

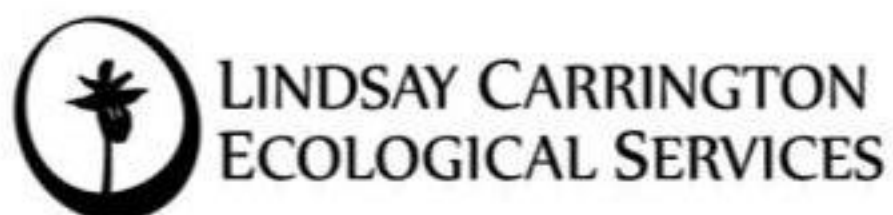


LINDSAY CARRINGTON
ECOLOGICAL SERVICES

ECOLOGICAL APPRAISAL AND PHASE 2 SURVEYS
AREA 3B AND 8
NEWLANDS LANE
WATERLOOVILLE
PO7 5SH

OCTOBER 2018

ON BEHALF OF GRAINGER PLC



The Old Squash Court,
Rempstone Hall,
Rempstone,
Corfe Castle,
Wareham,
Dorset,
BH20 5JQ
www.ecological-services.co.uk

Telephone: 01929 477115
E-mail: louisa@ecological-services.co.uk

Authorisation

	Name	Date	Signature
Report prepared by:	Louisa Jones	23.10.18	
Report reviewed by:	Jenny Sutch	24.10.18	

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SUMMARY

1. Lindsay Carrington Ecological Services Limited were commissioned by Grainger plc to conduct an ecological appraisal of Phase 3B and 8 at Berewood, Waterloooville, PO7 7PS (Grid Ref: SU 6762 0900).
2. Berewood (Havant Borough Council planning ref: APP/10/00828/ Winchester City Council planning ref: 10/02862/OUT) is a large multi-phase development. The boundary for these works in relation to the wider survey area is shown in appendix I.
3. An ecological appraisal is essentially a multi-disciplinary walk-over survey and was conducted with the objective of identifying any ecological constraints associated with the proposals such as the site's potential to support any legally protected species or habitats of high nature conservation value.
4. Phases 3B and 8 mainly consists of a large amenity grassland field which is regularly managed as short sward grassland. There are a number of species-rich native hedgerows which mark the field boundaries.
5. There are two species-rich native hedgerows on site within the application boundary, no hedgerows will be lost as part of this development and no further action is required.
6. During the survey the invasive species three-cornered garlic was recorded at the base of hedgerow 2. This species is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Further recommendations have been made in section 5.1.
7. There is suitable foraging habitat for badgers across the site and previous surveys identified badger setts in the vicinity. The site provides potential foraging habitat and further recommendations are provided in section 5.2.
8. Activity transects across the site recorded the site as being of local importance for bats in the local area with areas along the eastern and western boundary being of particular importance. Further recommendations are provided in section 5.3.
9. Suitable terrestrial habitat for great crested newts is present on site and great crested newts have been recorded in the area with all confirmed great crested newt ponds over 500 metres from the site. It is considered highly unlikely that newts are currently present on site and no further action is required.
10. The hedgerows on site provide suitable habitat for dormice. As the hedgerows are remaining within the development no further action is required.
11. The hedgerows on site provide potential nesting habitat for birds. The fields provide limited potential habitat for overwintering birds. Further recommendations are provided in section 5.4.

12. The amenity grassland on the site is currently heavily managed and does not provide habitat for reptiles. Reptiles are known to be present within the wider area. To ensure the habitat remains unsuitable further recommendations are provided in section 5.5.
13. Recommendations to enhance the ecological value of the site are outlined in section 5.6.

1.0 INTRODUCTION

Lindsay Carrington Ecological Services Limited were commissioned by Grainger plc to conduct an ecological appraisal of Area 3B of the land at Berewood, Waterlooville, PO7 7PS (Grid Ref: S 67560 09031).

Berewood, Waterlooville (Havant Borough Council planning ref: APP/10/00828/ Winchester City Council planning ref: 10/02862/OUT) is a large multi-phase development. This report presents current information for the works associated with phases 3B and 8. A site location plan is provided in appendix I.

An ecological appraisal is essentially a multi-disciplinary walk-over survey and was conducted with the objective of identifying any ecological constraints associated with the proposals such as the site's potential to support any legally protected species or habitats of high nature conservation value.

Section 2 of the report provides some background information on legislative requirements and relevant policy. Section 3 details the methodologies adopted for the ecological surveys that were conducted and section 4 provides an account of the survey results. Section 5 provides information on the relevance of the results to the proposed development and makes recommendations for measures to mitigate and compensate for the effects on a particular habitat or species.

2.0 LEGISLATION AND POLICY

2.1 Legislation

The following legislation may be of relevance to the proposed works. Full details of statutory obligations with respect to biodiversity and the planning system can be found in DCLG Circular 06/2005.

- **The Conservation of Habitats and Species Regulations 2017:**
This transposes the EU Habitats Directive (Council Directive 92/43/EEC) into domestic law. The Regulations provide protection for a number of species including:
 - All species of bat;
 - Dormouse;
 - Otter; and
 - Great crested newt.

This legislation makes it an offence to deliberately capture, kill or injure individuals of these species listed on Schedule 2 and damage or destroy their breeding site or place of shelter. It is also illegal to deliberately disturb these species in such a way as to be likely to significantly affect: (i) the ability of any significant group of the species to survive, breed or rear or nurture their young; or (ii) the local distribution or abundance of the species¹;

This legal protection means that where development has the potential to impact on bats, or other European protected species, the results of a protected species survey must be submitted with a planning application.

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are also protected under this legislation. These are a network of sites designated for supporting habitats or species of high nature conservation importance in the European context. Any activity that has a detrimental effect on these European sites is made an offence under the Regulations. Where a development is likely to have a significant impact on a European site, the Regulations require a rigorous assessment of the impacts, known as an Appropriate Assessment.

¹ The *Conservation of Habitats and Species Regulations 2017* consolidates the numerous amendments that were made to the *Conservation (Natural Habitats, &c.) Regulations 1994*. Of particular relevance are amendments made in August 2007 and January 2009 which increased the threshold of illegal levels of disturbance to European Protected Species (EPS). An offence is only committed if the deliberate disturbance would result in significant impacts to the EPS population. However, it should be noted that activities that cause low levels of disturbance to these species continue to constitute an offence under *Section 9 of the Wildlife and Countryside Act (1981)*.

- **The Wildlife and Countryside Act 1981 (and amendments):** Protected fauna and flora are listed under Schedules 1, 5 & 8 of the Act. Species likely to be of relevance include:
 - All species of **bat**. It is an offence to intentionally or recklessly disturb any bat whilst it is occupying a roost or to intentionally or recklessly obstruct access to a bat roost;
 - All species of British **reptile** (in particular grass snake, common lizard, adder and slow-worm). It is illegal to kill or injure these species; and
 - **Great crested newt**. It is illegal to obstruct access to any structure or place which great crested newts use for shelter or protection or to disturb any great crested newt while it is using such a place.
 - **Water vole**. It is an offence to intentionally kill, injure or take water vole, intentionally or recklessly damage, destroy, obstruct access to water vole burrows or disturb them whilst in a burrow.

This Act also makes it an offence to intentionally kill, injure or take any wild bird or to take, damage or destroy their eggs and nests (whilst in use or being built). In addition, it is an offence to disturb any nesting bird listed on Schedule 1 or their young.

Schedule 9 of the Act lists those species for which it is an offence to cause their spread. Schedule 9 species that are most likely to be encountered are Japanese knotweed (*Fallopia japonica*) and New Zealand pigmyweed (*Crassula helmsii*).

Sites of Special Scientific Interest (SSSIs) are also protected under the Wildlife and Countryside Act 1981. These are a network of sites identified as being of national nature conservation importance and hence afforded legal protection.

- **The Countryside and Rights of Way Act 2000:** This Act strengthens nature conservation and wildlife protection. It places a duty on Government Ministers and Departments to conserve biological diversity, provides police with stronger powers relating to wildlife crimes, and improves protection and management of SSSIs.
- **The Protection of Badgers Act 1992:** This Act makes it an offence to wilfully take, injure or kill a badger (*Meles meles*); cruelly mistreat a badger; interfere with badger setts. A licence is required for work which may damage or disturb a sett.
- **Wild Mammals (Protection) Act 1996:** This Act provides protection for all wild animals from intentional acts of cruelty.
- **Hedgerow Regulations 1997:** These Regulations establish a set of criteria for assessing the importance of hedgerows. Where a hedgerow is deemed to be

‘important’ its removal is prohibited without consent from the local Planning Authority

2.2 Policy

The following policy is of relevance to the proposed works:

- **National Planning Policy Framework (NPPF):** This sets out the Government’s vision for biodiversity in England with the broad aim that planning, construction, development and regeneration should maintain and enhance, restore or add to biodiversity and geological conservation interests. NPPF includes sections on legally protected species and sites in section 15(2) (see section 2.1).
- **Local Sites (including Sites of Nature Conservation Interest (SNCIs), Local Nature Reserves (LNR), and Biological Notification Sites (BNSs)/County Wildlife Sites (CWSs)):** These are a network of sites designated for their nature conservation importance in a local context. Although they are not afforded legal protection they contribute towards local and national biodiversity. Where such development is permitted, the local planning authority will use conditions and/or planning obligations to minimise the damage and to provide compensatory and site management measures where appropriate.
- **Biodiversity Action Plans (BAPs):** BAPs set out policy for protecting and restoring priority species and habitats as part of the UK’s response as signatories to the Convention on Biological Diversity. BAPs operate at both a national and local level with priority species and habitats identified at a national level and a series of Local BAPs that identify ecological features of particular importance to a particular area of the country. The requirement to consider and contribute towards BAP targets was strengthened through the Countryside and Rights of Way Act 2000. Habitat and Species Action Plans that are likely to be of relevance include:
 - Reptiles (UK BAP)
 - Brown long-eared bat (*Plecotus auritus*) (UK BAP)
 - Soprano pipistrelle (*Pipistrellus pygmaeus*) (UK BAP)
 - Dormice (*Muscardinus avellanarius*) (UKBAP)

3.0 METHODOLOGY

3.1 Desk study

Hampshire Biological Information Centre (HBIC) provided protected species records within two kilometres of the site and details of any non-statutory designated sites. The Multi-Agency Geographical Information for the Countryside (MAGIC) website was used to provide information on any statutory designated sites within five kilometres of the proposed development.

3.2 Field study

3.2.1 Vegetation

The standard phase 1 habitat survey methodology (JNCC, 2010) was adopted whereby habitats are mapped using colour codes (appendix II). A detailed walkover survey of the site was undertaken on 27th April 2018 by Andrew Heideman, directly searching for legally protected and invasive species of flora and fauna, and categorising any habitats of ecological value that were encountered. A general description of the vegetation on site was also recorded, listing species encountered and scoring their abundance using the DAFOR scale:

D	Dominant;
A	Abundant;
F	Frequent;
O	Occasional;
R	Rare;
L	Local (used as a prefix to any of the above).

3.2.2 Protected species assessment

Badgers

A direct search was undertaken for signs of badger. Signs of badger may include setts, dung pits, latrines, paths or hairs on fences and vegetation. Any setts encountered were classified according to the number of entrances and the extent of their use.

Bats

Foraging/commuting habitat

The site was assessed for its suitability to support foraging/commuting bats. Bats will forage on sites that support linear landscape features (e.g. hedgerows, tree lines and

rivers) with good habitat connectivity and within proximity to suitable roosting sites. Sites that support a range of semi-natural habitats with varied vegetation structure are considered to provide more suitable foraging habitat for bats as they support an abundance and diversity of insect prey.

