed within an Ecological Management Plan to be agreed with the planning authority and Natural England.

Bats

6.10 Native bat species receive full protection under UK and European legislation including the WCA 1981 (as amended), the CRoW Act 2000, and the

Conservation of Species and Habitats (Amendment) Regulations 2011. It is an offence to wilfully or recklessly disturb or harm individual bats or to destroy, damage or obstruct a place of shelter used by bats, even if bats are absent.

6.11 There is an assemblage of common bat species currently using the site features for commuting and foraging activities. There are also very low numbers of lesser and greater horseshoe bats commuting and foraging across the site occasionally during June and October 2013. Key areas of activity are the hedgerows and mature trees and ditches.

6.12 The majority of mature trees with the potential to be used by roosting bats will be retained as part of the proposed development. A Construction Environmental Management Plan (CEMP) will cover the protection of these habitats. Should arboricultural works be required to trees with potential for bats, an inspection using an endoscope will be conducted prior to any tree cutting or arboricultural works. Further emergence and/or re-entry surveys of the trees (between May to September) may be required depending upon the outcome of these endoscope surveys.

6.13 Several hedgerows will be removed under the current proposals, which will reduce the number of commuting and foraging corridors within the site, and access to suitable connective habitat in the wider countryside.

6.14 The creation of wide, dark corridors with native planting through the proposed development particularly in the southern and eastern sections of the site and along Manley Lane will benefit foraging and commuting bats and will mitigate for lost hedgerow habitat. Where possible, this corridor should include a variety of habitats including wetland or aquatic, scrub and woodland, to provide suitable conditions and food sources for a diverse array of bat species.

6.15 Interconnected, dark habitat corridors should be maintained and created by shielding vegetated areas from light spill during construction and operation. A dark corridor with less than 1 lux along the wildlife corridors is recommended.

6.16 Existing linear features within the proposed site will be enhanced to improve potential foraging/commuting flight paths for bats. Such enhancement will include installing bat boxes within existing trees on the site and creating a

mosaic of additional habitats including meadow, scrub and woodland within and around the proposed development.

Breeding Birds

6.17 Moderate numbers of common and widespread birds have been recorded on site. Open areas of species-rich grassland, hedgerows, scrub and trees should be retained and enhanced within the proposals.

6.18 The removal of suitable nesting habitat should occur outside of the nesting season (March to August) or have an ECoW present to inspect vegetation prior to removal.

Reptiles

6.19 There is potential for small populations of reptiles on site within hedgerows and rough grassland. Clearance of this habitat will be managed under a CEMP. The mitigation measures for bats dormice and birds will be of benefit for reptiles.

Badgers

6.20 There are four active badger setts within the proposal site including one, likely main sett, one subsidiary or annexe sett and two outliers. The full descriptions of these setts and a location plan are provided in a separate confidential letter report provided to the planning authority. It is clear that at least one small population of badgers are using the site in conjunction with surrounding farmland.

6.21 The main and annexe badger setts, will be retained and protected within the proposals. Two outlier setts may require permanent closure under license from Natural England once planning permission has been granted.

6.22 The loss of arable habitat is likely to affect the foraging area used by the badgers on site. There is an abundance of this habitat nearby and the local badger population is unlikely to be adversely effected in the long term. New amenity grassland and other habitat creation will provide some compensatory foraging habitat for badgers.

Amphibians

6.23 No great crested newts have been found at the site. Common frog were recorded within the ponded ditch within the proposed development site. There is also potential for this species and for common toad to use scrub, hedgerows and woodland throughout the year. Sensitive, seasonal clearance methods will be used and a destructive search will be carried out as required to protect these species. Should amphibian species be encountered during construction, they will be translocated to safe suitable habitat.

Hedgerows

6.24 The ecologically important hedgerows on site should be retained within the development and kept outside of the curtilage. Other hedgerows should be retained and protected where possible.

6.25 The sections of hedgerow which will be lost or significantly fragmented will be replaced with a similar length of hedgerow within the development, outside of curtilage.

6.26 A greater loss of interior hedgerows will increase the importance of the boundary hedgerow corridors for wildlife. Where it is not possible to mitigate for this loss on site, off-site compensation in the form of hedgerow, woodland or scrub planting, which will enhance connectivity for the local populations of dormice, birds, bats and other wildlife, will be agreed with the planning authority.

Ecological Enhancement

6.27 The proposal site has the potential for overall enhancements for biodiversity. The following enhancement options will be considered within the design:

- Appropriate local native plant species and features in landscape planting plans to increase species and habitat diversity;
- Planting of additional lengths of native hedgerow and planting standard trees to create new wildlife corridors enhancing connectivity both within and leading off site; and
- Installation of bat and bird boxes in existing and new trees as well as on buildings close to natural habitat on the site (once new trees established).

7 CONCLUSIONS

7.1 The protected species surveys have revealed the site is of importance for dormice, bats, breeding birds and badgers.

7.2 Mitigation has been adopted in the design to retain and protect the majority of important habitats supporting these species groups, including hedgerows, mature trees and woodland copses. Lighting will be managed to minimise impacts on the wildlife corridors. Landscape planting will mitigate for some loss of hedgerow where they are to be removed for access. Additional landscaped native species planting will enhance the habitat potential for protected species and biodiversity improvement.

7.3 A CEMP will provide precautionary and protective measures to safeguard habitats and wildlife during the construction. This will include pre-commencement surveys. A long-term ecological management plan will be a commitment to benefit biodiversity and it is expected these measures will form a planning condition.

7.4 Following the implementation of mitigation and enhancement measures, the proposed development will overall ecologically enhance the site for protected species and biodiversity.

7.5 It is the responsibility of those involved with the development works to ensure that due diligence is demonstrated in complying with wildlife protection and nature conservation legislation at every stage of the project. Such legislation applies even in the absence of related planning conditions.

8 REFERENCES

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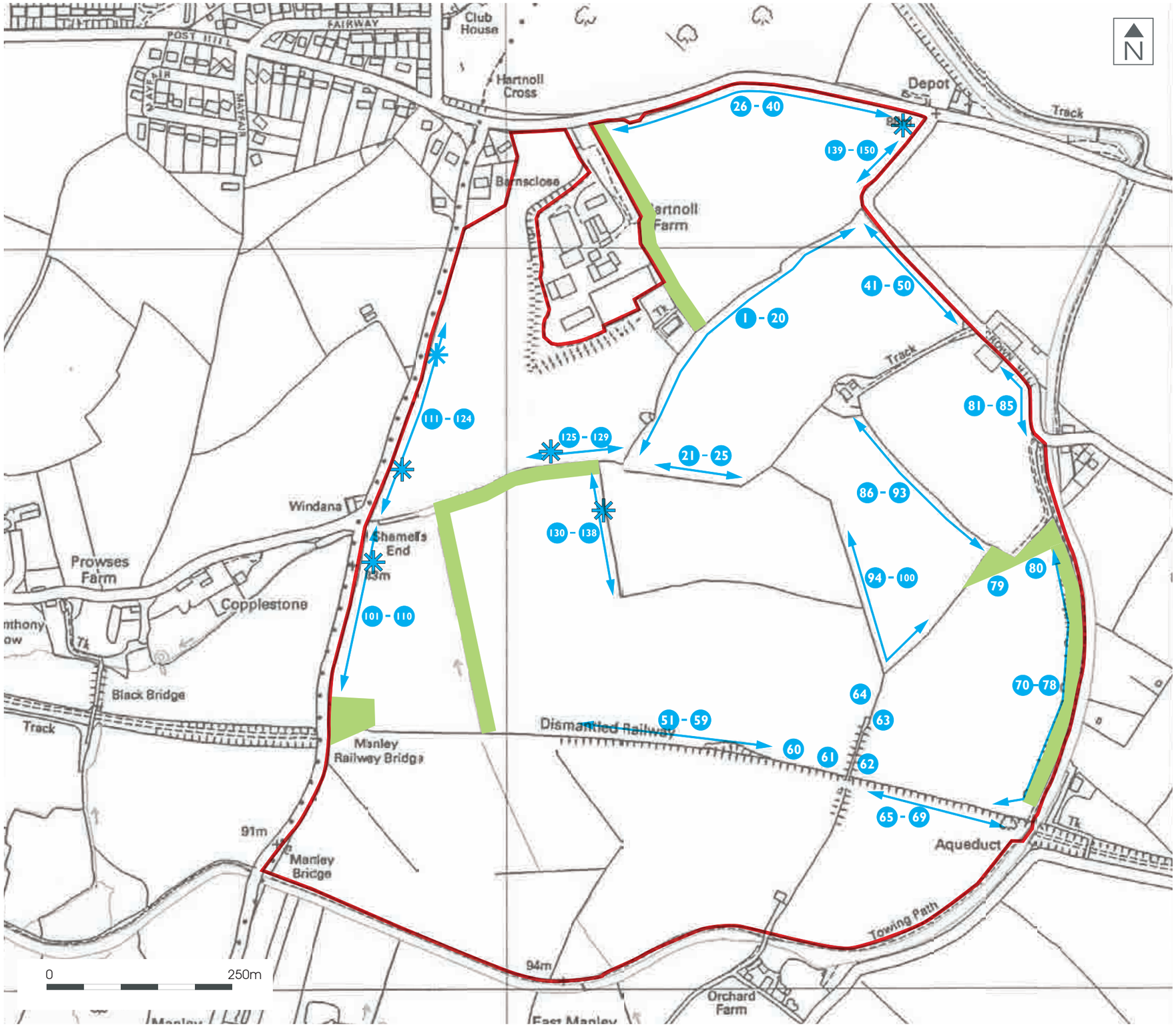
APPENDICES

Appendix 1: Dormouse and Reptile Survey Plan



Survey site

Dormouse nest found

Locations of dormouse nest tubes

Reptile refuges

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ON BEHALF OF

Waddeton Park Ltd

PROJECT

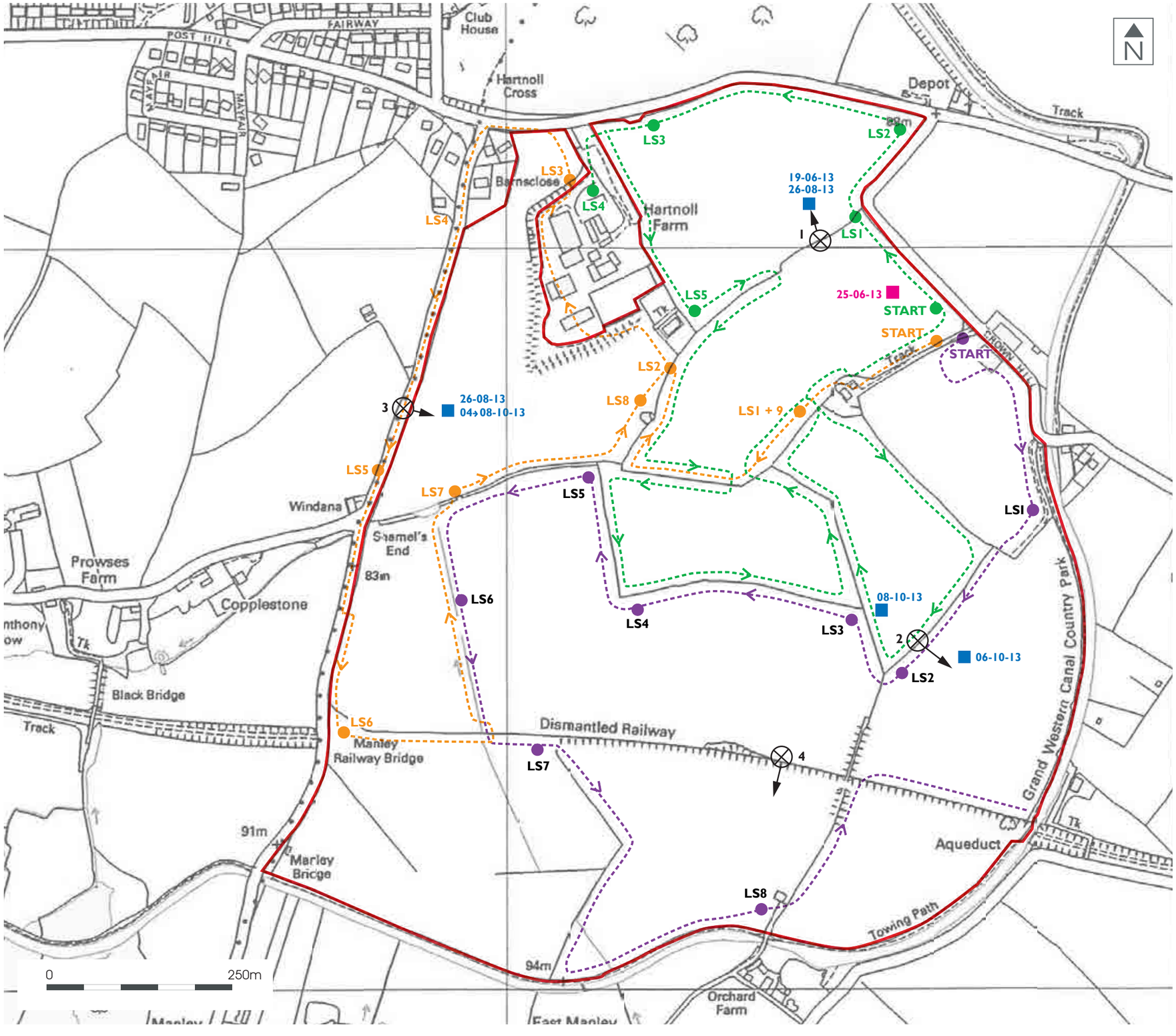
Hartnoll's Farm, Tiverton

TITLE

Protected Species Survey Plan

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW

Appendix 2: Bat Survey Plan



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ON BEHALF OF

Waddeton Park Ltd

PROJECT

Hartnoll's Farm, Tiverton

TITLE

Bat Survey

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW

Appendix 3: Bat Survey Results

Bat Survey Record Sheet

Recorder:	JB	**Location:**	Hartnoll's - Transect 3			**Time**	**Temp ° C**
Date:	04/06/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	09.20	14
Job No:	eg13511	**Sun Set/Rise Time:**	9.20		**Finish:**	11.45	
MP3 Recorder:			**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*2*	Rain (0-3**):	*0*	Cloud (?/8):	0
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 : 43		Leislers.
	21 : 45		Bat (1), LS3, heard in westerly direction.Leislers.
	21 58		Common pipistrelle.
	22 18		3 passes. Common pipistrelle.
	22 : 20		Bat (1), just before LS7, northerly direction over rapeseed field, heard 3 times and seen.
	22 : 21		LS7, 1 bat flying over treeline, south of rapeseed field,seen flying over. Common pipistrelle
	22 34		Soprano pipistrelle.
	22 : 35		1 bat, west of LS8, heard north of LS8, over field looking towards LS7, commuting and
			foraging. Soprano pipistrelle.
	22 36		2 passes. Soprano pipistrelle.
	22 37		2 passes. Soprano pipistrelle.
	22 : 39		LS8, heard once foraging, north of LS8 (22.40, also commuting)
	22 40		Common pipistrelle.
	22 41		2 bats, multiple passes. Common pipistrelle followed by Soprano pipistrelle.
	22 : 42		Bat heard west of LS8, over the hedgerow heard for about a minute. Common pipistrelle.
	22 : 43		Bat heard between LS7 & LS8 (on return) possible north over field or east over treeline. Bat heard intermittenly as walking north from LS8
	22 _ 45		2 bats. Soprano pipistrelle and Common pipistrelle.
	22 _ 57		Common pipistrelle.
	23 : 00		Bat heard north of LS9 along western hedgerow
	23 : 03		Bat heard at LS9, facing north, possible western trees
	23 07		Common pipistrelle.

*Beauford Scale: 0 - Smoke rises vertically; 1 - direction of wind shown by smoke; 2 - wind felt on face, leaves russle; 3 - leaves and small twigs in constant motion; 4 - raises dust & loose paper, small branches move; 5 - small trees in leaf sway; 6 - large branches in motion; 7 - whole trees in motion;

Habitat / Location Categories

Habitat: Grassland / Garden / Arable / Farmland / Pasture / Quarry / Sand-sune / Wetland / Heathland / Scrub / Parkland

Setting: Rural / Suburban / Urban / Residential / Industrial / Other

Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	23 : 09		Bat (1), heard whilst along back hedge row, east of LS9, heard in a northerly direction
	23 31		Leislers.
	23 : 33		Bat heard (v high pitched) between LS1 & LS5 along northern hedgerow from start
	23 : 39		Common pipistrelle.
	:		

Bat Survey Record Sheet

Recorder:	JW	**Location:**	Hartnoll's - transect 1			**Time**	**Temp ° C**
Date:	04/06/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	09.20	14
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	11.50	
MP3 Recorder:			**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*2*	Rain (0-3**):	*0*	Cloud (?/8):	0
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 : 45	2-3	Large bat, heard not seen, brief pass **no record**
	21 : 55	Just before 3	Couple of passes, unseen. **Noctule followed by Common pipistrelle.**
	21 : 57	3	Unseen pass. **Soprano pipistrelle.**
	22 : 02	3	Foraging activity, unseen, foraging in fieldcorner, in shelter of tall trees (seen).
			Soprano pipistrelle x 12
	22 : 04	3-4	Brief pass along hedge, unseen **2 x soprano pip**
	22 : 06	3-4	High flying large bat, hawking.Leislers.
	22 : 11	3-4	Middle of ditch, possible bat **no record**
	22 :20	4-5	Possible brief pass **no record**
	22 : 26	5	Couple of brief passes. **Common pipistrelle x 2**
	22 : 27	5	Commute. **Common pipistrelle.**
	22 : 28	5	Repetitive passes. **Common pipistrelle x 2**
	22 : 30	5-6	Couple of passes, unseen. **Common pipistrelle followed by Soprano pipistrelle.**
	22 31		**Common pipistrelle followed by Soprano pipistrelle x 3**
	22 : 34	5-6	Commute along treeline, Flying to south of tall treeline,repetitive passes. **Soprano pip**
	22 35		**Common pipistrelle.**
	22 : 36	5-6	**Soprano pipistrelle.**
	22 37		**Whiskered myotis.**
	22 : 44	6	Brief pass along hedge, unseen. **Common pipistrelle.**

*Beauford Scale: 0 - Smoke rises vertically; 1 - direction of wind shown by smoke; 2 - wind felt on face, leaves russle; 3 - leaves and small twigs in constant motion; 4 - raises dust & loose paper, small branches move; 5 - small trees in leaf sway; 6 - large branches in motion; 7 - whole trees in motion;

Habitat / Location Categories

Habitat: Grassland / Garden / Arable / Farmland / Pasture / Quarry / Sand-sune / Wetland / Heathland / Scrub / Parkland

Setting: Rural / Suburban / Urban / Residential / Industrial / Other

Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	22 : 47	6	Several passes, at stop 6on edge of cereal crop, next to broken treeline. **Common pip**
	22 : 53	6-7	Brief pass to the west of canal path, underneath hedge. **Soprano pipistrelle.**
	22 : 55	6-7	Few passes by gap in hedge. **Common pipistrelle x 2**
	22 56		**Common pipistrelle.**
	22 56		**Whiskered myotis.**
	22 : 57	6-7	Brief commute. **Common pipistrelle.**
	22 58		**Common pipistrelle x 4**
	22 59		**Soprano pipistrelle.**
	23 : 00	6-7	Repetitive foraging along hedgerow by canal. **Common pipistrelle x 2**
	23 01		2 bats. Soprano pipistrelle then **common pipistrelle x 2**
	23 : 04	1	Repetitive passes. **Pipistrelle - Intermediate x 4**
	23 05		Repettetive passes. **Pipistrelle - Intermediate x 3**
	23 : 07	1	Left listening stop 1. **Pipistrelle - Intermediate x 2**
	:		

Bat Survey Record Sheet

Recorder:	ZH	**Location:**	Hartnoll's - transect 2			**Time**	**Temp ° C**
Date:	04/06/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	9.15	14
Job No:	eg13511	**Sun Set/Rise Time:**	9.20		**Finish:**	11.45	
MP3 Recorder:			**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*2*	Rain (0-3**):	*0*	Cloud (?/8):	0
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 53		**Noctule.**
	21 : 56	10m after LS3	Bat flew along the hedge. **Leislers.**
	22 : 00	LS4	Constant foraging in the tops of the trees. Soprano pipistrelle followed by common pipistrelle. Myotis - Whiskered/Daubentons. **X 3 passes**
	22 01		**Whiskered/Daubentons x 3**
	22 : 02		No viz
	22 06		**Soprano pipistrelle**
	22 : 07	b/w LS4 & LS5	Bat commuting north- viz in the middle of the road **no record**
	22 : 10	LS5	Bat foraging in the trees on the right hand side og the road. **Common pipistrelle.**
	22 : 14	past LS5	Foraging bat- no viz. **Common pipistrelle.**
	22 : 26	past LS6	Bat sound- no viz. **Common pipistrelle.**
	22 : 27	LS6	Bat foraging above the hedges- flying up and down (N->S->N). **Common pipistrelle x 7**
	22 : 29	LS6	Two bats foraging along hedges and oak tree (LS6). **Common pipistrelle x 4**
	22 : 34	200m from LS6	No viz. **Common pipistrelle x 3**
	22 : 36	stream	Bat noise and strange beating sound. **Common pipistrelle and Noctule.**
	22 : 55	LS8	Sound of a foraging bat in/ above the bushes- no viz. Daubentons.
			Daubentons x 2
	22 : 59	LS8	**Common pipistrelle.**
	23 : 02		No viz. **Common pipistrelle.**
	23 : 07	Rape field	Bat sound- no viz. **Daubentons.**

*Beauford Scale: 0 - Smoke rises vertically; 1 - direction of wind shown by smoke; 2 - wind felt on face, leaves russle; 3 - leaves and small twigs in constant motion; 4 - raises dust & loose paper, small branches move; 5 - small trees in leaf sway; 6 - large branches in motion; 7 - whole trees in motion;

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Setting: Rural / Suburban / Urban / Residential / Industrial / Other

Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	23 : 12	LS9	Bat sound- no viz. **Pipistrelle - Intermediate.**
	23 : 19	At car	Bat sound- no viz. **Soprano pipistrelle.**
	23 : 27	LS1	Bat sound- no viz. **Soprano pipistrelle.**
	23 : 36	Near LS1	Bat sound- no viz. **Pipistrelle - Intermediate.**
	23 : 39		**Common pipistrelle.**
	23 : 40		**Common pipistrelle.**
	23 : 41		**Noctule**

Bat Survey Record Sheet

Recorder:	Jenette Howard	**Location:**	Hartnoll Farm - transect 3				**Time**	**Temp ° C**
Date:	25/06/2013	**Dusk/Dawn Survey:**	Dusk			**Start:**	21:32	15
Job No:	eg13511	**Sun Set/Rise Time:**	21:32			**Finish:**	00:02	10
MP3 Recorder: EM3+			**MP3 Folder**				**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*1*	Rain (0-3**):	*0*	Cloud (?/8):	8/8
** 0=none 1=light 2=medium 3=heavy								