Activity transects

A suite of bat activity surveys were undertaken on site in accordance with the guidelines established by the BCT (Collins, 2016).

Bats are generally most active between the months of March and September with the optimal months for undertaking transects being June to August. Activity transects were undertaken on during April, May 2018, June 2018, July 2018, August 2018 and September 2018. The dusk transect surveys began at or just before sunset and continued for approximately two hours afterwards in order to record any bats commuting from roost sites to foraging grounds as well as general foraging activity. The dawn transect surveys commenced two hours before sunrise and continued until sunrise.

Bat transect surveys involve walking pre-defined route which incorporate key areas of habitat that are likely to be important for foraging and/or commuting bats. Such areas include scrub and grassland and linear features such as hedgerows and woodland/scrub edge. In regards to the development site, a predetermined transect route was walked by a pair of surveyors during each survey visit. The route was walked up to twice during any one survey at a steady speed and a number of listening station stops were also incorporated along the route. The surveyors paused at each listening stop for a duration of five minutes. The site transect route is illustrated on the plan included as appendix IV.

Static Monitoring

Static monitoring devices were left on site for a minimum of five nights during April, May, June, July, August and September 2018 following the updated guidelines by the BCT (Collins, 2016). The recording devices consisted of SM2, SM4 and Anabat expresses. The recording devices were set up at the same strategically selected locations around the site on each occasion. All analysis of the static recording device was conducted using Kaleidoscope software.

For all months, the statics were deployed at the following locations:

- Static monitor 1 (SU 67502 09062): Positioned within northern area of the tree line on the western site boundary.
- Static Monitor 2 (SU 67436 08821): Positioned within southern area of the tree line on the western site boundary.

The detectors ran throughout each survey period for a minimum of five consecutive nights at each point. On some occasions the detectors ran for more than this. No issues with the detector occurred throughout the survey period. Table 1 below identifies the number of nights that recorded bat activity for each monitor per month. Recordings from these transects were considered sufficient to gauge local bat activity levels.

Table 1: Static Monitoring days

	April	May	June	July	August	September
Monitor 1	5	9	7	7	7	5
Monitor 2	5	9	8	7	7	5

Assessment of foraging and commuting habitat importance

A methodology for the ecological impact assessment of bats has been developed by Wray et al (2010). This uses a number of factors such as the species and number of bats involved, presence of roosts nearby and characteristics for foraging and commuting habitat to produce a score indicating level of importance. This scoring system has been applied to the foraging area and commuting routes for the site to assess their level of importance. The value of the habitat can be assessed for each of the bat species recorded during the survey, but the highest score (normally obtained for the rarest species) is used when defining the value of the habitat. The scores relate to the following levels of importance:

- 0–10 = not valuable
- 11–20 = locally important
- 21–30 = important at county level
- 31–40 = important at regional level
- 41–50 = nationally important

Limitation and constraints

The site was initially assessed as holding moderate suitability to support commuting and foraging bats and as such monthly surveys were undertaken with a view to surveying once a month between April and October in accordance with the BCT's guidelines (Collins, 2016). Due to the project deadline and the proposal to submit a planning application the surveys were concluded in September. The reduced survey effort is not considered to have had a significant impact on the results of the survey as only low numbers of bats were recorded during the surveys.

Dormice

The habitat on the site was assessed for the potential to support dormice, which are found in habitats such as woodlands, scrub and hedgerows with good connectivity and suitable food plants. A visual inspection for their distinctive nests was undertaken. Where fruiting

hazel (*Corylus avellana*) is present nuts are checked for dormice distinctive opening holes. Satellite images were used to assess the connectivity of any suitable habitat present on the site to other areas of woodland and hedgerow networks.

Great crested newts

Suitable breeding ponds are essential to support populations of great crested newt (*Triturus cristatus*) although they actually only spend a relatively short period of the year in the ponds during the spring for breeding. The remainder of the year is spent in suitable 'foraging' terrestrial habitat such as tall grassland and woodland. During the winter the great crested newt hibernates, often amongst the roots of trees and scrub or in other places such as rubble piles, amongst the foundations of buildings or under fallen trees and logs.

Great crested newts are known to forage up to at least five hundred metres from their breeding pond and suitable habitats that fall within two hundred and fifty metres must be considered even in situations where the breeding pond itself will not be affected. The site and surrounding area was assessed during the phase 1 habitat survey for the presence of ponds that may provide suitable breeding habitat for great crested newts. Suitable terrestrial habitat was also assessed.

Reptiles

Common reptile species such as slow-worm (*Anguis fragilis*) and grass snake (*Natrix natrix*) are widespread in habitats that provide both cover, in the form of scrub or tall vegetation, and basking areas such as hard standing or short grassland communities. Piles of debris or rubble also provide excellent refuge and hibernation sites for reptiles. They do also have an affinity for hiding under debris exposed or partially exposed to the sun. Recommendations for further surveys have been made where applicable.

4.0 RESULTS

4.1 Desk study

Designated sites

Table 2 below lists sites designated for nature conservation located within five kilometres of the development site.

Table 2: Statutory designated sites within a five kilometre radius and non-statutory sites within a two kilometre radius of the land at Berewood, Waterloooville.

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
Solent Maritime	SAC ²	3.7 south	165300	The Solent encompasses a major estuarine system on the south coast of England. Designated for its estuary, salt meadow, coastal lagoons, mudflats. Qualifying species includes Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>)
Chichester and Langstone Harbours	SPA ³	3.7 south	5,810	The SPA qualifies under Article 4.1 for breeding little tern (<i>Sterna albifrons</i>) and sandwich tern (<i>Sterna sandvicensis</i>), little egret (<i>Egretta garzetta</i>) and overwintering bar-tailed godwit (<i>Limosa lapponica</i>). This site also qualifies under Article 4.2 for ringed plover (<i>Charadrius hiaticula</i>), overwintering black-tailed godwit (<i>Limosa limosa islandica</i>), dark-bellied brent goose (<i>Branta bernicla bernicla</i>), dunlin (<i>Calidris alpina alpina</i>), grey plover

² SAC: Special Area of Conservation

³ SPA: Special Protection Area

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				(<i>Pluvialis squatarola</i>), redshank (<i>Tringa totanus</i>), and assemblage of international importance.
	Ramsar ⁴	3.7 south	5,810	Chichester Harbour comprises extensive mud and sandflats that are exposed at low tide. The site is designated as a wetland of international importance and is of particular significance for wintering wildfowl and waders as well as breeding birds both within the Harbour and in the surrounding permanent pasture fields and woodlands.
Lye Heath Marsh	SSSI ⁵	2.4 west	4.4	Lye Heath Marsh supports the following habitats including a mixture of basic flushes, unimproved grassland, alder woodland and dense hedgerows, which combine to form a now rare association of individually restricted habitats.
Hook Heath Meadows	SSSI	2.8 south-west	5.9	Hook Heath Meadows comprise an intimate mixture of woodland and agriculturally unimproved acid pasture lying within a shallow river valley over London Clays. Many of the habitats present are now rare in lowland Britain through agricultural intensification. Their close juxtaposition here is of particular value as an invertebrate habitat.

⁴ Ramsar: Internationally important wetland site

⁵ SSSI: Site of Special Scientific Interest

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
Langstone Harbour	SSSI	3.7 south	2,069	A tidal basin with extensive mudflats, marshland and reedbeds supporting internationally important numbers of overwintering waders.
Portsdown	SSSI	2.7 south-west	69.15	Portsdown is notified for its geological importance.
Catherington Down	SSSI LNR ⁶	4.8 north east	12.83	Catherington Down is an area of chalk grassland and narrow fringing woodland. The grasslands support numerous insect species that help to pollinate flowers. Chalk grasslands that contain a rich variety of plant species, which in turn support numerous insect species, like butterflies, that help to pollinate flowers. The terraces that occur on Catherington Down are actually an ancient farming system dating back to the medieval times.
Hazelton Common	LNR	3.1 north-east	17.45	A large area of heathland, mixed scrub and wooded dells with ponds and wetland area, supporting many species of reptile, dragonfly and other invertebrates. Bracken has spread in some areas, a few patches of heather survive, mostly mixed with extensive areas of gorse where there is a good breeding population of stonechats (<i>Saxicola torquata</i>).

⁶ LNR: Local Nature Reserve

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
Farlington Marshes	LNR	3.5 south-east	119.68	Farlington marshes comprise grazed wildflower rich-marshes. The site is internationally important for bird populations, and is a popular location for observing butterflies.
Yeoll's Copse	LNR	3.7 north-east	5.48	A precious fragment of Ancient Woodland with a small wetland area on the north side and now surrounded on three sides by housing development. Unusual plants include common cow wheat (<i>Melampyrum pratense</i>) and butcher's broom (<i>Ruscus aculeatus</i>).
Dell Piece West	LNR	3.9 north-east	4.06	Well-wooded borders, unimproved grassland, damp marshy ground and a large shallow pond provides habitat for a rich variety of wildlife that includes various butterflies, dragonflies and reptiles.
Newlands Row and Plant Row	SINC ⁷	0.4 east	5.35	Ancient semi-natural woodlands. A site that supports dormouse (<i>Muscardinus avellanarius</i>) populations.
Newlands Farm Meadow	SINC	0.4 south east	3.75	Semi improved grassland which retain a significant element of unimproved grassland.
Stakes Coppice Remnant 1	SINC	0.5 east	0.47	Woodland where there is a significant element of ancient semi-natural woodland surviving. Site of nature conservation interest which occur in areas

⁷ SINC: Site of Importance for Nature Conservation

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				otherwise deficient in such interest, and/or are known to be of particularly high value to local communities e.g. community wildlife sites.
Marrelsmoor Row	SINC	0.6 south	0.7	Ancient semi-natural woodlands.
Marrelsmoor Coppice	SINC	0.6 south	3.05	Ancient semi-natural woodlands. A site that supports dormouse populations.
Alsfordmoor Coppice	SINC	0.7 south	5.66	Woodland where there is a significant element of ancient semi-natural woodland surviving. They comprise important community types of restricted distribution in the County, such as yew (<i>Taxus baccata</i>) woods and alder (<i>Alnus glutinosa</i>) swamp woods. A site that supports dormouse populations.
Purbrook Heath	SINC	0.8 south	3.4	Agriculturally unimproved grasslands. A site that supports dormouse populations.
Newlease Copse, Havant	SINC	0.9 south east	1.74	Ancient semi-natural woodlands.
The Queen's Inclosure	SINC	1.2 north east	40.27	Ancient semi-natural woodlands.
Pound Coppice Remnant	SINC	1.2 west	1.23	Woodland where there is a significant element of ancient semi-natural woodland surviving. A site that supports dormouse populations.
Drivetts Complex	SINC	1.2 west	63.70	Ancient semi-natural woodlands.
Halls Cottage Woodland	SINC	1.2 west	2.85	Woodland where there is a significant element of ancient semi-natural

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				woodland surviving.
Park Wood, Havant	SINC	1.3 north east	2.60	Ancient semi-natural woodlands.
Sheepwash/Tattle/Dunsland Coppices	SINC	1.3 west	20.06	Ancient semi-natural woodlands. A site that supports dormouse populations.
Aldermoor Meadow Part	SINC	1.4 south	1.93	Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.
London Road Fen	SINC	1.5 south	1.91	They comprise important community types of restricted distribution in the County, such as yew woods and alder swamp woods. Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.
Broomground Coppice/Potwell Coppice	SINC	1.5 south west	19.95	Ancient semi-natural woodlands. Woodland where there is a significant element of ancient semi-natural woodland surviving. They comprise important community types of restricted distribution in the County, such as yew woods and alder swamp woods.
Widley Walk Meadow	SINC	1.6 south west	1.56	Agriculturally unimproved grasslands.
Sandy and Aldermoor Coppices	SINC	1.6 south west	6.18	Ancient semi-natural woodlands.
Frank's Coppice	SINC	1.7 east	1.78	Woodland where there is a

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				significant element of ancient semi-natural woodland surviving.
Piper's Hill Wood	SINC	1.7 north west	1.96	Ancient semi-natural woodlands.

Chichester and Langstone Harbours SPA and Ramsar lie 3.7 kilometre to the south-east of the site, the Solent Maritime SAC lies 3.7 kilometre to the south, and the nearest statutory site is Lye Heath Marsh which is situated 2.4 kilometre south-west of the site. There are not anticipated to be any impacts to these sites from this element of the scheme. Issues relating to the wider housing development are detailed within the Ecology Chapter for the development (Biodiversity by Design 2010b). No further action is required.

Protected species records

Table 3 below lists records of protected species within two kilometres of the site provided by HBIC.

Table 3: Protected and notable species within two kilometres of land at Berewood, Waterloooville

Common Name	Scientific name	Status	Dates
<i>Amphibians and Reptiles</i>			
Slow-worm	<i>Anguis fragilis</i>	Schedule 5 WCA ⁸ , UKBAP ⁹	2 records dated 2011.
Great crested newt	<i>Triturus cristatus</i>	Habs Regs ¹⁰ Annex II, Schedule 5 WCA, UK BAP	38 records dated between 2007 and 2015.
<i>Birds</i>			
Lesser redpoll	<i>Acanthis cabaret</i>	Red List BoCC ¹¹ , UK BAP	2 records dated between 2010 and 2015.
Skylark	<i>Alauda arvensis</i>	Red List BoCC, UK BAP	6 records dated between 2008 and 2015.
Kingfisher	<i>Alcedo atthis</i>	Schedule 1 WCA, Annex 1 ¹² , Amber List BoCC	7 records between 2007 and 2015.

⁸ WCA: The Wildlife and Countryside Act 1981 (as amended)

⁹ UKBAP: UK Biodiversity Action Plan

¹⁰ Habs Regs: Conservation of Habitats and Species Regulations 2010

¹¹ BoCC: Birds of Conservation Concern

Common Name	Scientific name	Status	Dates
Gadwall	<i>Anas strepera</i>	Amber List BoCC	1 record dated 2013.
Short-eared owl	<i>Asio flammeus</i>	Annex 1, Amber List BoCC	2 records dated 2003.
Brent goose	<i>Branta bernicla</i>	Amber List BoCC, UK BAP	12 records dated between 2005 and 2015.
Dunlin	<i>Calidris alpina</i>	Amber List BoCC	1 record dated 2015.
Nightjar	<i>Caprimulgus europaeus</i>	Annex 1	16 records dated between 1994 and 2010.
Cetti's warbler	<i>Cettia cetti</i>	Schedule 1 WCA	1 record dated 2015.
Black-headed gull	<i>Chroicocephalus ridibundus</i>	Amber List BoCC	21 records dated between 2006 and 2015.
Little egret	<i>Egretta garzetta</i>	Annex 1	47 records dated between 2002 and 2015.
Yellowhammer	<i>Emberiza citrinella</i>	Red List BoCC	1 record dated 2011.
Reed bunting	<i>Emberiza schoeniclus</i>	Amber List BoCC, UK BAP	2 records dated 2015.
Peregrine	<i>Falco peregrinus</i>	Schedule 1 WCA, Annex 1, Red List BoCC	37 records dated between 2001 and 2015.
Hobby	<i>Falco subbuteo</i>	Schedule 1 WCA	65 records dated between 1993 and 2015.
Pied flycatcher	<i>Ficedula hypoleuca</i>	Red List BoCC	1 record dated 2015.
Brambling	<i>Fringilla montifringilla</i>	Schedule 1 WCA	1 record dated 2008.
Oystercatcher	<i>Haematopus ostralegus</i>	Amber List BoCC	1 record dated 2015.
Herring gull	<i>Larus argentatus</i>	Red List BoCC, UK BAP	7 records dated between 2010 and 2015.
Lesser black-backed gull	<i>Larus fuscus</i>	Amber List BoCC	22 records dated between 2012 and 2015.
Great black-backed gull	<i>Larus marinus</i>	Amber List BoCC	8 records dated between 2006 and 2013.
Mediterranean gull	<i>Larus melanocephalus</i>	Schedule 1 WCA, Annex 1, Amber List BoCC	Over 150 records dated between 2004 and 2015.
Black-tailed godwit	<i>Limosa limosa</i>	Schedule 1 WCA, Red List BoCC, UK BAP	1 record dated 2015.
Linnet	<i>Linaria cannabina</i>	Red List BoCC, UK BAP	8 records dated between 2007 and 2015.
Common crossbill	<i>Loxia curvirostra</i>	Schedule 1 WCA	11 records dated between 2008 and 2015.
Woodlark	<i>Lullula arborea</i>	Schedule 1 WCA, Annex 1, UK BAP	3 records dated between 2010 to 2015.

¹² Annex 1 of the Birds Directive

Common Name	Scientific name	Status	Dates
Nightingale	<i>Luscinia megarhynchos</i>	Red List BoCC	1 record dated 2011.
Red kite	<i>Milvus milvus</i>	Schedule 1 WCA, Annex 1	20 records dated between 2008 and 2015.
Grey wagtail	<i>Motacilla cinerea</i>	Red List BoCC	100 records dated between 1994 and 2015.
Yellow wagtail	<i>Motacilla flava</i>	Red List BoCC, UK BAP	3 records dated between 2010 and 2012.
Spotted flycatcher	<i>Muscicapa striata</i>	Red List BoCC, UK BAP	3 records dated between 2006 and 2015.
Curlew	<i>Numenius arquata</i>	Red List BoCC, UK BAP	27 records dated between 1994 and 2007.
Whimbrel	<i>Numenius phaeopus</i>	Schedule 1 WCA, Red List BoCC	1 record dated 2003.
Osprey	<i>Pandion haliaetus</i>	Schedule 1 WCA, Annex 1, Amber List BoCC	2 records dated between 2005 and 2013.
House sparrow	<i>Passer domesticus</i>	Red List BoCC, UK BAP	51 records dated between 2007 and 2015.
Black redstart	<i>Phoenicurus ochruros</i>	Schedule 1 WCA, Red List BoCC	1 record dated 2015.
Redstart	<i>Phoenicurus phoenicurus</i>	Amber List BoCC	1 record dated 2011.
Wood warbler	<i>Phylloscopus sibilatrix</i>	Red List BoCC	2 records dated between 2010 and 2011.
Marsh tit	<i>Poecile palustris</i>	Red List BoCC, UK BAP	11 records dated 2006 and 2014.
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber List BoCC, UK BAP	45 records dated between 2002 and 2015.
Firecrest	<i>Regulus ignicapillus</i>	Schedule 1 WCA,	4 records dated between 2010 and 2014.
Whinchat	<i>Saxicola rubetra</i>	Red List BoCC	1 record dated 2008.
Woodcock	<i>Scolopax rusticola</i>	Red List BoCC	7 records dated between 1994 and 2012.
Turtle dove	<i>Streptopelia turtur</i>	Red List BoCC, UK BAP	2 records dated between 2006 and 2009.
Starling	<i>Sturnus vulgaris</i>	Red List BoCC, UK BAP	43 records dated between 2006 and 2015.
Greenshank	<i>Tringa nebularia</i>	Schedule 1 WCA, Amber List BoCC	1 record dated 2015.
Green sandpiper	<i>Tringa ochropus</i>	Schedule 1 WCA, Amber List BoCC	1 record dated 2015.
Redwing	<i>Turdus iliacus</i>	Schedule 1 WCA, Red List BoCC	38 records dated between 1993 and 2015.
Song thrush	<i>Turdus philomelos</i>	Red List BoCC, UK BAP	10 records dated between 2010 and 2013.

Common Name	Scientific name	Status	Dates
Fieldfare	<i>Turdus pilaris</i>	Schedule 1 WCA, Red List BoCC	1 record dated 2011.
Mistle thrush	<i>Turdus viscivorus</i>	Red List BoCC	1 record dated 2013.
Barn owl	<i>Tyto alba</i>	Schedule 1 WCA	4 records dated 2009 and 2013.
Lapwing	<i>Vanellus vanellus</i>	Red List BoCC, UK BAP	3 records dated 2006 and 2015.
Invertebrates - Coleoptera			
Stag beetle	<i>Lucanus cervus</i>	Annex II(non-priority)	2 records dated between 2007 and 2012.
Invertebrates - Lepidoptera			
Purple emperor	<i>Apatura iris</i>	IUCN ¹³ GB 2001 NT ¹⁴	1 record dated 2003.
Silver-washed fritillary	<i>Argynnis paphia</i>	HBAP ¹⁵	4 records dated between 2006 and 2011.
White admiral	<i>Limenitis camilla</i>	IUCN GB 2001 VU ¹⁶	9 records dated between 1992 and 2011.
Grizzled skipper	<i>Pyrgus malvae</i>	IUCN GB 2001 VU	1 record dated 2007.
Mammals – bats			
Serotine	<i>Eptesicus serotinus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	3 records dated between 1986 and 2012.
Daubenton's bat	<i>Myotis daubentonii</i>	Schedule 2 Habs Regs, Schedule 5 WCA	8 records dated between 2006 and 2009.
Whiskered bat	<i>Myotis mystacinus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	1 record dated 2005.
Whiskered/Brandt's bat	<i>Myotis mystacinus/brandtii</i>	Schedule 2 Habs Regs, Schedule 5 WCA	1 record dated 2005.
Noctule	<i>Nyctalus noctula</i>	Schedule 2 Habs Regs, Schedule 5 WCA, UK BAP	8 records dated from 1982 to 2013.
Pipistrelle species	<i>Pipistrellus sp.</i>	Schedule 2 Habs Regs, Schedule 5 WCA	17 records dated between 1985 and 2011.
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	14 records dated between 1982 and 2015.
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Schedule 2 Habs Regs, Schedule 5 WCA, UK BAP	9 records dated between 2009 and 2015.
Brown long-eared	<i>Plecotus auritus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	26 records dated between 1982 and 2014.
Mammals – Terrestrial (non-bats)			
West European hedgehog	<i>Erinaceus europaeus</i>	UK BAP	4 records dated 2007.

¹³ International Union for Conservation of Nature (2001)

¹⁴ Near threatened

¹⁵ Hampshire Biodiversity Action Plan species

¹⁶ Vulnerable

Common Name	Scientific name	Status	Dates
Eurasian badger	<i>Meles meles</i>	PBA ¹⁷	3 records dated between 2002 and 2008.
Hazel dormouse	<i>Muscardinus avellanarius</i>	UK BAP, Schedule 5 WCA	27 records dated between 2006 and 2012.
<i>Invasive plants</i>			
Montbretia	<i>Crocsmia x crocosmifolia</i>	Schedule 9 WCA	1 record dated 2014.
Nuttall's waterweed	<i>Elodea nuttallii</i>	Schedule 9 WCA	2 records dated 2004 and 2014.
Japanese knotweed	<i>Fallopia japonica</i>	Schedule 9 WCA	6 records dated between 2007 and 2014.
Indian balsam (Himalayan balsam)	<i>Impatiens glandulifera</i>	Schedule 9 WCA	4 records dated between 2007 and 2011.
Yellow variegated archangel	<i>Lamium galeodolom argenteum</i>	Schedule 9 WCA	2 records dated 1998 and 2010.
Virginia-creeper	<i>Parthenocissus quinquefolia</i>	Schedule 9 WCA	1 record dated 2013.
Rhododendron	<i>Rhododendron ponticum</i>	Schedule 9 WCA	3 records dated between 1991 and 2001.