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	22 : 00	LS3	45 Pip - HNS, flying fast, likely along hedgeline
	22 : 04		45 Pip x 1 - feeding briefly along access road N of LS4
	22 : 07	LS4	45 Pipi x 1 - HNS, brief pass, distant
	22 : 09		45 Pip x 2 - feeding along line of trees between LS3 & LS5
	22 : 13		45 Pip x 1 - feeding to N of LS5 (field edge / bank)
	22 : 16	LS5	Noctule - HNS, quiet pass
	22 : 21	T1	45 Pip x 1 - feeding along hedge
	22 : 25	T1	55 Pip x 1 - commute along hedge S of T1
	22 : 30	LS6	45 Pip x 1 - multiple passes
	22 : 34		Noctule - HNS, on recorder
	22 : 35	T2	45 Pip - commute along hedge, single pass
	22 : 41	LS7	45 Pip - HNS, 2 x passes
	22 : 46	T3	45 Pip x 1 - feeding along hedge
	22 : 48	T4	45 Pip - HNS, brief pass
	22 : 49	T4	55 & 45 Pip - commute along hedge
	22 : 49	T4	Whiskered/Brandt's - HNS, brief pass
	22 : 52	T5	55 Pip - HNS, 2 x passes (feeding)
	22 : 56	LS8	45 Pip - HNS, feeding closeby
	22 : 59	T6	Noctule - HNS, single pass
	23 : 02	T7	55 Pip - HNS, feeding along hedge
	23 : 06	LS9	55 Pip - HNS, flying fast
	23 : 29	T9	45 Pip - HNS, couple brief passes closeby

*Beauford Scale: 0 - Smoke rises vertically; 1 - direction of wind shown by smoke; 2 - wind felt on face, leaves russle; 3 - leaves and small twigs in constant motion; 4 - raises dust & loose paper, small branches move; 5 - small trees in leaf sway; 6 - large branches in motion; 7 - whole trees in motion;

Habitat / Location Categories

Habitat: Grassland / Garden / Arable / Farmland / Pasture / Quarry / Sand-sune / Wetland / Heathland / Scrub / Parkland

Setting: Rural / Suburban / Urban / Residential / Industrial / Other

Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
:	23 : 31	T9	45 Pip - HNS, feeding between T9 & LS10
:	23 : 31		45 Pip - HNS, commute between T9 & LS10
:	23 : 33	LS10	45 Pip - feeding
:	23 : 47	T10	45 Pip - HNS, feeding
23 :48 -	23 : 49		45 Pip - HNS, brief pass W of LS12, to N of bldgs
:	:		
:	:		

Bat Survey Record Sheet

Recorder:	LG	**Location:**	Hartnolls - transect 1			**Time**	**Temp ° C**
Date:	25/06/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	21:32	17.5
Job No:	eg13511	**Sun Set/Rise Time:**	21:32		**Finish:**		
MP3 Recorder:		2	**MP3 Folder**			**File No.**	
		Weather:	Wind (0-7*)::	*1*	Rain (0-3**):	*0*	Cloud (?/8):	4
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 52	20 m from L2	1 bat, 3 m above ground flying between trees **common p.p**
	21 54	10 m from L2	Foraging noise. Saw 1 swoop out and back into tree line 2 m above ground **3 x common p**
	21 56	L2	3 bats over my head close to trees S->N staying wide trees **common p.p x 5**
	22 00	0 m from L	2 bats flying E->W between trees **common p.p x 6**
	22 04	3+4	Foraging call- movement in trees **common p.p**
	22 05	3+4	1 in trees flying under canopy E->W
	22 06	00 m nearer	No sight lots of movemnt noise
	22 11	0 m from L	1 flew S->N between field boarders, 1 acoss rape **common p.p**
	22 20	L4	
	22 30	4+5	1 flew over field **common p.p**
	22 32	4+5	Foraging 1-2m above long grass **common p.p x 6**
	22 35	5	2 flying over long grass **myotis species**
	22 43	6	Long calls, no sighting **myotis**
	22 44	6	1 flying over ditch 2m over **common p.p**
	22 45	6	2 flying circling over grass **common p.p**
	22 53	7	Heard not seen **soprano p.p x 5**
	22 55	7	Heard not seen **soprano p.p**
	22 57	20 m after 7	Loud near trees and ditch **soprano p.p**
	22 59	50 m after 7	1 came out of trees then circled back in **greater horseshoe**
	23 01	50 m after 7	1 came out of trees then circled back in, might be same one as above
	23 02	8	Flying along hedgerow **common pip**
	23 06	20 m after 8	lots of noise **common pip and lesser horseshoe**

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Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	23 12	8-9	Loud by metal building **lesser horseshoe**
	23 23	9	loud by the field border **lesser horseshoe x 3**
	23 27	9-10	**common pip**
	23 35	10	top corner **common pip**

Bat Survey Record Sheet

Recorder:	ZH	**Location:**	Hartnoll - transect 2			**Time**	**Temp ° C**
Date:	25/06/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	21:32	17.5
Job No:	eg13511JW	**Sun Set/Rise Time:**	21:32		**Finish:**		
MP3 Recorder:		3	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*0-1*	Rain (0-3**):	*0*	Cloud (?/8):	4
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 : 55	LS2	One bat flew approx 2.5 m above ground -> N **soprano p.p**
	21 : 57	LS2	Single bat flew North - commuting **soprano p.p x 2**
	22 : 10	LS3	No vis **common p.p x 2**
	22 : 12	LS3	One bat foraging in the trees at front of Hartnoll business centre **common p.p x 2**
	22 : 24	LS4->LS5	Single bat flew in the middle of the Came -> N **soprano p.p x 2**
	22 : 25	LS4->LS5	One bat foraging above hedge- flew S-N-S **soprano p.p x 3**
	22 : 26	LS4->LS5	One bat flew N **common p.p**
	22 :27	LS4->LS5	No vis **common p.p**
	22 : 31	LS5	No vis **common p.p**
	22 : 32	LS5	Single bat circled overhead, joined by another foraging and heading south **2 common pip**
	22 : 34	LS5	Foraging bat heading south **common p.p x 2**
	22 : 34	LS5	No vis **common p.p**
	22 : 38	LS5-LS6	No vis **common p.p**
	22 : 39	LS5-LS6	One bat flying south (towards house) and another bat foraging in the tree in the garden
			2 common p.p
	22 : 44	near LS6	Two bats flying alongside a hedgerow **common p.p x 2**
	22 : 49	LS6	No vis **soprano p.p**
	22 : 55	LS6-LS7	No vis **common p.p x 2**
	22 : 57	LS6-LS7	(near stream) No vis **common p.p**
	23 : 01	LS6-LS7	(near stream) No vis **noctule**
	23 : 05	LS6-LS7	No vis **common p.p**
	23 : 13	LS7	Single bat flew around oak tree foraging **common p.p x 2**

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Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	23 : 14	LS7	Constant bat activity within oak tree **common p.p**
	23 : 15	LS7	Constant bat activity within oak tree **common p.p x 3**
	23 : 28	LS8-LS9	No vis **common p.p**
	23 : 29	LS8-LS9	No vis **soprano p.p**
	23 :30	LS8-LS9	No vis in the rape field **soprano p.p**
	23 : 55	by car	**greater horseshoe**

Bat Survey Record Sheet

Recorder:	CS	**Location:**	Hartnolls - transect 1			**Time**	**Temp ° C**
Date:	09/07/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	21:39	21
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	00:00	
MP3 Recorder:			**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*2*	Rain (0-3**):	*0*	Cloud (?/8):	0
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 : 59	LS2	Seen commuting along hedge. S --> N. Common pip.
	22 : 03	LS2-3	Hearn not seen. Not recorded.
	22 : 05	LS3	Heard not seen. Common pip.
	22 : 07	LS3	Possible hearing. Unseen. Not recorded.
	22 : 17	LS3-4	Seen commuting along hedge. 2 passes. Not recorded.
	22 : 20	LS4	Seen commuting S --> N 2m above hedge.Common pip. (x2)
	22 : 28	LS5	Multiple bats seen commuting and foraging amongst trees in corner of field, multiple..
			..passes for 2 minutes. Common pip. (x2) And soprano pip. (x2)
	22 : 29	LS5	Myotis (2 calls)
	22 : 30	LS5	Soprano pip.
	22 : 31	LS5	Possible myotis.
	22 : 32	LS5-6	heard not seen. Soprano pip.
	22 : 34	LS5-6	Seen commuting along hedge. Multiple passes. Common pip. (x2)
	22 : 35	LS5-6	Heard foraging. Extensive calls. Unseen. Common pip. And soprano pip. (x2)
	22 : 36	LS5-6	Seen under tree foraging. Continued for 2 mins.Soprano pip. (x8) and common pip (x5)
	22 : 44	LS5-6	Unseen. Common pip. (x3)
	22 : 51	LS6	Unseen. Soprano pip.
	22 : 54	LS6-7	Foraging, unseen. Common pip.
	22 : 56	LS6-7	Foraging, unseen. Pip. - intermediate
	23 : 00	LS6-7	Foraging, unseen. Common pip. (x3)
	23 : 05	LS6-7	Foraging, unseen. Common pip.
	23 : 14	LS7	Common pip.

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Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	23 : 15	LS7	Unseen, lots of activity. Common pip. (x2)
	23 : 16		Pip. - intermediate
	23 : 19	LS7-8	Unseen, lots of activity. Common pip. (x2)
	23 : 21		Common pip.
	23 : 22	LS7-8	Unseen. Common pip. And soprano pip.
	23 : 23		Myotis.
	23 : 31	LS8	Unseen. Pip. - intermediate.
	23 :35	LS8-9	Unseen. Common pip.
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Bat Survey Record Sheet

Recorder:	NW	**Location:**	Hartnoll - transect 3			**Time**	**Temp ° C**
Date:	09/07/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	21:39	22
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	24:10	
MP3 Recorder:			**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*0*	Rain (0-3**):	*0*	Cloud (?/8):	0
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 57		Myotis
	21 : 59	LS2	Common pip along hedge (road/field side) E --> W.
	22 : 12		Common pip. (x2)
	22 : 25	LS7	Commuting: not seen.
	22 : 30	LS8	F around hedges corner of field near large oak - up and down along hedge. Myotis.
	22 : 36	after LS8	C: 2 bats W --> E along hedge line.
	22 : 50	LS8-9	C/F: seen but not initially recorded. (faint). Along hedge. Possible myotis.
	22 : 56	nr LS10	C/F: not seen.
	23 : 01		Common pip.
	23 : 02		Soprano pip.
	23 : 07	past LS10	Far off, faint, metallic. Not seen.
	23 : 13	LS1	C: not seen.
	23 : 16	LS1	C: not seen.
	23 : 18	LS2	C/F: not seen. Possible myotis.
	23 : 22	nr LS2/3	C: not seen.
	23 : 24	LS3	C: not seen.
	23 : 28	LS4	C: not seen. Possible myotis.
	23 : 37	LS5	C: not seen. V. faint/distant.
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Bat Survey Record Sheet

Recorder:	ZH	**Location:**	Hartnolls - transect 2			**Time**	**Temp ° C**
Date:	09/07/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	21:45	22
Job No:	eg13511	**Sun Set/Rise Time:**	21:27		**Finish:**		
MP3 Recorder:		Duet: tess	**MP3 Folder**		6	**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*0*	Rain (0-3**):	*0*	Cloud (?/8):	0
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)		Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
14	00	21 : 58	LS1-LS2	Bat flew E --> W along hedge. Soprano pip.
14	47	21 : 58	LS1-LS2	No viz. Soprano pip.
16	17	22 : 00	LS1-LS2	Bat flew E --> W along hedge. Pip.-Intermediate, then Soprano pip.
17	32	22 : 01	LS1-LS2	No viz. Soprano pip. (x2)
29	23	22 : 13	LS2-LS3	Two bats. Common pip.
36	35	22 : 20	LS3	Possible myotis (multiple?) and soprano pip. (x6)
	-->	22 : 25		Common pip. (x8).
46	05	22 : 30	LS3-4	In front of Hartnoll BC. No viz. Common pip.
46	57	22 : 31	LS3-4	In front of Hartnoll BC. No viz. Common pip.
50	20	22 : 34	LS4	No viz. Possible myotis.
56	03	22 : 40	Ls4-5	No viz. Soprano pip. (x2)
57	39	22 : 41	LS5	No viz. Common pip.
60	56	22 : 44	LS5	No viz. Pip. - Intermediate.
63	26	22 : 47	LS5-6	No viz. Soprano pip.
64	16	22 : 48	LS5-6	No viz. Common pip.
65	17	22 : 48	LS5-6	No viz. Unknown.
69	23	22 : 53	LS6	Strange faint beeping noise. No viz. Myotis species. (x4)
70	23	22 : 54	LS6	Constant activity. No viz. Myotis species (x4)
73	19	22 : 56	LS6	Near the oak tree. Constant activity. Myotis species (x6)
		23 : 47	start	No viz. Foraging bat. Myotis species (x2)
		:		
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Bat Survey Record Sheet

Recorder:	CS	**Location:**	Hartnolls transect 1			**Time**	**Temp ° C**
Date:	29/08/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	20:00	18 - 14
Job No:	eg13511	**Sun Set/Rise Time:**	20:00		**Finish:**		
MP3 Recorder:		em3/02	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*3*	Rain (0-3**):	*0*	Cloud (?/8):	7.5
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	20 : 46	LS4-5	Unseen. Commuting. 45 pip. (x6)
	20 : 48	LS4-5	continuous activity. Foraging. Unseen. 45 pip. (x12)
	20 : 50	LS5	Circling beneath field corner tree, foraging. Constant activity. 55 pip (x34)
	20 : 55	nr 5	Unseen. 45 pip.
	20 : 56	LS5-6	Commuting along hedge. 45 pip. (x2)
	20 : 57	LS5-6	Commuting along hedge. Constant activity. 45 pip. (x5)
	20 : 59	LS5-6	Foraging under oaks. 45 pip (x2)
	21 : 01	nr 6	Unseen. 45 pip.
	21 : 23	nr 7	Unseen. Myotis - whiskered.
	21 : 27	nr 7	Unseen. Constant activity. 45 pip. (x4)
	21 : 30	LS8	Unseen. Constant activity. 45 pip. (x4)
	21 : 35	LS8	Unseen. 55 pip.
	21 : 42	nr 9	Unseen. Constant activity. 45 pip. (x11)
	21 : 47	LS9	Constant activity. 55 pip. (x9), 45 pip (x5) and myotis sp. (x5)
	21 : 54	nr 9	Unseen. 45 pip (x4) and myotis (whiskered) (x4)
	21 : 56	nr 9	Unseen. Constant. 55 pip (x5) and 45 pip (x3)
	21 : 59	LS9-10	Unseen. 55 pip (x2)
	22 : 01	nr 10	Unseen. Myotis - daubentons.
	22 06		55 pip
	22 : 09	LS10-1	Foraging under oak tree. 45 pip. (x32)
	22 : 20	LS10-1	Unseen. 45 pip (x2) and myotis sp.
	22 : 25	start	45 pip. (x7) and 55 pip. (x6)

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Bat Survey Record Sheet

Recorder:	Jenette Howard	**Location:**	Hartnoll Farm - transect 3				**Time**	**Temp ° C**
Date:	29/08/2013	**Dusk/Dawn Survey:**	Dusk			**Start:**	20:06	18
Job No:	eg13511	**Sun Set/Rise Time:**	20:06			**Finish:**	22:36	14.5
MP3 Recorder: EM3+			**MP3 Folder**				**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*2*	Rain (0-3**):	*0*	Cloud (?/8):	7/8 - <1/8 by end
** 0=none 1=light 2=medium 3=heavy								

Rec Time (min/sec)		Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
		20 : 35	LS4	45 Pip x 1 - commute, E - W, single pass
20	37 -	20 : 39	E of LS4	55 Pip x 1 - feeding along tree line, multiple passes
20	44 -	20 : 47	LS5	55 Pip x 1 - heard, not seen; three passes, faint
		20 : 48	LS6	55 Pip x 1 - heard, not seen; single pass
		20 : 50	LS6	45 Pip x 1 - heard, not seen; commute, faint
		20 : 51	LS6	45 Pip x 1 - heard, not seen; commute along hedge, closeby
		20 : 53	T1	55 Pip x 1 - feeding along hedge / oak tree
		21 : 01	LS7	55 Pip x 1 - heard, not seen; commute, faint
		21 : 06	T2	45 Pip x 1 - heard, not seen; feeding, closeby
		21 : 07	T2	55 Pip x 1 - heard, not seen; commute
21	08 -	21 : 10	T3	55 Pip x 1 - feeding along hedge / tree line, continuous, plus social calls
		21 : 09	T3	45 Pip x 1 - commute, single pass
21	11 -	21 : 14	LS8	45 Pip x 1 - feeding along hedge / tree canopy, continuous
		21 : 14	LS8	Whiskered / Brandt's x 1 - heard, not seen; single pass, closeby
		21 : 20	T4	45 Pip x 1 - heard, not seen; feeding along hedge / tree line
		21 : 29	T5	55 Pip x 1 - heard, not seen; commute, closeby, couple passes
21	33 -	21 : 35	T6	45 Pip x 1 - heard, not seen; feeding, closeby
		21 : 36	T7	45 Pip x 1 - heard, not seen; commute
		21 : 36	T7	Whiskered / Brandt's x 1 - heard, not seen; commute, couple passes
		21 : 38		Noctule x 1 - on recorder; commute, faint
21	38 -	21 : 39	T7	45 Pip x 1 - heard, not seen; feeding along hedge / tree line
		21 : 40	T7	Whiskered / Brandt's x 1 - feeding along hedge / tree line, couple passes

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Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 : 42	T8	Pip Ind x 1 - heard, not seen; commute, couple passes (echolocating at 50kHz)
	21 : 43	T8	45 Pip x 1 - heard, not seen; commute, closeby
	21 : 45	N of LS10	Whiskered / Brandt's x 1 - heard, not seen; commute, closeby, single pass
	21 : 46	LS10	45 Pip x 1 - heard, not seen; commute, single pass, brief
	21 : 51	T9	55 Pip x 1 - heard, not seen; commute, brief
	21 : 52	T9	Noctule x 1 - heard, not seen; commute, very faint
	21 : 53	LS11	55 Pip x 1 - heard, not seen; commute, faint
	21 : 58	T10	45 Pip x 1 - heard, not seen; commute, couple passes
	22 : 04	T11	Noctule x 1 - heard, not seen / recorded; faint
	22 : 12	T12	45 Pip x 1 - heard, not seen; commute, brief
	22 : 18	LS1	45 Pip x 1 - heard, not seen; commute, single pass, closeby
	22 : 23	T13	45 & 55 Pip x 1 - heard, not seen; commute, single passes, faint
	22 : 24	T13	45 Pip x 1 - heard, not seen; feeding, multiple passes
	22 : 25	T13	55 Pip x 1 - heard, not seen; couple passes, faint
22 26 -	22 : 30	T13	45 & 55 Pip x 1 - heard, not seen; multiple passes
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Bat Survey Record Sheet

Recorder:	JW	**Location:**	Hartnolls - trasnect 2			**Time**	**Temp ° C**
Date:	29/08/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	20:15	16
Job No:	eg13511	**Sun Set/Rise Time:**	20:05		**Finish:**	22:35	
MP3 Recorder:		Duet	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*2*	Rain (0-3**):	*0*	Cloud (?/8):	6
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	20 : 37	LS2	myotis sp.
	20 : 39	LS2	big bat followed by another. Myotis sp.
	20 : 40	LS2	Quiet bat. Not recorded.
	20 : 41	A	Big bat commuting over open field. Not recorded.
	20 : 41	LS2	Pip with social call and forage. Not recorded/
	21 : 03		Top of west manley lane. Pips foraging. Not recorded.
	21 : 08	LS3	Foraging pips under old hazel coppice. Not recorded
	21 : 12	nr LS3	Foraging pips under old ash tree.
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*Beauford Scale: 0 - Smoke rises vertically; 1 - direction of wind shown by smoke; 2 - wind felt on face, leaves russle; 3 - leaves and small twigs in constant motion; 4 - raises dust & loose paper, small branches move; 5 - small trees in leaf sway; 6 - large branches in motion; 7 - whole trees in motion;

Habitat / Location Categories

Habitat: Grassland / Garden / Arable / Farmland / Pasture / Quarry / Sand-sune / Wetland / Heathland / Scrub / Parkland

Setting: Rural / Suburban / Urban / Residential / Industrial / Other

Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Bat Survey Record Sheet

Recorder:	CS	**Location:**	Hartnoll farm - transect 3			**Time**	**Temp ° C**
Date:	26/09/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	19:04	15
Job No:	eg13511	**Sun Set/Rise Time:**	19:03		**Finish:**	21:40	
MP3 Recorder:		em3/01	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*1*	Rain (0-3**):	*0*	Cloud (?/8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	19 : 21	1-2	pip. Brief pass. HNS. 55 pip.
	19 : 30	2-3	45 pip. Commuting along hedge W->E. 55 pip.
	19 : 37	3	Faint call. HNS. 45 pip.
	19 : 39	3	Pip. HNS. 55 pip.
	19 : 41	3-4	Commuting along hedge W->E. 55 pip.
	19 : 51	4-5	45 pip. HNS
	19 : 56	5	HNS. Myotis sp.
	20 : 01	5-6	HNS. Repeated foraging under oak. 45 pip. (x2)
	20 : 05	5-6	45 pip. HNS. Not recorded.
	20 : 06	5-6	Commuting W->E along hedge. Myotis sp. Followed by 45 pip.
	20 : 09	5-6	45 pip. HNS
	20 : 16	6	Faint 45 pip. Unseen.
	20 : 17	nr. 6	HNS. 45 pip (x5)
	20 : 27	7	HNS. 45 pip (x6)
	20 : 33	7-8	45 pip. HNS. Repeated for 2 mins. 45 pip (x10)
	20 : 37	7-8	Myotis? In corner under oak. Not recorded
	20 : 52	8-9	Foraging under oak. 45 pip (x2)
	20 : 58	8-9	45 pip HNS.
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Bat Survey Record Sheet

Recorder:	LG	**Location:**	Hartnolls - transect 1			**Time**	**Temp ° C**
Date:	26/09/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	07:03	15
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**		
MP3 Recorder:		engain anabat	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*1*	Rain (0-3**):	*0*	Cloud (?/8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	19 : 20	1	Bat circling oak tree 2m up then flew off in easterly direction towards canal. 55 pip.
	19 : 23	20m on	By next oak tree. HNS. Noctule.
	19 : 28	2	Bat flew S->N from stubble field into hedgerow. 55 pip.
	19 : 29	2	Bat flew from north into dying oak on corner. 45 pip.
	19 : 35	3	HNS. Myotis sp.
	19 : 43	4	Bat flew from west to east, 4m high. 45 pip.
	19 : 44	4	Continuous foraging buzzes. HNS. 45 pip (x3)
	19 :47	20m on	Foraging in big oak tree. Continuous. 45 pip (x10)
	19 : 51	5	Two bats flying up and down hedge. 45 pip.
	19 : 52	5-6	20m on, bat foragng between two trees in hedge. 45 pip.
	19 : 54	by gate	HNS. Pip - intermediate.
	19 : 56		45 pip (x2), 55 pip and myotis sp.
	20 : 15	7-8	Continuous noise under large oaks. 55 pip (x2)
	20 : 24	9	Continuous. HNS. 55 pip (x4) and 45 pip (x5)
	20 : 27	past 9	Top of field by road continuous foraging, one bat circling oak tree.Myotis sp., 45 pip (x5) ar
	20 : 33	1	Continuous calls under large oak. 45 pip (x24)
	20 : 43		45 pip
	20 : 45		55 pip (x5)
	20 : 48		myotis sp.
	21 : 01	4-3	Calls under oak HNS. Myotis sp.
	21 : 04	3	Brief call. Myotis sp.