These records of protected, notable and invasive species in the vicinity of the site increase the likelihood of them being present where suitable habitat is identified in the field survey.

4.2 Field survey

4.2.1 Vegetation

The accompanying phase 1 habitat map provided as appendix II depicts the habitats encountered and highlights areas of particular interest with target notes.

The site comprises amenity grassland, tall ruderal vegetation, native hedgerows, scrub, hardstanding/bare ground, dry ditches, wet ditches and a structure.

Descriptions of the habitats encountered during the survey are provided below:

Amenity grassland (Target notes 1 & 2)

Rough amenity grassland (T1)

¹⁷ Protection of Badgers Act

At the east and south-east of the site there is a considerable area of rough amenity grassland which comprises an infrequently managed and mostly species-poor sward c. 10-12 centimetres in average height. Dominant and abundant species recorded within the sward include Yorkshire fog (*Holcus lanatus*), perennial rye-grass (*Lolium perenne*), false oat-grass (*Arrhenatherum elatius*) and creeping bent (*Agrostis stolonifera*). A full species list is provided in table 4 below.

Table 4: Species recorded within the rough amenity grassland

Common name	Latin name	Abundance	Status
Grasses, sedges and rushes			
Creeping bent	<i>Agrostis stolonifera</i>	D-A	Common & widespread
False oat-grass	<i>Arrhenatherum elatius</i>	A	Common & widespread
Soft brome	<i>Bromus hordeaceus</i>	F-O	Common & widespread
Red fescue	<i>Festuca rubra</i>	F-O	Common/widespread in many grassland habitats
Yorkshire fog	<i>Holcus lanatus</i>	D	Common & widespread
Perennial rye-grass	<i>Lolium perenne</i>	A	Common & widespread
Annual meadow-grass	<i>Poa annua</i>	O	Common & widespread
Rough-stalked meadow-grass	<i>Poa trivialis</i>	F	Common & widespread
Herbaceous plants			
Creeping thistle	<i>Cirsium vulgare</i>	O-R	Common & widespread
Wild teasel	<i>Dipsacus fullonum</i>	R	Common & widespread
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	O-R	Common & widespread
Common bird's-foot trefoil	<i>Lotus corniculatus</i>	R	Typically occurs in unimproved and semi-improved grasslands
Bristly ox-tongue	<i>Picris echioides</i>	O	Common & widespread
Ribwort plantain	<i>Plantago lanceolata</i>	O-R	Common & widespread
Curled dock	<i>Rumex crispus</i>	O	Common & widespread
Broad-leaved dock	<i>Rumex obtusifolius</i>	O	Common & widespread
Dandelion	<i>Taraxacum</i> agg.	O	Common & widespread
Lesser trefoil	<i>Trifolium dubium</i>	O	Common & widespread
White clover	<i>Trifolium repens</i>	O-LA	Common & widespread
Common ragwort	<i>Senecio jacobaea</i>	O	Common & widespread
Common vetch	<i>Vicia sativa</i>	O	Common & widespread

Species present within the areas of rough amenity grassland are common/widespread and this habitat is considered to be of limited ecological value. The rough amenity grassland could potentially support badgers, ground nesting birds, common reptile species and great crested newt, these species are discussed further in section 4.2.2.

Regularly managed amenity grassland (T2)

There is an area of regularly managed amenity grassland at the north-eastern section of the site and a margin of regularly managed amenity grassland adjacent to the southern boundary of the site and hedgerow H3. This amenity grassland comprises a regularly mown, species-poor sward c. 3-6 centimetres in height. Species recorded include common bent (*Agrostis capillaris*), creeping bent, annual meadow-grass (*Poa annua*), Yorkshire fog, perennial rye-grass, red fescue (*Festuca rubra*), daisy (*Bellis perennis*), dandelion (*Taraxacum* agg.), white clover (*Trifolium repens*), lesser trefoil (*Trifolium dubium*), ribwort plantain (*Plantago lanceolata*), common mouse-ear (*Cerastium fontanum*), bristly ox-tongue (*Picris echioides*) and cut-leaved crane's-bill (*Geranium dissectum*).

Species present within the areas of regularly managed amenity grassland are common/widespread and this habitat is considered to be of negligible ecological value. The regularly managed amenity grassland is considered unsuitable to support any protected or notable species and therefore no further action is required.

Tall ruderal vegetation (Target note 3)

There are stands of tall ruderal vegetation covering earth mounds near to the eastern boundary of the site. Species recorded within the stands of tall ruderal include common nettle (*Urtica dioica*), cleavers (*Gallium aparine*), hogweed (*Heracleum sphondylium*), cock's-foot (*Dactylis glomerata*), rough-stalked meadow-grass (*Poa trivialis*), Yorkshire fog, dock (*Rumex* sp), sterile brome (*Anisantha sterilis*), wild teasel (*Dipsacus fullonum*), creeping thistle (*Cirsium vulgare*) and great willowherb (*Epilobium hirsutum*).

The stands of tall ruderal on site comprise common/widespread species and are considered to be of limited ecological value, nevertheless they could potentially support badgers, ground nesting birds, common reptile species and great crested newt, these species are discussed further in section 4.2.2.

Native hedgerows (Target note 4)

A total of three native hedgerows were recorded on site, which includes one established species-rich native hedgerow (H1) and two recently planted native hedgerows (H2 & H3). The established native hedgerow on site comprises a good variety of woody species, including standard oak (*Quercus robur*) and ash (*Fraxinus excelsior*) trees, and a moderately diverse field layer comprising common/widespread species, and ranges from 2 to 5 metres in height. The two recently planted native hedgerows on site comprise a mixture of native shrub planting, with some tree guards still in place. Hedgerow H2 is approximately 2–2.5 metres in height and hedgerow H3 ranges between 2 and 3.5 metres in height. The field layer of these hedgerows is mostly species poor. Species present are shown in table 5 below.

Table 5: Native hedgerows recorded on site

Key (see Phase 1 map)	Woody species	Ground flora	BAP status (80% native woody species)	General description
H1	Field maple (<i>Acer campestre</i>) Dogwood (<i>Cornus sanguinea</i>) Hazel (<i>Corylus avellana</i>) Hawthorn (<i>Crataegus monogyna</i>) Ash (<i>Fraxinus excelsior</i>) Holly (<i>Ilex aquifolium</i>) Blackthorn (<i>Prunus spinosa</i>) Pedunculate oak (<i>Quercus robur</i>) Rose (<i>Rosa</i> sp.) Goat willow (<i>Salix caprea</i>)	Cow parsley (<i>Anthriscus sylvestris</i>) False oat-grass (<i>Arrhenatherum elatius</i>) Lord's-and-ladies (<i>Arum maculatum</i>) Soft brome (<i>Bromus hordeaceus</i>) Common mouse-ear (<i>Cerastium fontanum</i>) Cleavers (<i>Galium aparine</i>) Wood avens (<i>Geum urbanum</i>) Cut-leaved crane's-bill (<i>Geranium dissectum</i>) Ivy (<i>Hedera helix</i>) Bluebell (<i>Hyacinthoides non-scripta</i>) Honeysuckle (<i>Lonicera periclymenum</i>) Rough-stalked meadow-grass (<i>Poa trivialis</i>) Creeping buttercup (<i>Ranunculus repens</i>) Bramble (<i>Rubus fruticosus</i> agg.) Wood dock (<i>Rumex sanguineus</i>)	Yes	Intact, species-rich native hedgerow with mature standard oak and ash trees.
H2	Field maple Dogwood Wild plum (<i>Prunus domestica</i>) Hawthorn Gooseberry (<i>Ribes uva-crispa</i>) Rose Elder (<i>Sambucus nigra</i>) Guelder rose (<i>Viburnum opulus</i>)	Three-cornered garlic (<i>Allium triquetrum</i>) Sterile brome (<i>Anisantha sterilis</i>) Cow parsley Soft brome Creeping thistle (<i>Cirsium arvense</i>) Hedge bindweed (<i>Calystegia sepium</i>) Great willowherb (<i>Epilobium hirsutum</i>) Cleavers Wood avens Ivy Hogweed (<i>Heracleum sphondylium</i>) White dead-nettle (<i>Lamium album</i>)	Yes	Recently planted, intact, species-poor hedgerow c. 5 – 10 years in age.

		Rough-stalked meadow-grass Bramble Common nettle Bush vetch (<i>Vicia sepium</i>)		
H3	Field maple Dogwood Hazel Hawthorn Holly Cherry (<i>Prunus sp</i>) Blackthorn Rose Elder English elm (<i>Ulmus procera</i>) Guelder rose	Yarrow (<i>Achillea millefolium</i>) Cow parsley Soft brome Rough chervil (<i>Chaerophyllum temulum</i>) Cock's-foot (<i>Dactylis glomerata</i>) Red fescue (<i>Festuca rubra</i>) Cleavers Hedge-bedstraw (<i>Galium mollugo</i>) Herb Robert (<i>Geranium robertianum</i>) Wood avens Ivy Hogweed Yorkshire fog (<i>Holcus lanatus</i>) Ox-eye daisy (<i>Leucanthemum vulgare</i>) Creeping buttercup Hedge woundwort Common nettle Speedwell (<i>Veronica sp</i>)	Yes	Recently planted, intact, moderately species-rich hedgerow c. 10 – 20 years in age.

*All of the native hedgerows on site comprise 80% or more cover of at least one woody UK native species which qualifies them as UK BAP Hedgerow habitat. The established native hedgerow (H1) could potentially qualify as 'Important' under the Hedgerow Regulations 1997. These are boundary hedgerows and will be maintained as part of any development on the land. The Schedule 9 invasive plant three-cornered garlic (*Allium triquetrum*) was recorded within the field layer of hedgerow H2, this species is discussed further in section 5.1. The hedgerows on site could potentially support badgers, nesting birds, foraging/commuting/roosting bats, dormice, great crested newt, and reptiles. These species are discussed further in section 4.2.2.*

Scrub (Target note 5)

There is a small amount of scrub adjacent to the eastern boundary and north-western corner of the site. Scrub species recorded on site include bramble (*Rubus fruticosus* agg.), grey willow (*Salix cinerea*), blackthorn (*Prunus spinosa*) and butterfly-bush (*Buddleja davidii*).

The scrub on site is limited in extent and comprises common/widespread species, it is considered to be of negligible botanical value, nevertheless it could potentially support badgers, nesting birds, foraging/commuting bats, dormice, great crested newt, and reptiles, these species are discussed further in section 4.2.2.

Hardstanding and bare ground (Target notes 6 & 7)

Areas of hardstanding and bare ground within the site include tarmac access roads (T6), gravel pedestrian footpaths, and a bare earth/gravel construction site compound (T7).

The areas of hardstanding and bare ground on site are considered to be of negligible ecological value and unsuitable to support any protected or notable species. No further action is required.

Dry ditches (Target note 8)

There is a dry ditch situated near to the northern boundary of the site. This ditch appears to have been excavated recently to provide a surface-water drainage channel. The ditch channel is approximately 0.5 metres in depth and 1 metre in width. The ditch is vegetated with amenity grassland vegetation, as described in the relevant section above, and a number of additional ruderals including common ragwort (*Senecio jacobaea*), marsh sow-thistle (*Sonchus palustris*) and wild teasel. It is considered that this ditch may hold water for short periods during persistent wet weather.