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Habitat / Location Categories

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Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	21 15	1	Brief call. 55 pip (x2)
	21 : 25	barn	45 pip (x9) and 55 pip.

Bat Survey Record Sheet

Recorder:	LR	**Location:**	Hartnoll Farm, Tiverton - transect 2			**Time**	**Temp ° C**
Date:	26/09/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	19:03	15
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	21:33	
MP3 Recorder:		duet	**MP3 Folder:**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*):	*1*	Rain (0-3**):	*0*	Cloud (0-8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	19 : 22	1	common pip
	19 : 27	1	19:27-19:32 common pip - 1 pass - foraging
	19 : 35	2	soprano pip foraging around oak
	19 : 36	3	common pip and soprano pip foraging.
	19 : 39	4	common pip x 2 - foraging
	19 : 40	LS2	19:40-19:45 common pip- frequent foraging + @ 2.40
	19 : 54	5	soprano pip
	19 : 55	LS3	19:55-20:00: myotis species (see end tc) + soprano pip x 3 pass and common pip
	20 : 01	6	soprano pip
	20 : 03	7	soprano pip
	20 : 04	8	common pip and soprano pip
	20 : 07	LS4	2007-2012: common pip foraging (0:30) and soprano pip x 2 pass social calls.
	20 : 13	9	myotis x 2 passes
	20 : 14	10	myotis x 2 passes
	20 : 15	11	common pip foraging
	20 : 17	12	myotis foraging
	20 : 18	LS5	20:18-20:23 myotis foraging pass common pip foraging pass
	20 : 19	13	common pip x 2
	20 : 28	14	common pip x 2
	20 : 29	15	common pip x 2
	20 : 30	16	common pip x 2
	20 : 31	LS6	20:31-20:36 ?

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Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	20 : 43	17	pp (feint)
	20 : 45	LS7	20:45-20:50 u (4:20)
	20 : 59	LS7	20:59-21:04 common pip x 4 passes
	21 : 05	LS8	common pip
	21 : 08	LS8	21:08-21:13 common pip x 3 pass
	21 : 17	19	common pip
	21 : 21	LS9	21:21-21:26
	21 : 29	20	common pip x 2
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Bat Survey Record Sheet

Recorder:	CS	**Location:**	Hartnoll - transect 3			**Time**	**Temp ° C**
Date:	27/09/2013	**Dusk/Dawn Survey:**	Dawn		**Start:**	05:37	12
Job No:	eg13511	**Sun Set/Rise Time:**	07:03		**Finish:**	07:07	
MP3 Recorder:		em3/01	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*0*	Rain (0-3**):	*0*	Cloud (?/8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	05 : 57	2-3	Commuting E->W along roadside hedge. 55 pip.
	06 : 10	4-5	HNS. 45 pip.
	06 : 26	nr 6	Faint call HNS. Not recorded.
	06 : 28	6	45 pip (x2) and 55 pip (x3)
	06 : 29	6	Pips circling by trees, constant. 55 pip (x6) and 45 pip (x8)
	:		> seen clearly, just 2 bats circling repeatedly.
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Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Bat Survey Record Sheet

Recorder:	LG	**Location:**	Hartnoll - transect 1			**Time**	**Temp ° C**
Date:	27/09/2013	**Dusk/Dawn Survey:**	Dawn		**Start:**	05:38	12
Job No:	eg13511	**Sun Set/Rise Time:**	07:03		**Finish:**	07:03	
MP3 Recorder:		engain anabat	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*0*	Rain (0-3**):	*0*	Cloud (?/8):	7
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	05 : 57	3-4	Brief pass under oak tree. 45 pip.
	06 : 01	4	Continuous calls for 2 mins - foraging in oaks and along hedgerow going north.
			45 pip (x15)
	06 : 05	5	Continuous calls - two bats flying up and down hedgerow and foraging. 45 pip (x10)
			and myotis sp. (x8)
	06 : 11		55 pip
	06 : 25	nr 8	bat flying up and down grassy path alongside woodland. 55 pip (x4)
	06 : 35	9-10	Bat flew N->S down canal tree line. 55 pip (x2)
	06 : 37		55 pip.
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Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Bat Survey Record Sheet

Recorder:	LR	**Location:**	Hartnoll Farm, Tiverton - transect 2			**Time**	**Temp ° C**
Date:	27/09/2013	**Dusk/Dawn Survey:**	Dawn		**Start:**	05:38	13
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	07:05	
MP3 Recorder:		duet	**MP3 Folder:**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*):	*1-3*	Rain (0-3**):	*0*	Cloud (0-8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	05 : 44	LS1	05:44-05:47 No bats
	05 : 50	1	soprano pip
	05 : 51	2	soprano pip foraging and common pip
	05 : 50	LS2	05:50-05:53 No bats
	06 : 04	LS3	06:04-06:07 No bats
3 20	06 : 10	3	myotis
	06 : 11	LS4	06:11-06:14 m(01:30) 2 pass
30	06 : 14	4	myotis
	06 : 16	5	soprano pip commuting
	06 : 17	LS5	06:17-06:20: m 1 pass, common pip x 6 foraging
1 10	06 : 22	6	myotis
	06 : 25	LS6	06:25-06:28 - no bats
	06 : 30	LS7	06:30-06:33 : soprano pipx 1 pass, 1 myoits (2:30), common pip x 1 commuting E-W
	06 : 33	7	soprano pip commuting and foraging
	06 : 40	8	common pip foraging
	06 : 42	LS8	06:42-06:45 - No bats
	06 : 53	LS9	No bats
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Bat Survey Record Sheet

Recorder:	CS	**Location:**	Hartnoll - transect 3			**Time**	**Temp ° C**
Date:	08/10/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	18:33	16
Job No:	eg13511	**Sun Set/Rise Time:**	18:34		**Finish:**	21:02	
MP3 Recorder:		em3	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*3*	Rain (0-3**):	*1*	Cloud (?/8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	19 : 00	3-4	45 pip commuting S->N across field. 45 pip
	19 : 03	4-5	small bat seen foraging in field but not heard. Not recorded
	19 : 08	4-5	2 bats seen, repeated passes. 45 pip. (x2)
	19 : 13	5	pip commuting/foraging in field corner continuously. 55 pip and 45 pip (x10)
	19 : 19	5-6	pip foraging under oak tree continuously. 45 pip (x10)
	19 : 24	nr 6	pip foraging, unseen. 45 pip.
	19 : 27	nr 6	unseen pip. 45 pip (x3) and 55 pip.
	19 :31	6	HNS 45 pip
	19 : 32	6	continuous foraging under oak tree. Pip sp. (x25)
	19 : 36	6-7	HNS. Myotis sp. And 45 pip
	19 : 45	7	HNS. Continuous. 45 pip. (x13)
	19 : 48	7-8	HNS. 45 pip.
	19 : 58	8	faint pip pass, unseen. Not recorded
	19 : 59	8	HNS 45 pip
	20 : 09	8-9	myotis sp.
	20 : 15	nr 9	Unseen. Lesser horseshoe.
	20 : 16	9	Unseen, repeated passes. 45 pip (x7)
	20 : 23	nr 9	HNS. 55 pip (x2)
	20 : 26	9-10	Unseen. 45 pip (x2)
	20 : 46	1	HNS, repeated. 45 pip (x11)
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Linear Feat: Hedge / Wall / Treeline / Road / River / Ditch / Gully / Fence / Rail verge / Woodland Edge / Other

Bat Survey Record Sheet

Recorder:	EF	**Location:**	Hartnoll Farm, Tiverton - transect 1			**Time**	**Temp ° C**
Date:	08/10/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	18:34	16
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	20:58	
MP3 Recorder:		engain anabat	**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*3*	Rain (0-3**):	*1*	Cloud (?/8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	19 : 08	5	Unseen pass. 45 pip
	19 : 16	5-6	Unseen pass. Possible myotis sp.
	19 : 21	6	Unseen pass. Not recorded.
	19 : 30	7	Unseen pass. Commuting. Possible BLE
	19 : 42	8	Activity under oak tree, repeated. Myotis sp. And 55 pip.
	19 : 49	9	Brief unseen pass. 55 pipi
	19 : 59	10	Foraging behaviour heard, numerous feeding buzzes. Activity seen briefly around trees at
	:		field corner. Repeated passes heard. 55 pip (x2) and 45 pip (x5)
	20 : 02	10	Flying overhead (~2m height) W->E in field corner foraging.45 pip (x4)
	20 : 04	10-2	High activity heard under and around oak tree at X. repeated feeding buzzes. 45 pip (x6)
	20 : 10	2	Activity heard at oak tree.Myotis sp.
	20 : 39	4-3	Commuting E->W along field boundary at 3m height. Myotis sp.
	20 : 47	2-1	Activity heard at oak tree X, repeated feeding buzz heard. 45 pip (x3)
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Bat Survey Record Sheet

Recorder:	Liam Russell	**Location:**	Hartnoll Farm - transect 2			**Time**	**Temp ° C**
Date:	03/10/2013	**Dusk/Dawn Survey:**	Dusk		**Start:**	1830	16
Job No:	eg13511	**Sun Set/Rise Time:**			**Finish:**	2100	14
MP3 Recorder:			**MP3 Folder**			**File No.**	
Grid Ref:		**Weather:**	Wind (0-7*)::	*3-4*	Rain (0-3**):	*0*	Cloud (?/8):	8
** 0=none 1=light 2=medium 3=heavy							

Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	18 : 40	LS1	1840-4845: No bats
	18 : 51	LS2	1851-1856: No bats
	19 : 07	LS3	1907-1912: P45, 2 pass foraging
	19 : 17	LS4	1917-1922: P45, 1 pass
	19 : 24	1	Myotis (poss. Natterer's) commuting down lane
	19 : 27	2	P45 foraging, several passes
	19 : 28	3	Long-eared or Myotis sp. (poor recording, faint call)
	19 :30	LS5	1930-1935: P55, 1 pass
	19 : 35	4	P55
	19 : 37	5	P55
	19 : 38	6	Myotis and P45
	19 : 40	7	P45 several passes
	19 : 41	8	P55
	19 : 42	9	P45
	19 : 43	LS6	1943-1948: P45 + P55, several pass foraging; Myotis (poss. Whisk.Brandt's), 1 pass
	19 : 55	LS7	1955-2000: P45, frequent foraging; P55, 1 pass
	20 : 05	10	P45
	20 : 07	LS8	2007-2012: P45, 6 pass
	20 : 12	11	P45 forgaing
	20 : 15	12	P45x2 + P55, foraging for several metres along hedge
	20 : 22	LS9	2022-2027: No bats
	20 : 31	13	P45

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Rec Time (min/sec)	Time (hr/min)	Figure Reference	Notes - (No. of Bats/ Height Above Ground/ Activity/ Flight Direction / Location / Ref Code for Habitat Map etc.)
	20 : 36	LS1	2036-2041: No bats
	20 : 42	14	P45
	20 : 47	15	P45

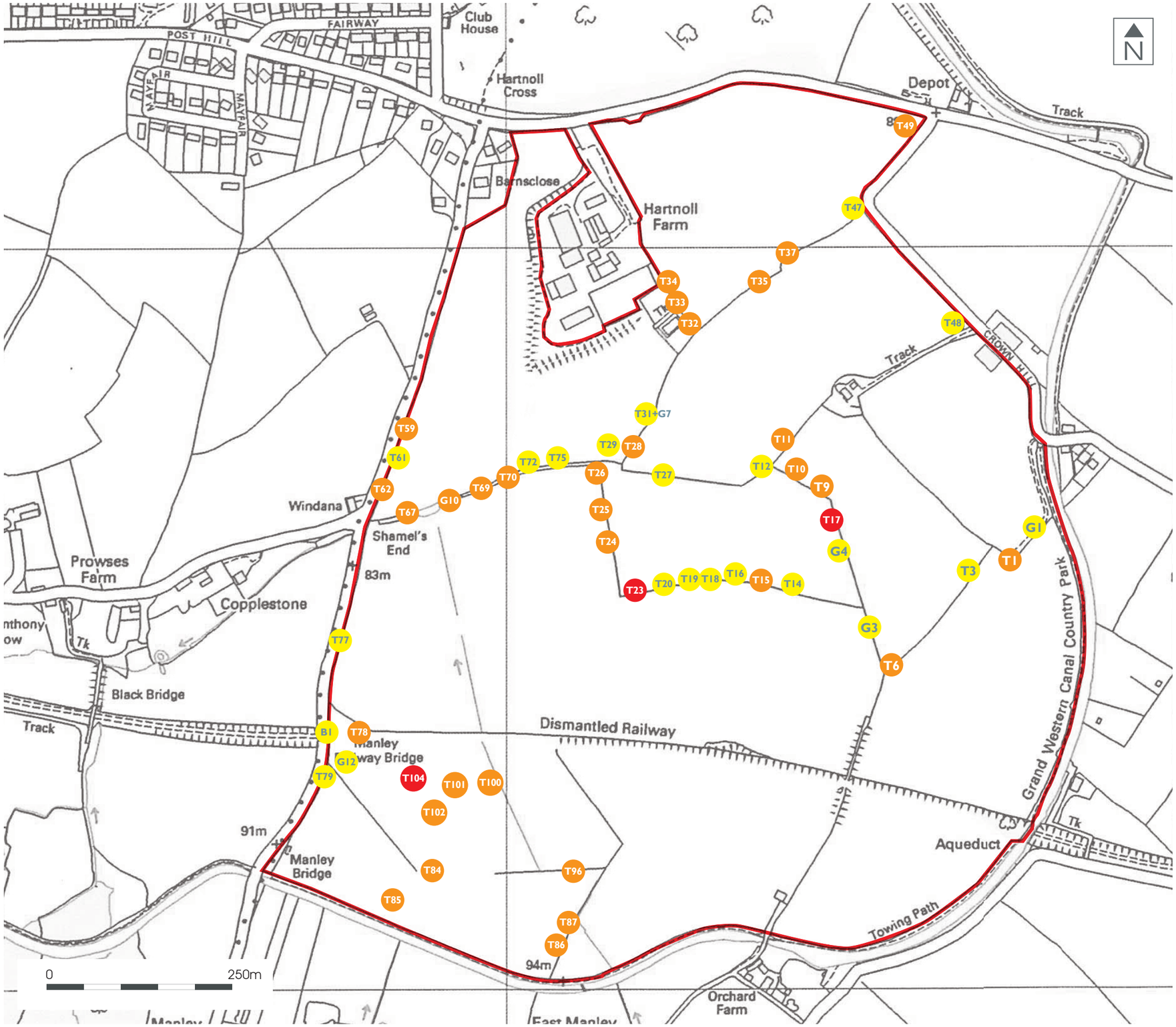
Static Datalogger Bat Results									
		Bat Species and Number of Passes							
Survey date	**Anabat Location**	**Common pip**	**Soprano pip**	**Myotis Species**	**Noctule**	**Leisler**	**Serotine**	**Lesser Horseshoe**	**Daubenton**
29-05-13 / 04-06-13	1	624	45	8	3	6	1	0	0
Total passes = 1063	2	184	108	10	4	1	0	0	0
	3	45	19	0	4	1	0	0	0
% of total		80	16	1.6	1	<1	<1		
18-06-13 / 24-06-13	1	332	21	14	3	1	0	1	0
Total passes = 1120	2	279	124	53	2	0	0	0	0
	3	234	15	18	23	0	0	0	0
% of total		75	14	7.5	2.5	<1		<1	
24-07-13/ 29-07-13	2	435	68	0	0	0	0	0	0
Total passes = 1463	3	442	23	7	0	0	2	0	1
	4	423	53	4	5	0	0	0	0
% of total		89	10	<1	<1		<1		<1
21-08-13/ 27-08-13	1	317	111	48	6	3	0	1	0
Total passes = 1078	3	366	153	70	1	1	0	1	0
% of total		63	24	11	<1	<1		<1	
11-09-13 / 17-09-13	1	80	34	11	1	1	0	0	0
Total passes = 1104	2	238	168	113	0	0	0	0	0
	3	279	124	53	2	0	0	0	0
% of total		54	29	16	<1	<1			
03-10-13 / 09-10-13	1	279	124	53	2	0	0	0	0
Total passes = 953	2	32	56	12	1	0	0	0	0
	3	256	78	48	0	0	0	12	0
% of total		59	27	12	<1			1	0

	Bat Transect Survey Results										
		Bat Species and Number of Passes									
Survey date	**Transect number**	**Common pip**	**Soprano pip**	**Myotis sp.**	**Noctule**	**Whiskered**	**Leisler**	**Serotine**	**Daubentons**	**Greater horseshoe**	**Lesser horseshoe**
04/06/2013	1	25	25		1	3	11	2	3		
Total passes = 129	2	22	3		2	6	1				
	3	13	9				3				
%passes		46	28		2	7	12	2	2		
25/06/2013	1	31	7	2						1	4
Total passes = 99	2	11	11							1	
	3	21	6		3	1					
%passes		63	24	2	3	1				2	4
09/07/2013	1	30	15	4							
Total passes = 103	2	13	14	18							
	3	4	1	4							
%passes		45	29	25							
29/08/2013	1	98	65	2		5					
Total passes = 212	2	2		2							
	3	18	13		3	4					
%passes		55	37	2	1	4					
26/09/2013	1	48	13	5	1						
Total passes = 151	2	29	11	6							
	3	31	4	3							
%passes		71	18	9	0.5						
27/09/2013	1	26	8	8							
Total passes = 81	2	9	5	4							
	3	11	10								
%passes		54	28	15							
08/10/2013	1	19	5	4							
Total passes = 138	2	14	5	4							
	3	57	28	2							1
%passes		65	27	7							0.7
Total overall passes		931	449	128	16.5	31	27	4	5	4	9

Total percentages from all transects

Bat Species	**%**
common pp	58%
soprano pp	28%
myotis sp	7%
noctule	1%
whiskered	2%
leisler	<1%
serotine	<1%
daubentons	<1%
greater hs	<1%
lesser hs	<1%