The dry ditch on site has been excavated recently and comprises common/widespread species, and is considered to be of negligible ecological value. The dry ditch is considered unsuitable to support any protected or notable species. No further action is required.

Wet ditches (Target note 9)

In the central area of the site there is a recently excavated wet drainage ditch situated alongside a pedestrian footpath. The wet ditch is < 0.5 metres in depth and approximately 0.5 metres in width, it holds a minimal amount of water which is mostly stagnant and poor/turbid in quality. It is considered that the ditch may hold more water during periods of persistent wet weather. The ditch is mostly vegetated with amenity grassland vegetation, as described in the relevant section above. Numerous tadpoles were noted within the water.

The wet ditch on site comprises a shallow excavation which holds a minimal amount of water and is vegetated with common/widespread species, it is therefore considered to be of limited ecological value. The wet ditch on site could potentially support reptiles and great crested newt, and water vole, these species are discussed further in section 4.2.2.

Structures (Target note 10)

In the central area of the site there is a small modern rectangular structure used for housing utilities which is situated adjacent to a pedestrian footpath. The structure appears to have been recently installed and comprises a metal case and roof. It is in a thoroughly good and sealed condition throughout with no gaps, crevices or ingress points noted.

The structure on site appears to have been recently installed and is in a thoroughly good and sealed condition throughout, and is considered to be of negligible ecological value. The structure is considered unsuitable to support any protected or notable species. No further action is required.

4.2.2 Protected species assessment

Badgers

No evidence of badgers, including setts, dung pits, latrines, paths or fur, was identified during the field survey. Badgers are known to be present in the wider Berewood development with a main sett present in the western half over 500 metres from this section of development.

The site provides foraging habitat for badgers with the grassland on the site.

Further recommendations regarding construction impacts on foraging badgers have been provided in section 5.2.

Bats

Foraging habitat

The hedgerows, scattered trees, scrub, woodland and semi-improved grassland on the wider site has been assessed as moderate value foraging/commuting habitat for bats. Collectively, these habitats are likely to support a diverse assemblage of invertebrate prey and they are also well connected with further suitable habitat in the surrounding area including hedgerows, woodland and lowland farmland. Within the wider surrounding area there are native hedgerows, woodland, arable and pasture fields, water courses, residential housing with associated gardens, and allotment gardens, all of which could provide suitable foraging and commuting habitat for bats.

Activity survey

A series of monthly bat transect surveys were started in April 2018 alongside static monitoring devices. Activity surveys were conducted in 2018 and a diagram showing the transect routes is located in appendix III. A summary of the results is provided below while detailed results are provided in appendix IV.

To summarise low numbers of common pipistrelle, soprano pipistrelle, noctule (*Nyctalus noctula*) serotine (*Eptesicus serotinus*), and long-eared (*Plecotus* sp.) bats were recorded during the activity surveys. The bats were recorded mainly foraging and commuting along the

tree line along the western boundary of the site and the hedgerows along the eastern boundary of the site.

April survey

Low numbers of common pipistrelle bats were recorded foraging along the hedgerows on site between 20:42 and 21:51.

May survey

Low numbers of common pipistrelle bats were recorded foraging along the tree line on the western boundary of the site and along the hedgerow on the eastern boundary of the site between 21:34 and 22:57. A single noctule pass was recorded at 21:26.

June survey

Low numbers of common pipistrelle bats were recorded foraging and commuting between 21:53 and 23:05 along the tree line on the western boundary of the site and along the hedgerow on the eastern boundary of the site.

July survey

Dusk

Low numbers of common pipistrelle bats were recorded foraging along the tree line on the western boundary of the site and along the hedgerow on the eastern boundary of the site between 22:02 and 23:07. A serotine bat was recorded at 22:42 along the tree line on the western boundary of the site.

Dawn

Low numbers of common pipistrelle bats were recorded foraging and commuting between 03:29 and 04:30 along the tree line on the western boundary of the site.

August survey

Low numbers of common pipistrelle bats were recorded foraging along the tree line on the western boundary of the site and along the hedgerow on the eastern boundary of the site between 21:24 and 22:38. Two soprano pipistrelle passes were recorded at 21:30 and 22:23 along the eastern hedgerow. A single pass from a long-eared bat was recorded at 22:11 along the tree line on the western boundary of the site.

September survey

Low numbers of common pipistrelle bats were recorded foraging along the tree line on the western boundary of the site and along the hedgerow on the eastern boundary of the site between 19:55 and 21:19. Two soprano pipistrelle passes were recorded at 19:56 and 21:13 along the tree line on the western boundary of the site and along the hedgerow on the eastern boundary of the site.

Static monitoring

The results of the static monitoring are presented in table 6 below, indicating the average passes per night per species. A summary of the findings has been provided below. A total of five species of bat were recorded during the static monitoring survey including common pipistrelle, soprano pipistrelle, noctule, leisler's (*Nyctalus leisleri*) and *Myotis* species.

Table 6: Static monitor average passes per night per month

Static 1						
Averages	April	May	June	July	August	September
C.pip ¹⁸	55.40	2.00	41.43	0.43	101.29	122.20
Leisler's	0.00	0.00	0.00	0.57	0.29	0.00
Myotis sp.	0.00	0.00	0.14	0.00	0.00	10.00
Noctule	0.60	0.00	0.00	0.00	0.71	0.00
S.pip ¹⁹	0.00	0.00	0.14	0.00	0.86	0.00
Static 2						
Averages	April	May	June	July	August	September
C.pip	8.00	53.44	260.75	52.57	65.43	87.80
S.pip	0.40	0.00	1.00	0.29	1.29	4.00

The majority of the activity comprises common pipistrelle bats which were recorded on every session. Soprano pipistrelle bats were recorded occasionally and in lower numbers than the common pipistrelle bats. Noctule, leisler's and *Myotis* sp. were recorded infrequently.

Static monitor 1 recorded the highest diversity in species however the highest level of activity was recorded at static monitor 2 in June with an average of 260.75 bat passes a night. The low number of Noctule, leisler's and *Myotis* sp. passes recorded across the site means it is highly unlikely any roosts are present on site.

Value of the habitat for foraging and commuting bats

The value of the habitat for foraging and commuting bats was assessed. The scores in table 7 and 8 assume a small population of Leisler's bat, the rarest species recorded. As this species was not consistently recorded across the site, in similar numbers or over successive months, it is concluded there is no roost located near the site.

Table 7: Scores for Area 3B, Berewood foraging habitat (bold indicates the relevant criteria)

Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site

¹⁸ C.pip: Common pipistrelle

¹⁹ S.pip: Soprano pipistrelle

			without established vegetation (1)
-	-	Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches, less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)
5	10	1	3
Total score			19

Table 8: Score for Area 3B, Berewood commuting habitat (bold indicates relevant criteria)

Species	Number of bats	Roosts/potential roosts nearby	Commuting habitat characteristics
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well-grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Well-grown and well-connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and river/streams (5)
5	10	1	3
Total score			19

Using the scoring system above, the foraging and commuting routes across the site are considered to be locally important for bats. This is reflected in the survey data by the low number of passes recorded on the majority of the survey nights.

The site is locally important for bats and therefore further recommendations regarding foraging/commuting bats have been provided in section 5.3.

Birds

Breeding birds

Previous breeding bird surveys were carried out on site by FCPR in 2003 and 2005. Species recorded as breeding or probable breeding included the following: lesser whitethroat (*Sylvia curruca*), blue tit (*Cyanistes caeruleus*), skylark (*Alauda arvensis*), wren (*Troglodytes aedon*), whitethroat (*Sylvia communis*), dunnock (*Prunella modularis*), blackcap (*Sylvia atricapilla*), robin (*Erithacus rubecula*), wood pigeon (*Columba palumbus*), pheasant (*Phasianus colchicus*) and chaffinch (*Fringilla coelebs*). Species recorded as possible breeding included starling (*Sturnus vulgaris*). Skylark, dunnock and starling are UK BAP Priority bird species and BoCC red list species, the other recorded birds are common and widespread species which are not of conservation concern.

The hedgerows within the site provide suitable breeding habitat for common species of bird. The site has limited suitability for any arable species as it is now managed as an area of amenity grassland and is frequently used by pedestrians and dog walkers from completed sections of the development.

Wintering birds

The amenity grassland fields may provide suitable habitat for wintering birds. However, the site is considered to be of low suitability for brent geese due to the level of disturbance currently on the site and the level of construction in the surrounding area.

There are ten sets of records for brent goose (*Branta bernicla*) within 2 kilometres of the site. Phase 3B and 8 falls within the Wader and Brent Geese Strategy (King, 2010) survey area WO6L and H00B which was surveyed for the 2010 strategy for waders and brent geese without positive results.

The Environmental Statement details mitigation for wintering birds (Biodiversity by Design Ltd, 2010a). Further details have been given in section 5.4.

Dormice

The hedgerows within the application boundary provide suitable habitat for dormice, with good structure and availability of suitable food plants. These areas however are very isolated from suitable habitat across the site. This section of the site is now surrounded by residential development.

Dormice mitigation licences with an associated Berewood wide masterplan has been granted by Natural England for the clearance of small amounts of scrub, hedgerows and woodland to enable works across the wider development. This mitigation should not affect the works for this application. Lindsay Carrington Ecological Services Limited are currently conducting monitoring across the site.

The hedgerows within this section of site will be maintained within the final development proposals.

Dormice are present across the Berewood development site but the hedgerows on site will be maintained within this section of the development. No further action is required. If plans change and involve the removal of hedgerows then further advice should be sought.

Great crested newts

The hedgerows and tall ruderal habitats on the site provide potential habitat for great crested newts. Great crested newts are present within the wider Berewood development with the main breeding pond located over 500 metres to the west of the site. The breeding pond is also separated from this phase of the development by a herpetosure fence. The wet ditches present within the site boundary are not considered suitable for great crested newts due to the low water levels and absence of any suitable egg laying vegetation within the ditches.

There is a pond 50 metres to the west of the site within an adjacent area of woodland. As part of the monitoring programme currently being carried out for the populations of great crested newts on the site this pond was tested for eDNA. The results came back negative for great crested newts and they are therefore not considered present in this phase of the development.

Great crested newts are considered absent from the site. No further action will be needed.

Reptiles

The site predominantly comprises short sward amenity grassland which is regularly managed. The grassland lacks the structural diversity to provide foraging habitat for reptiles. There are small areas of tall ruderal in the site but these are considered relatively isolated from any suitable reptile areas. The hedgerow along the eastern boundary separates the site from an allotment area which may provide habitat for common reptile species.

The site is currently not considered suitable for reptiles and recommendations have been made in section 5.5 in regards to future management of the area to ensure reptiles do not colonise the site prior to development.

Water vole

There is a recently excavated wet ditch running through the centre of the site. This ditch lacks any suitable foraging species for water voles (*Arvicola amphibius*). Surveys carried out for the wider Berewood development have not recorded water vole on the wider Berewood development. They are therefore considered absent from this section of the site.

Water vole are not considered present within any of the watercourses within the site. No further action is required.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Phase 3B and 8 at Berewood are considered to be of low ecological value with the main constraints relating the presence of badgers, bats and breeding birds. The development may have the following impacts:

- The killing/injury of badgers during the clearance of the site.
- Disturbance to bats foraging in the local area through the use of lighting.
- The killing/injury of nesting birds during the clearance of the site.
- The killing/injury of reptiles during the clearance of the site if the site is not appropriately managed.