Appendix 4: Tree Survey Results and Plan



Survey site

T1 Feature with high potential for roosting bats

T2 Feature with moderate potential for roosting bats

T3 Feature with low potential for roosting bats

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ON BEHALF OF

Waddeton Park Ltd

PROJECT

Hartnoll's Farm, Tiverton

TITLE

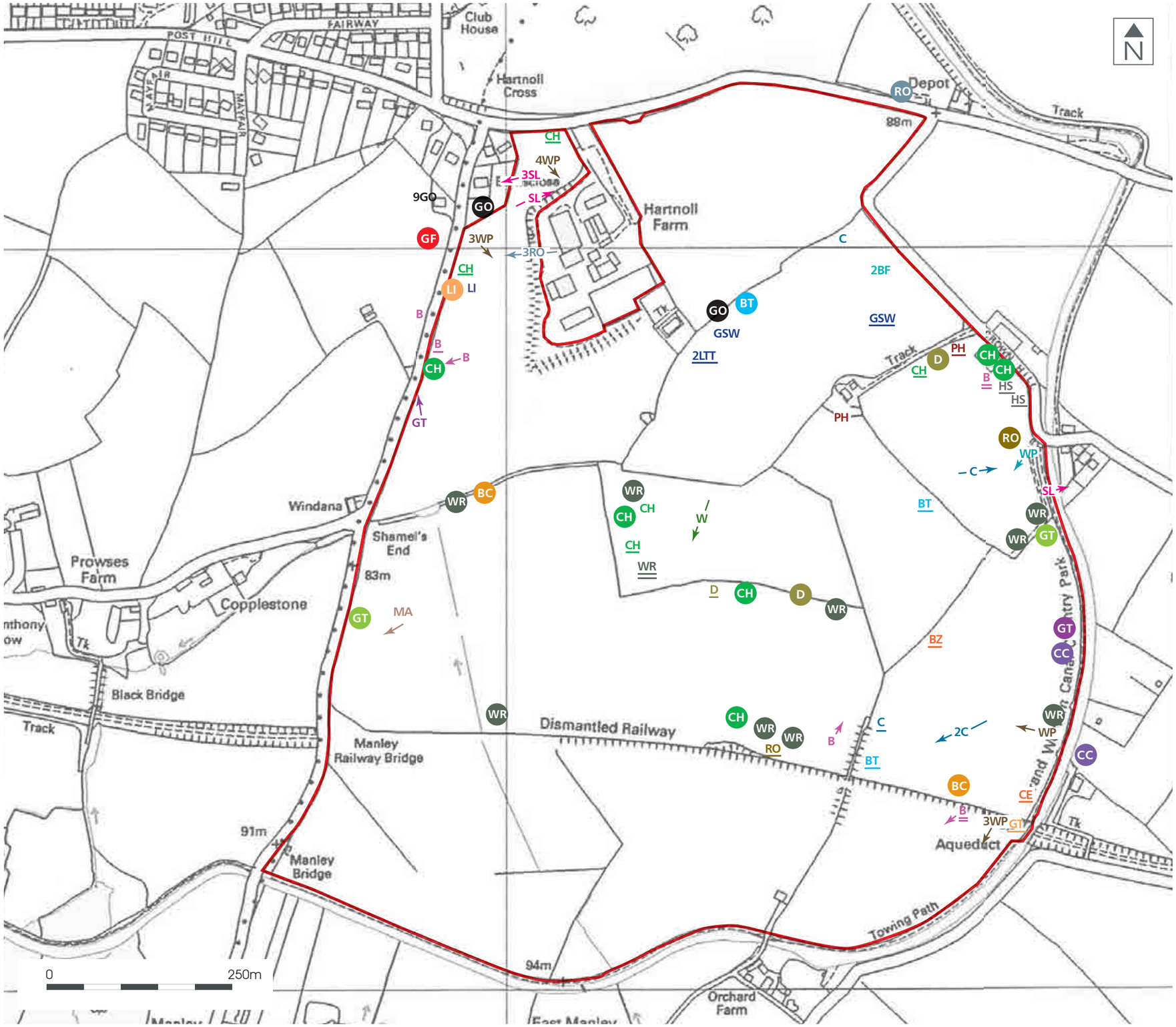
Tree Survey

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW

Appendix 5: Breeding Bird Survey Results

Common Name	*Scientific Name*	*BTO Code (as mapped)*	*Breeding Status on Site*	*Conservation Status (BOCC)*	*UKBAP Priority Species*	*Species of Principal Importance*
Blue Tit	*Parus caeruleus*	BT	B	Green		
Blackbird	*Turdus merula*	B.	B	Green		
Robin	*Erithacus rubecula*	R.	B	Green		
Jay	*Garrulus glandarius*	J.	B	Green		
Great Tit	*Parus major*	GT	B	Green		
Magpie	*Pica pica*	MG	B	Green		
Buzzard	*Buteo buteo*	BZ	Po	Green		
Carrion Crow	*Corvus corone corone*	C.	N	Green		
Herring Gull	*Larus argentatus*	HG	N	Red	Y	Y
House Martin	*Delichon urbica*	HM	N	Amber		
Jackdaw	*Corvus monedula*	JD	N	Green		
Rook	*Corvus frugilegus*	RO	N	Green		
Skylark	*Alauda arvensis*	S.	N	Red	Y	Y
Sparrowhawk	*Accipiter nisus*	SH	N	Green		
Swallow	*Hirundo rustica*	SW	N	Amber		
Blackcap	*Sylvia atricapilla*	BC	Po	Green		
Bullfinch	*Pyrrhula pyrrhula*	BF	Po	Amber	Y	Y
Goldfinch	*Carduelis carduelis*	GO	Po	Green		
Greenfinch	*Carduelis chloris*	GF	Po	Green		
Long-tailed Tit	*Aegithalos caudatus*	LT	Po	Green		
Pied Wagtail	*Motacilla alba*	PW	Po	Green		
Chaffinch	*Fringilla coelebs*	CH	Pr	Green		

Common Name	***Scientific Name***	***BTO Code (as mapped)***	***Breeding Status on Site***	***Conservation Status (BOCC)***	***UKBAP Priority Species***	***Species of Principal Importance***
Chiffchaff	*Pyhlloscopus collybita*	CC	Pr	Green		
Dunnock	*Prunella modularis*	D.	Pr	Amber	Y	Y
Linnet	*Carduelis cannabina*	LI	Pr	Red	Y	Y
Song Thrush	*Turdus philomelos*	ST	Pr	Red	Y	Y
Whitethroat	*Sylvia communis*	WH	Pr	Green		
Woodpigeon	*Columbia palumbus*	WP	Pr	Green		
Wren	*Troglodytes troglodytes*	WR	Pr	Green		



Survey site

Bird survey recordings

- Flying over
- Flying off
- Flying in
- Singing
- Calling
- Alarm calling
- Carrying food
- Nesting activity
- Juvenile present
- Territorial behaviour

NOTES
Coloured circles/text represent different bird species.

Species are represented by a standard BTO code
i.e. S = Skylark, CH = Chaffinch
For a full list of codes please refer to Appendix 5 within the report

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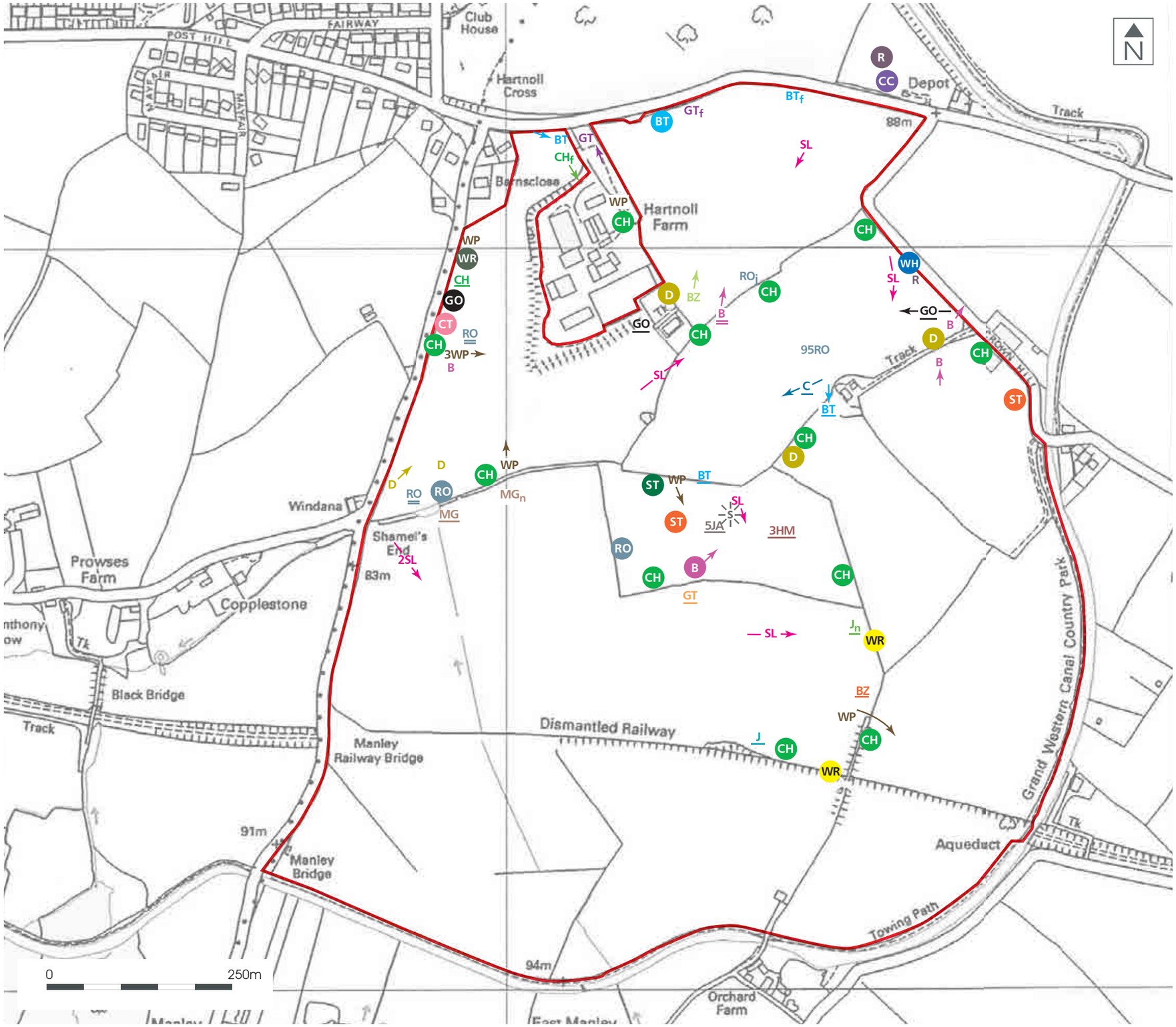
ON BEHALF OF
Waddeton Park Ltd

PROJECT
Hartnoll's Farm, Tiverton

TITLE
Breeding Bird Survey 24th April 2013

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW



Survey site

Bird survey recordings

- Flying over
- Flying off
- Flying in
- Singing
- Calling
- Alarm calling
- Carrying food
- Nesting activity
- Juvenile present
- Territorial behaviour

NOTES
Coloured circles/text represent different bird species.

Species are represented by a standard BTO code
i.e. S = Skylark, CH = Chaffinch
For a full list of codes please refer to Appendix 5 within the report

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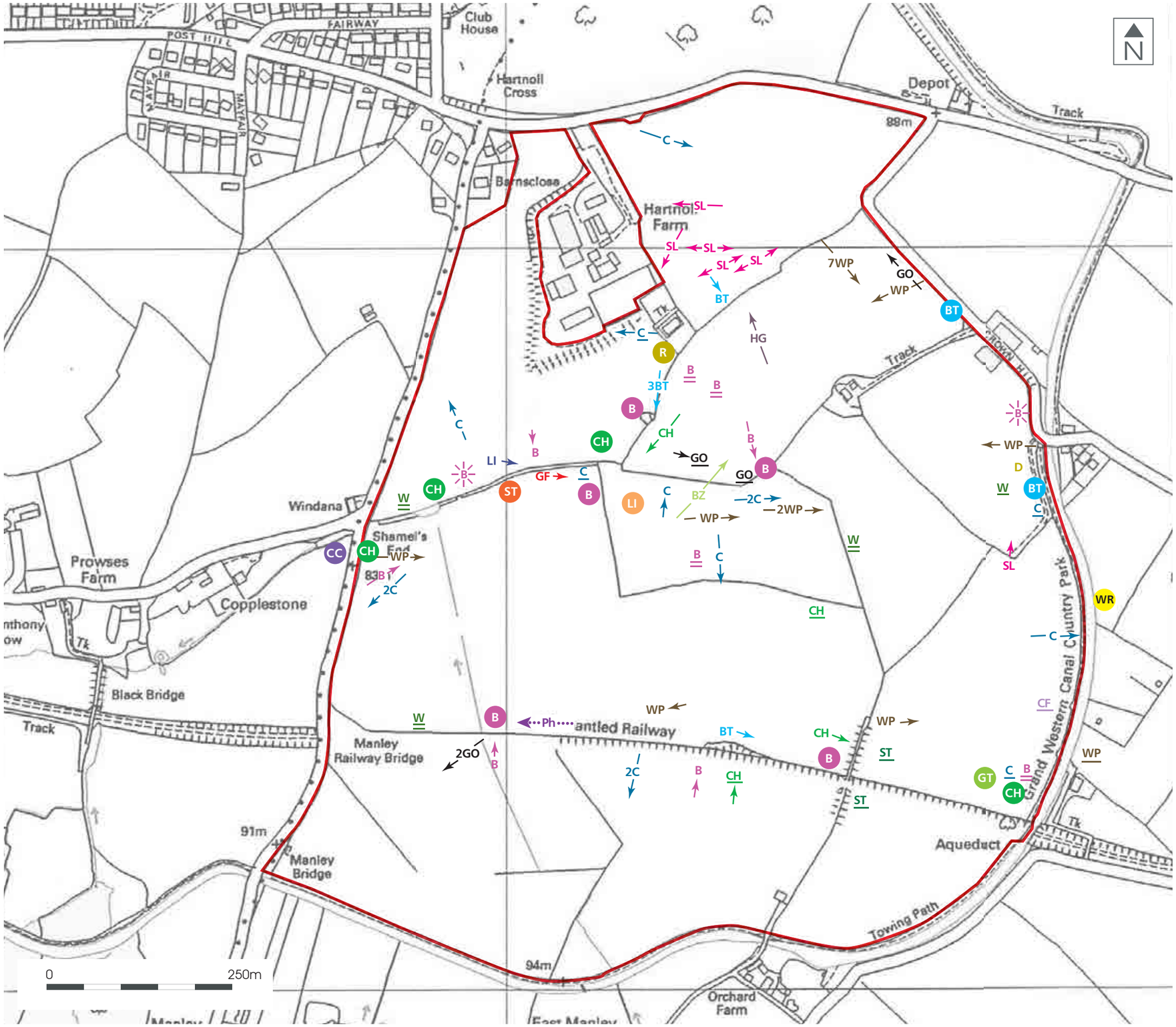
PROJECT
Hartnoll's Farm, Tiverton

TITLE
Breeding Bird Survey 29th May 2013

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW



Survey site

Bird survey recordings

- Flying over
- Flying off
- Flying in
- Singing
- Calling
- Alarm calling
- Carrying food
- Nesting activity
- Juvenile present
- Territorial behaviour
- Walking

NOTES
Coloured circles/text represent different bird species.

Species are represented by a standard BTO code
i.e. S = Skylark, CH = Chaffinch
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ON BEHALF OF
Waddeton Park Ltd

PROJECT
Hartnoll's Farm, Tiverton

TITLE
Breeding Bird Survey 14th June 2013

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW

Appendix 6: Reptile Survey Results

Date	*Time*	*Weather*	*Temp. (°C)*	*Species*	*Mat No.*	*Details*
19/06/2013	09:00 - 10:30	100% cloud; dry	13	None	-	-
23/09/2013	08:00 - 9:00	100% cloud; short shower	15	None	-	-
	16:10 - 16:35	40% cloud; dry	17	None		
25/09/2013	10:00 - 10:30	Clear	17	None	-	-
	16:45 - 17:15	Survey carried out after heavy shower; 60% cloud	17	None	-	-
30/09/2013	09:07 - 09:31	100% cloud; dry	14	None	-	-
	16:10 - 16:35	100% cloud; dry	17	None	-	-

Appendix 7: Great Crested Newt Survey Results

Great Crested Newt Survey

1. Pond Details

Project	**Tiverton East Urban Expansion**
Project number/reference	
Site	

Pond number/reference	Canal
OS Grid reference	SS995121
Location details	
Access instructions	

Landowner name	
Address/email	
Telephone	

Habitat Suitability Index

				SI value
SI1.	Map location	**A/B/C**		*0.00*
SI2.	Surface area	**rectangle/ellipse/irregular**		
		length (m)		
		width (m)		
		OR estimate (m^2) if irregular		
		area (m^2) =	*select shape*	*0.01*
SI3.	Dessication rate	**never/rarely/sometimes/frequently**		*0.90*
SI4.	Water quality	**good/moderate/poor/bad**		*0.00*
SI5.	Shade	% of margin shaded 1m from bank		*1.00*
SI6.	Waterfowl	**absent/minor/major**		*0.00*
SI7.	Fish population	**absent/possible/minor/major**		*0.00*
SI8.	Pond density	number of ponds within 1km		*0.10*
SI9.	Terrestrial habitat	**good/moderate/poor/isolated**		*0.00*
SI10.	Macrophyte cover	%		*0.31*

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

HSI score = n/a

Pond suitability = n/a

General description/notes/comments

Lots of fish - roach and sticleback observed. Not suitable newt habitat. NB. HIS not suitable for linear waterbodies.

Survey results summary

Number of survey visits: 2

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

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

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

Presence or likely absence = absent

Peak count = 0

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

Great Crested Newt Survey

2. Survey Details

	Visit 1				Visit 2				Visit 3			
Date	14 May 2012				15 May 2012							
Personnel	JW/GS				LR/R?							
Temperature (ºC)					5							
Weather	clear, wind 3				clear, wind 2							
Turbidity					4							
Vegetation cover					1							
Methods	torch	trap	net	other	torch	trap	net	other	torch	trap	net	other
indicate methods used and ***number of bottle traps***					x	32						
T. cristatus												
male												
female												
unknown adult												
total adults	**0**	**0**	0	0	**0**	**0**	0	0	**0**	**0**	0	0
immature												
larvae												
eggs present?	no				no							
L. vulgaris												
L. helveticus												
R. temporaria												
B. bufo												
Other												

	Visit 4				*Visit 5*				*Visit 6*			
Date												
Personnel												
Temperature (ºC)												
Weather												
Turbidity												
Vegetation cover												
Methods	torch	trap	net	other	torch	trap	net	other	torch	trap	net	other
indicate methods used and ***number of bottle traps***												
T. cristatus												
male												
female												
unknown adult												
total adults	**0**	**0**	0	0	**0**	**0**	0	0	**0**	**0**	0	0
immature												
larvae												
eggs present?												
L. vulgaris												
L. helveticus												
R. temporaria												
B. bufo												
Other												

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

Great Crested Newt Survey

1. Pond Details

Project	**Tiverton East Urban Expansion**
Project number/reference	
Site	

Pond number/reference	8
OS Grid reference	SS988126
Location details	Shamel's End
Access instructions	

Landowner name	
Address/email	
Telephone	

Habitat Suitability Index

				SI value
SI1.	Map location	**A/B/C**	B	*0.50*
SI2.	Surface area	**rectangle/ellipse/irregular**	rectangle	
		length (m)	15	
		width (m)	2	
		OR estimate (m^2) if irregular		
		area (m^2) =	*30*	*0.06*
SI3.	Dessication rate	**never/rarely/sometimes/frequently**	sometimes	*0.50*
SI4.	Water quality	**good/moderate/poor/bad**	moderate	*0.67*
SI5.	Shade	% of margin shaded 1m from bank	100	*0.20*
SI6.	Waterfowl	**absent/minor/major**	minor	*0.67*
SI7.	Fish population	**absent/possible/minor/major**	absent	*1.00*
SI8.	Pond density	number of ponds within 1km	3	*1.00*
SI9.	Terrestrial habitat	**good/moderate/poor/isolated**	poor	*0.33*
SI10.	Macrophyte cover	%	0	*0.31*

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

HSI score = **0.41**

Pond suitability = **poor**

General description/notes/comments

broad section of ditch

Survey results summary

Number of survey visits: 4

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

Presence or likely absence = **absent**

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

Peak count = **0**

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

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

Great Crested Newt Survey

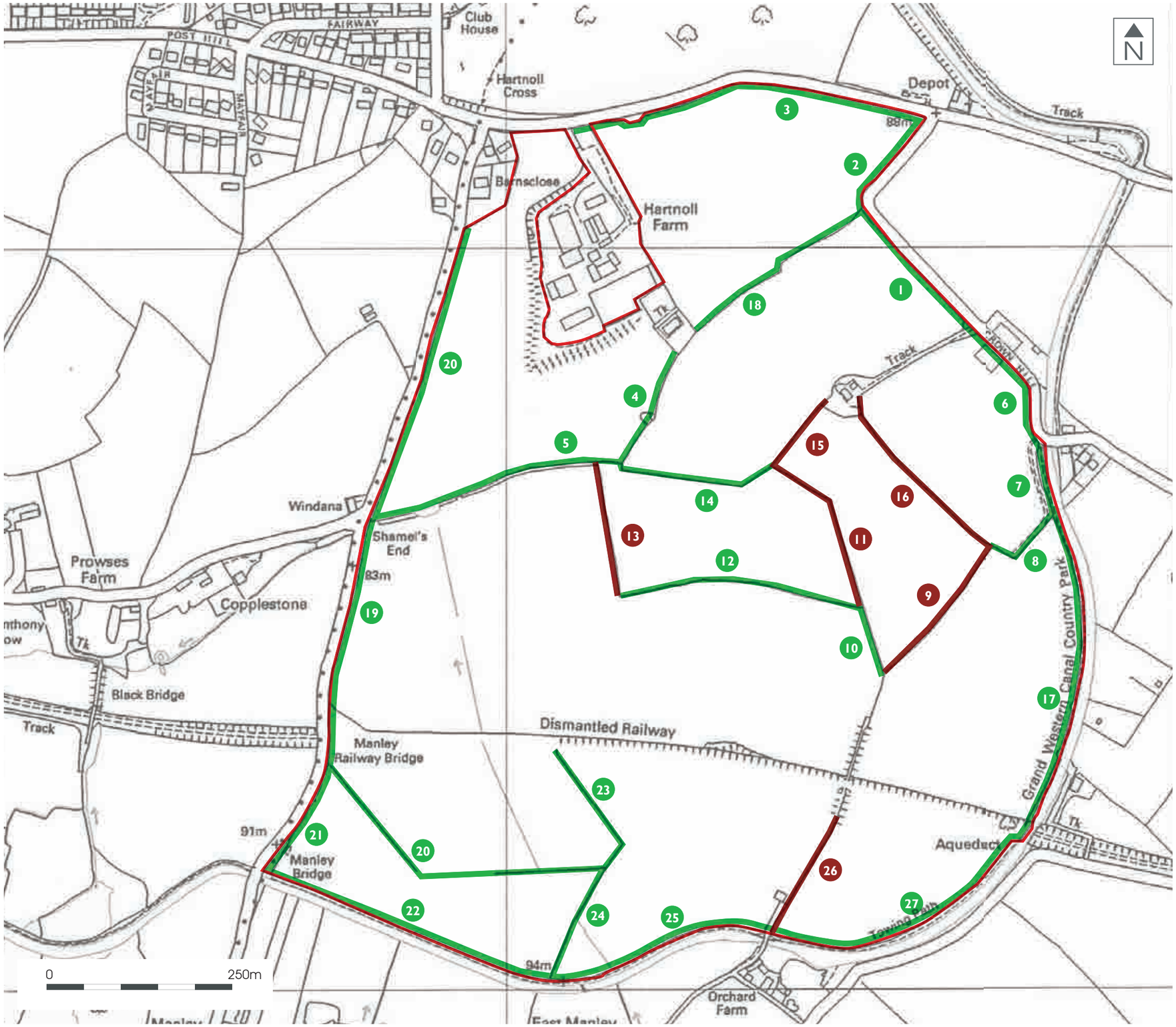
2. Survey Details

	Visit 1				Visit 2				Visit 3			
Date	25 May 2012				29 May 2012				30 May 2012			
Personnel	LR/SH				LR/SH				LR/SH			
Temperature (ºC)	17.2				16.3				15.4			
Weather	Partial cloud, wind 3				Warm, 30% cloud				Partial cloud			
Turbidity	3				3				3			
Vegetation cover	1				1				1			
Methods	torch	trap	net	other	torch	trap	net	other	torch	trap	net	other
indicate methods used and ***number of bottle traps***	x	5			x	5			x	5		
T. cristatus												
male												
female												
unknown adult												
total adults	**0**	**0**	0	0	**0**	**0**	0	0	**0**	**0**	0	0
immature												
larvae												
eggs present?	no				no				no			
L. vulgaris												
L. helveticus												
R. temporaria									1 adult			
B. bufo												
Other												

	Visit 4				*Visit 5*				*Visit 6*			
Date	7 June 2012											
Personnel	LR/SH											
Temperature (ºC)	12											
Weather	Light, wind 5											
Turbidity	4											
Vegetation cover	1											
Methods	torch	trap	net	other	torch	trap	net	other	torch	trap	net	other
indicate methods used and ***number of bottle traps***	x	5										
T. cristatus												
male												
female												
unknown adult												
total adults	**0**	**0**	0	0	**0**	**0**	0	0	**0**	**0**	0	0
immature												
larvae												
eggs present?	no											
L. vulgaris												
L. helveticus												
R. temporaria												
B. bufo												
Other												

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

Appendix 8: Hedgerow Survey Results



Survey site

Ecologically important hedgerows under Hedgerow Regulations

Hedgerow does not qualify as ecologically important under Hedgerow Regulations

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ON BEHALF OF

Waddeton Park Ltd

PROJECT

Hartnoll's Farm, Tiverton

TITLE

Hedgerow and Tree Survey

SCALE	DATE	PROJECT NO	APPROVED
Not to scale	March 2014	eg13511	JW