Mitigation strategies have been provided below to prevent and minimise these impacts.

5.1 *Invasive species*

5.1.1 Summary of findings

An area of three-cornered garlic was recorded along hedgerow 2 which has likely originated from the allotments adjacent to this hedgerow. This species is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). It is therefore illegal to allow this species to spread outside the site boundary and removal is advised which is detailed below.

5.1.2 Mitigation

Three-cornered garlic is best removed mechanically in the spring by digging the plants out and ensuring the bulbs are removed. This may need to be completed over a number of years to ensure all bulbs are removed from the seedbank. Any waste material will then need to be disposed of as controlled waste.

It is also possible to treat the area with herbicide in the spring and multiple applications will be required.

A specialist company should be contacted in regards to the removal of this species to ensure the correct measures are put in place.

5.2 *Badgers*

5.2.1 Summary of findings

Previous surveys recorded outlier badger setts in the immediate vicinity of the survey area. The site contains suitable foraging habitat, and no active setts were recorded in the vicinity of the site. Therefore, construction mitigation is proposed in line with the standard guidelines and the mitigation proposed in the Ecology Chapter, as per condition 6.

5.2.2 Mitigation

The following construction mitigation measures are recommended:

- Install fencing in areas where it is important to exclude badgers for safety reasons e.g. fuel storage areas.
- Locate any topsoil / material piles well away from identified badger activity and check on a daily basis for badger activity.
- Temporarily fence any piles of material that are to be on site for a significant period of time to prevent badgers from accessing the fresh soil.
- Minimise night-working to avoid disturbance to badgers, and cease works in proximity to active setts at least two hours before sunset.
- Where possible excavations should not be left open overnight. However, if excavations are left open at night, then an earth / wooden ramps must be installed to allow any animals that fall in to escape. Work areas would be checked daily to ensure no animals are trapped.
- Cap any pipes over-night on site to avoid animals becoming trapped.

5.3 Bats

5.3.1 Summary of findings

The boundary hedgerows provide foraging opportunities for bats. A total of five species and genus of bat were recorded during the static monitoring survey with serotines and long-eared bats also being recorded on the activity surveys.

Development of the site could have a negative effect on bats using the area in terms of loss of foraging habitat, reduced landscape connectivity and disturbance from light pollution. This negative effect will be most detrimental to bats commuting and foraging along hedgerows in the east of the site. This is reflected by the increase activity recorded in these areas by the static monitors and the activity surveys. Mitigation is therefore provided below.

5.3.2 Mitigation

Foraging and commuting habitat

The tree line and hedgerow were identified as an area of higher bat activity levels. It is therefore important that no additional lighting is introduced to these areas.

The overall masterplan for the wider development maintains the connectivity across and around the site so that foraging or commuting bats are able to cross the site. Connectivity to retained woodland habitat will be maintained and where possible enhanced through planting additional hedgerows.

Lighting

Where lighting is required the following measures will be put in place:

- Directing lighting to only where it is needed away from the hedgerows and trees;

- Through the design of the luminaire by using accessories such as cowls or hoods;
- Light sources should emit minimal ultra-violet light, peak higher than 550nm and be of a warm/neutral colour <4,200 kelvin.
- Using low pressure sodium lighting with light levels kept as low as practically possible (between 1 and 3 lux); and
- Restricting the height of the lighting columns to three metres or less.

5.4 Birds

5.4.1 Summary of findings

Breeding birds

The hedgerows on site provided potential nesting habitat for birds.

Wintering birds

Whilst no wintering birds have been recorded previously on the site and the habitat is not considered suitable, the Ecology Chapter outlined brent goose compensation measures, and these are detailed below.

5.4.2 Mitigation

Breeding birds

The following precautions should negate the risk of harming nesting birds during both the infrastructure and housing development:

- The clearance of any scrub and semi-improved grassland should where possible be undertaken outside of the bird nesting season, this is considered to extend from the 1st March to the 31st August, or if this is not possible, must be done under the supervision of an ecologist to ensure that nesting birds are not harmed. Where nesting birds are encountered, clearance and/or demolition must be postponed until the nestlings have fledged.
- Ecological enhancement measures suggested in section 5.6 will provide foraging and nesting opportunities for many species of bird.

Wintering birds

A substantial area of farmland 13.5 ha of 'Brent Goose Compensation Land' has been set aside on the north-western corner of the development. This will be managed to provide suitable habitat for brent geese.

5.5 Reptiles

5.5.1 Summary of findings

The amenity grassland is currently short sward and unsuitable for reptiles and is regularly managed. The site is currently not considered suitable to support reptiles but common species are known to be present over the wider Berewood development with slow worm and grass snake recorded on other sections of the site. This phase of the development also borders an allotment which may support populations of reptile.

5.5.2 Mitigation

To ensure reptiles do not colonise the site from adjacent areas, the areas of amenity grassland should be regularly maintained as short sward grassland. If areas are left unmanaged prior to development and the habitat becomes more suitable for reptiles an ecologist should be consulted and further mitigation may be required.

5.6 Ecological enhancement

A few suggestions for ecological enhancements across the development site are outlined below.

- Provision of log and brushwood piles alongside any retained hedgerows and within any new habitat creation areas will provide refugia and hibernacula for reptiles and other fauna such as hedgehog (*Erinaceus europaeus*).
- Flowering grassland seed mixes from a supplier of seeds of local provenance can be used to seed new lawns and areas of amenity grassland within the layout of the development (such as Emorsgate EL1). Such grassland provides better nectar sources for invertebrates and hence is of greater value for foraging birds, reptiles and amphibians.
- The inclusion of hedgehog houses within the development will provide habitat for this UKBAP species. The development area should allow the free movement of hedgehogs through the area by maintaining gaps under any perimeter fencing.

6.0 REFERENCES

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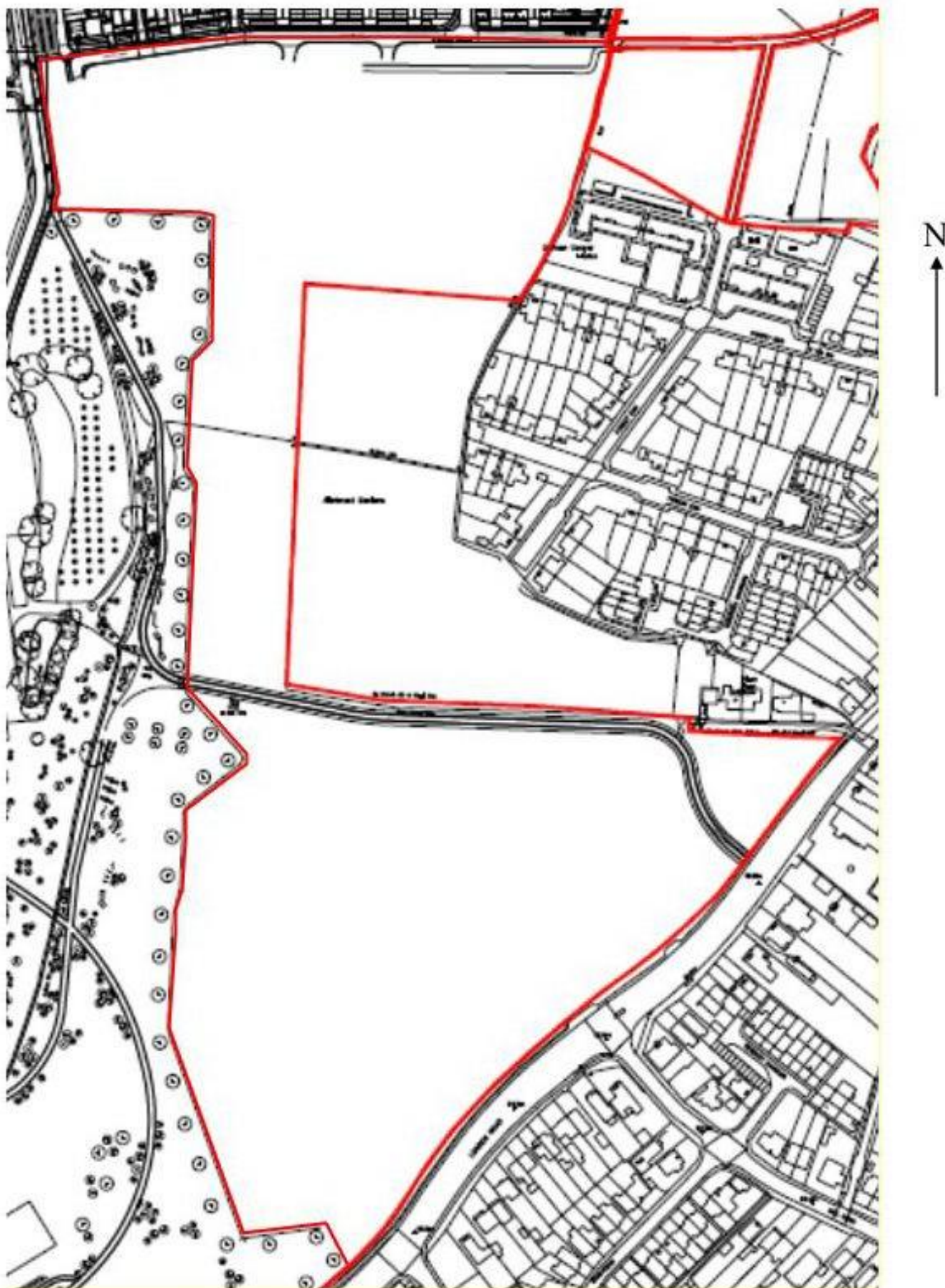
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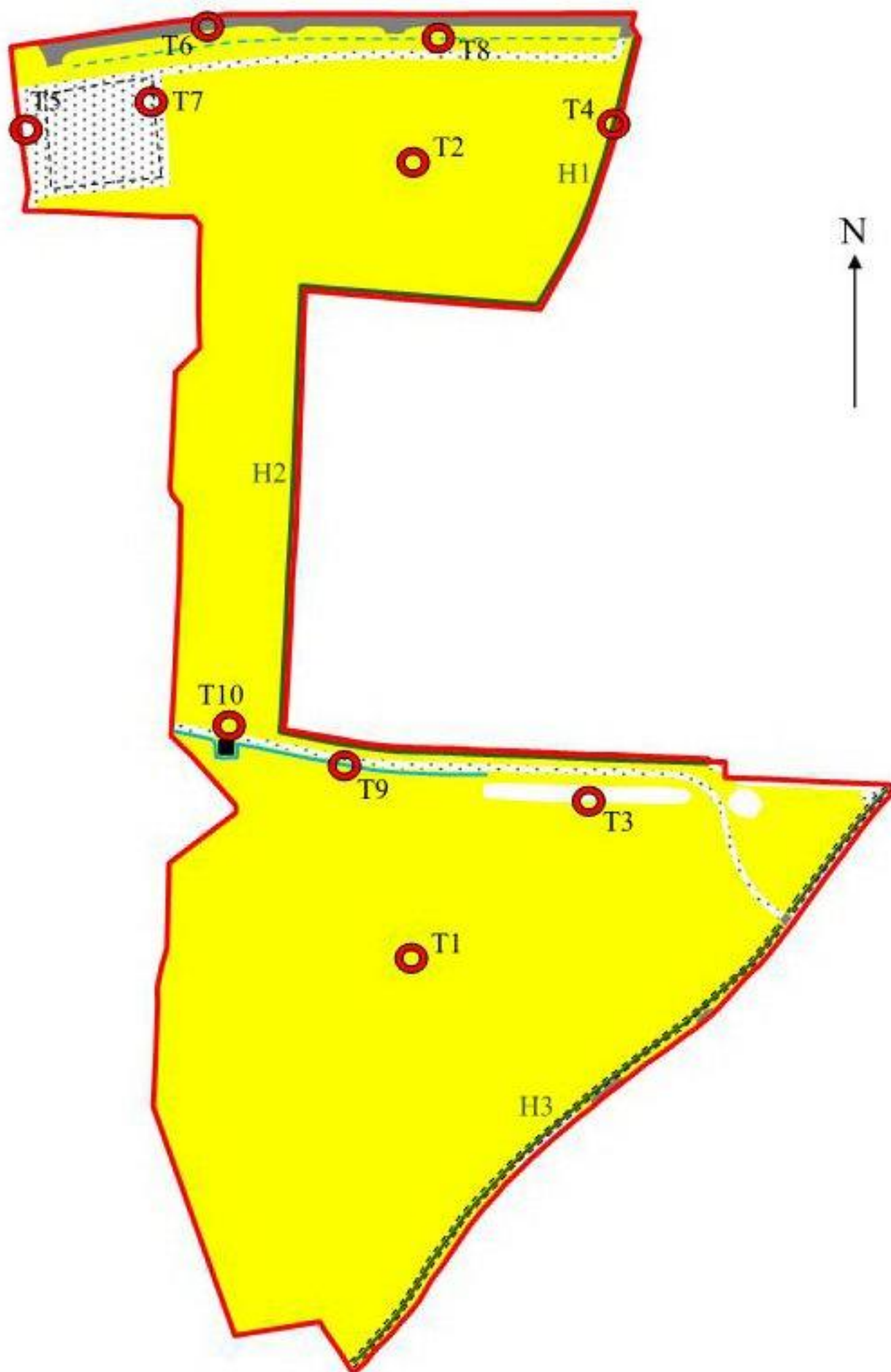
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APPENDIX I: Location plan



APPENDIX II: Phase 1 habitat map



Phase 1 habitat key

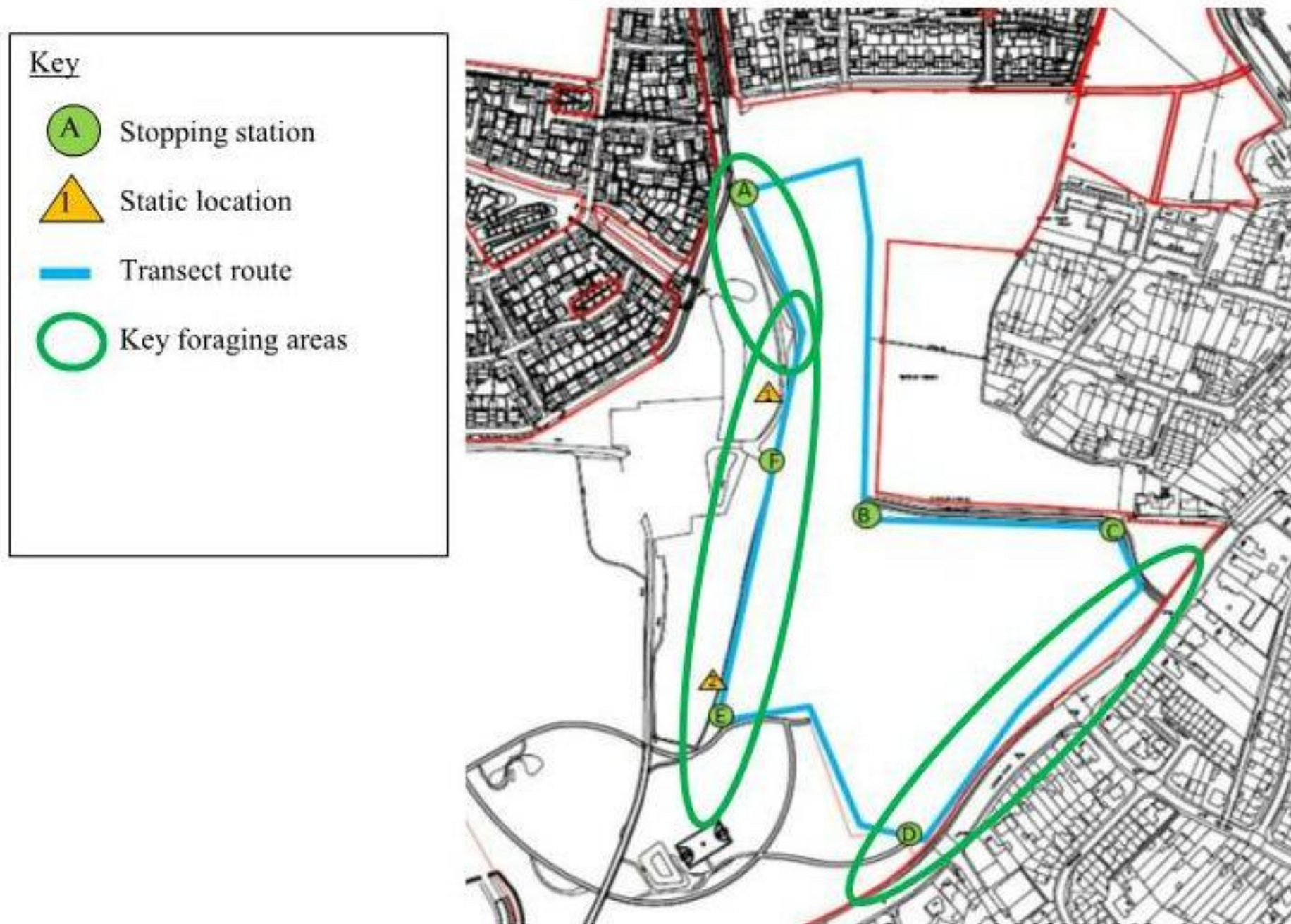
	Hardstanding
	Bare ground
	Amenity grassland
	Tall ruderal
 H1 – H3	Native hedgerow
	Scrub
	Fence line
	Dry ditch
	Wet ditch
	Structure
	Survey boundary
 T1	Target notes

Target notes to accompany Phase 1 habitat map

Target Note	Description
1	Rough amenity grassland which comprises an infrequently managed and mostly species-poor sward c. 10-12 centimetres in average height. Dominant and abundant species recorded within the sward include Yorkshire fog (<i>Holcus lanatus</i>), perennial rye-grass (<i>Lolium perenne</i>), false oat-grass (<i>Arrhenatherum elatius</i>) and creeping bent (<i>Agrostis stolonifera</i>), other species recorded include soft brome (<i>Bromus hordeaceus</i>), red fescue (<i>Festuca rubra</i>), annual meadow-grass (<i>Poa annua</i>), rough-stalked meadow-grass (<i>Poa trivialis</i>), creeping thistle (<i>Cirsium arvense</i>), wild teasel (<i>Dipsacus fullonum</i>), cut-leaved crane's-bill (<i>Geranium dissectum</i>), common bird's-foot trefoil, bristly ox-tongue (<i>Picris echinoides</i>), ribwort plantain (<i>Plantago lanceolata</i>), curled dock (<i>Rumex crispus</i>), broad-leaved dock (<i>Rumex obtusifolius</i>), dandelion (<i>Taraxacum</i> agg.), lesser trefoil (<i>Trifolium dubium</i>), white clover (<i>Trifolium repens</i>), common ragwort (<i>Senecio jacobaea</i>) and common vetch (<i>Vicia sativa</i>).
2	Regularly managed amenity grassland comprising a regularly mown, species-poor sward c. 3-6 centimetres in height. Species recorded include common bent (<i>Agrostis capillaris</i>), creeping bent, annual meadow-grass, Yorkshire fog, perennial rye-grass, red fescue, daisy (<i>Bellis perennis</i>), dandelion, white clover,

Target Note	Description
	lesser trefoil (<i>Trifolium dubium</i>), ribwort plantain, common mouse-ear (<i>Cerastium fontanum</i>), bristly ox-tongue and cut-leaved crane's-bill.
3	There are stands of tall ruderal vegetation covering earth mounds near to the eastern boundary of the site. Species recorded within the stands of tall ruderal include common nettle (<i>Urtica dioica</i>), cleavers (<i>Gallium aparine</i>), hogweed (<i>Heracleum sphondylium</i>), cock's-foot (<i>Dactylis glomerata</i>), rough-stalked meadow-grass (<i>Poa trivialis</i>), Yorkshire fog, dock (<i>Rumex sp.</i>), sterile brome (<i>Anisantha sterilis</i>), wild teasel (<i>Dipsacus fullonum</i>), creeping thistle (<i>Cirsium vulgare</i>) and great willowherb (<i>Epilobium hirsutum</i>).
4	Native hedgerows which include one established species-rich native hedgerow (H1) and two recently planted native hedgerows (H2 & H3). The established native hedgerow on site comprises a good variety of woody species, including standard oak (<i>Quercus robur</i>) and ash (<i>Fraxinus excelsior</i>) trees, and a moderately diverse field layer comprising common/widespread species, it ranges from 2 to 5 metres in height. The two recently planted native hedgerows on site comprise a mixture of native shrub planting, with some tree guards still in place, hedgerow H2 is approximately 2–2.5 metres in height and hedgerow H3 ranges between 2 and 3.5 metres in height, the field layer of these hedgerows is mostly species poor.
5	There is a small amount of scrub adjacent to the eastern boundary and north-western corner of the site. Scrub species recorded on site include bramble (<i>Rubus fruticosus</i> agg.), grey willow (<i>Salix cinerea</i>), blackthorn (<i>Prunus spinosa</i>) and butterfly-bush (<i>Buddleja davidii</i>).
6	Areas of hardstanding comprising tarmac access roads (T6).
7	Areas of bare ground including gravel pedestrian footpaths and a bare earth/gravel construction site compound (T7).
8	There is a dry ditch situated near to the northern boundary of the site. This ditch appears to have been excavated recently to provide a surface-water drainage channel, the ditch channel is approximately 0.5 metres in depth and 1 metre in width. The ditch is vegetated with amenity grassland vegetation, as described in the relevant section above, and a number of additional ruderals including common ragwort (<i>Senecio jacobaea</i>), marsh sow-thistle (<i>Sonchus palustris</i>) and wild teasel. It is considered that this ditch may hold water for short periods during persistent wet weather.
9	In the central area of the site there is a recently excavated wet drainage ditch situated alongside a pedestrian footpath. The wet ditch is < 0.5 metres in depth and approximately 0.5 metres in width, it holds a minimal amount of water which is mostly stagnant and poor/turbid in quality. It is considered that the ditch may hold more water during periods of persistent wet weather. The ditch is mostly vegetated with amenity grassland vegetation, as described in the relevant section above. Numerous tadpoles were noted within the water.
10	In the central area of the site there is a small modern rectangular structure used for housing utilities which is situated adjacent to a pedestrian footpath. The structure appears to have been recently installed and comprises a metal case and roof. It is in a thoroughly good and sealed condition throughout with no gaps, crevices or ingress points noted.

APPENDIX III: Transect map and peak activity areas



APPENDIX IV: Results of bat transect survey

April dusk transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Berewood -Blue Route	SURVEYORS:	Alex Coggins & Joe Marcroft	DATE:	19/04/2018
TEMP AT START:	17°C	SUNSET:	20:05	START TIME:	20:05
TEMP AT END:	16°C	CLOUD COVER (oktas):	0/8	END TIME:	22:05
WIND (bft):	1/12	RAINFALL:	NIL	WEATHER:	Mild
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
20:42	D	Common pipistrelle	1	Heard but not seen, commuting.	
20:47	E	Common pipistrelle	1	Heard not seen, commuting	
20:49	E	Common pipistrelle	1	Heard but not seen, foraging.	
20:52	E	Common pipistrelle	1	Heard but not seen, foraging.	
20:54	E-F	Common pipistrelle	1	Heard but not seen, foraging along the hedgerow.	
21:01	F	Common pipistrelle	1	Heard but not seen, foraging along the hedgerow.	
21:02	F-A	Common pipistrelle	1	Heard but not seen, foraging along the hedgerow.	
21:07	A	Common pipistrelle	1	Heard but not seen, foraging along the hedgerow.	
21:10	A	Common pipistrelle	1	Heard but not seen, foraging along the hedgerow.	
21:14 – 21:19	B	Common pipistrelle	2	Heard but not seen, foraging along the hedgerow.	
21:25	C	Common pipistrelle	1	Heard but not seen, foraging nearby.	
21:30	C-D	Common pipistrelle	1	Foraging along the hedgerow.	
21:32	C-D	Common pipistrelle	1	Foraging along the hedgerow.	
21:33	C-D	Common pipistrelle	1	Foraging along the hedgerow.	
21:36	D	Common pipistrelle	1	Heard but not seen, foraging.	
21:38	D	Common pipistrelle	1	Heard but not seen, foraging.	
21:42	E	Common pipistrelle	1	Heard but not seen, foraging constantly nearby.	
21:51	F	Common pipistrelle	1	Heard but not seen, foraging constantly nearby.	

May dusk transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Berewood Blue route	SURVEYORS:	Mallory Warrington and Andrew Heideman	DATE:	21/05/2018
TEMP AT START:	17°C	SUNSET:	20:55	START TIME:	20:55
TEMP AT END:	15°C	CLOUD COVER (oktas):	4/8	END TIME:	22:55
WIND (bft):	2/12	RAINFALL:	occasional	WEATHER:	Calm/showers
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:26	D	Noctule	1	Heard not seen, commuting	
21:34	E	Common pipistrelle	1	Heard not seen. North west to south west	
21:41- 21:43	E-F	Common pipistrelle	1	Foraging	
21:44-21:45	F	Common pipistrelle	1	Foraging	
21:45	F	Common pipistrelle	1	Foraging	
21:46	F	Common pipistrelle	1	Foraging	
21:47	F	Common pipistrelle	1	Foraging	
21:48	F	Common pipistrelle	2	Foraging north west into hidden path	
21:49	F	Common pipistrelle	2	Foraging north west into hidden path	
21:52-21:54	A	Common pipistrelle	1	Foraging	
21:55	A	Common pipistrelle	1	Foraging	
21:56-21:57	A	Common pipistrelle	1	Foraging	
22:04	B	Common pipistrelle	1	Foraging loop. North to south	
22:05	B	Common pipistrelle	1	Foraging loop. North to south	
22:06	B	Common pipistrelle	1	Foraging loop. North to south	
22:08	B	Common pipistrelle	1	Foraging loop. North to south	
22:10		Common pipistrelle	1	East to west foraging B-C	
22:13	C	Common pipistrelle	1	Foraging	
22:15	C	Common pipistrelle	1	Foraging	
22:20	C-D	Common pipistrelle	1	Foraging	
22:21	C-D	Common pipistrelle	1	Feeding north east to south east	
22:23	C-D	Common pipistrelle	1	Heard not seen	
22:24	C-D	Common pipistrelle	1	Heard not seen	
22:36	E	Common pipistrelle	1	Foraging	
22:40	E	Common pipistrelle	1	Foraging north west to south west loop	
22:43- 22:45	E-F	Common pipistrelle	1	Foraging north west to south west loop	
22:46-22:50	F	Common pipistrelle	1	Looping foraging/ feeding	

22:50-22:57	F-A	Common pipistrelle	1	Foraging
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June dusk transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	BEREWOO Blue route	SURVEYORS:	Matt Tennent and Mallory Warrington	DATE:	11.06.2018
TEMP AT START:	18°C	SUNSET:	21:17	START TIME:	21:17
TEMP AT END:	16°C	CLOUD COVER (oktas):	2/8	END TIME:	23:17
WIND (bft):	3/12	RAINFALL:	Nil	WEATHER:	Cool, slight breeze.
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:53	C	Common pipistrelle	1	Heard but not seen.	
22:04	B-A	Common pipistrelle	1	Commuting south.	
22:11	A	Common pipistrelle	1	Commuting east.	
22:12	A	Common pipistrelle	1	Commuting west.	
22:18	F	Common pipistrelle	1	Commuting north.	
22:27	E-F	Common pipistrelle	1	Commuting west.	
22:33	E	Common pipistrelle	1	Commuting west.	
22:34	E	Common pipistrelle	1	Foraging east to west along the path.	
22:37	E-D	Common pipistrelle	1	Heard but not seen.	
22:40-22:42	D	Common pipistrelle	1	Foraging.	
22:44	D	Common pipistrelle	2	Social calling.	
22:45	D-C	Common pipistrelle	1	Foraging.	
22:47	D-C	Common pipistrelle	1	Foraging.	
22:48	D-C	Common pipistrelle	1	Foraging.	
22:56	C	Common	1	Foraging.	

		pipistrelle		
22:58	C-B	Common pipistrelle	1	Foraging.
23:05	B	Common pipistrelle	1	Heard but not seen.
23:08	B-A	Common pipistrelle	1	Heard but not seen.

July dusk transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Berewood Blue transect	SURVEYORS:	Mallory Warrington and Sam Williams	DATE:	23.07.18
TEMP AT START:	21°C	SUNSET:	21:03	START TIME:	21:14
TEMP AT END:	19°C	CLOUD COVER (oktas):	0/8	END TIME:	23:14
WIND (bft):	0/12	RAINFALL:		WEATHER:	Cool, still
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
22:02	C	Common pipistrelle	1	Heard not seen	
22:04	C	Common pipistrelle	1	Heard not seen	
22:12-22:18	B	Common pipistrelle	1	Continuous foraging along hedgerow	
22:24	A	Common pipistrelle	1	Foraging along public footpath, south east to north west	
22:28	A	Common pipistrelle	1	Heard not seen	
22:32	A-F	Common pipistrelle	1	Heard not seen	
22:34-22:39	F	Common pipistrelle	1	Foraging along public footpath, south east to north west	
22:39-22:42	F-E	Common pipistrelle	1	Continuous foraging along public path	
22:42	E	Common pipistrelle	1	Heard not seen	
22:42	E	Serotine	1	Heard not seen	
22:42	E	Common pipistrelle	1	Heard not seen	

22:47 – 22:48	E	Common pipistrelle	1	Heard not seen
22:54	D	Common pipistrelle	1	Heard not seen
23:01	D	Common pipistrelle	1	Heard not seen
23:06	C	Common pipistrelle	1	Heard not seen
23:07	C-B	Common pipistrelle	1	Heard not seen

July dawn transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Berewood Blue route	SURVEYORS:	Mallory Warrington and Sam Fletcher	DATE:	24.07.18
TEMP AT START:	17°C	SUNRISE:	04:53	START TIME:	03:19
TEMP AT END:	16°C	CLOUD COVER (oktas):	7/8	END TIME:	05:10
WIND (bft):	0/12	RAINFALL:		WEATHER:	Still, dry, cool
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
03:29	F	Common pipistrelle	1	Heard not seen	
03:32	F	Common pipistrelle	1	Heard not seen	
03:37	E	Common pipistrelle	1	Foraging along public path, south east to north west	
03:50	D	Common pipistrelle	1	Heard not seen	
03:54	D-C	Common pipistrelle	1	Heard not seen	
04:04	C-B	Common pipistrelle	1	Heard not seen, faint	
04:05	B	Common pipistrelle	1	Commuting north to east along hedgerow	
04:08	B	Common pipistrelle	1	Commuting east to north along hedgerow	
04:30	F-E	Common pipistrelle	1	Commuting north east to south west down public path	

August dusk transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	BEREWOO Blue route	SURVEYORS:	Stuart Woodley & Alex Sinclair	DATE:	06.08.2018
TEMP AT START:	22°C	SUNSET:	20:40	START TIME:	20:40
TEMP AT END:	20°C	CLOUD COVER (oktas):	3/8	END TIME:	22:40
WIND (bft):	0/12	RAINFALL:	None	WEATHER:	Warm. Dry
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:24	D	Common pipistrelle	1	Foraging along the hedgerow, commuting north to south to north on the southern boundary of the site.	
21:26	D – C	Common pipistrelle	1	Heard but not seen.	
21:27-21:28	D – C	Common pipistrelle	1	Foraging along the hedgerow, commuting south to north on the southeast boundary of the site.	
21:30	D – C	Soprano pipistrelle	1	Heard but not seen.	
21:31-21:32	C	Common pipistrelle	1	Heard but not seen.	
21:36	C	Common pipistrelle	1	Heard but not seen.	
21:43	B	Common pipistrelle	1	Heard but not seen.	
21:46	B	Common pipistrelle	1	Foraging along the hedgerow in the middle of the site, commuting south to north.	
21:50	B – A	Common pipistrelle	1	Heard but not seen.	
21:54	A	Common pipistrelle	1	Heard but not seen.	
21:56	A	Common pipistrelle	1	Heard but not seen.	
22:00	A – F	Common pipistrelle	1	Heard but not seen.	
22:03-22:08	F	Common pipistrelle	1	Heard but not seen, continuous activity.	
22:10	F – E	Common pipistrelle	1	Heard but not seen.	

22:11	F – E	Long-eared species	1	Heard but not seen.
22:14	E	Common pipistrelle	1	Heard but not seen.
22:18	E	Common pipistrelle	1	Heard but not seen.
22:22-22:26	D	Common pipistrelle	1	Heard but not seen.
22:23	D	Soprano pipistrelle	1	Heard but not seen.
22:34-22:38	C	Common pipistrelle	1	Heard but not seen.

September dusk transect

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	BEREWOO Blue Route	SURVEYORS:	Mallory Warrington & Alex Coggins	DATE:	13.09.2018
TEMP AT START:	17°C	SUNSET:	19:24	START TIME:	19:24
TEMP AT END:	14°C	CLOUD COVER (oktas):	4/8	END TIME:	21:24
WIND (bft):	1/12	RAINFALL:	Nil	WEATHER:	Clear and dry
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
19:55	D	Common pipistrelle	1	Foraging, heard but not seen.	
19:56	D	Soprano pipistrelle	1	Heard not seen, very brief	
20:00	E	Common pipistrelle	1	Committed northwest.	
20:06	E-F	Common pipistrelle	1	Heard not seen	
20:09	E-F	Common pipistrelle	1	Heard but not seen.	
20:10	E-F	Common pipistrelle	1	Heard but not seen.	
20:13-20:19	F	Common pipistrelle	1	Continuous foraging up and down path.	
20:19	F-A	Common pipistrelle	1	Foraging along path, feeding buzz heard.	
20:20	F-A	Common pipistrelle	1	Foraging along path, feeding buzz heard.	
20:23	A	Common pipistrelle	1	Foraging along path, feeding buzz heard.	

20:32-20:38	B	Common pipistrelle	1	Continuous foraging up and down the hedgerow, feeding buzz heard.
20:40 -20:47	C	Common pipistrelle	1	Continuous foraging up and down path.
20:47	C-D	Common pipistrelle	1	Foraging, heard but not seen.
20:53	D	Soprano pipistrelle	1	Heard but not seen.
21:02	E	Common pipistrelle	1	Heard but not seen.
21:07	E-F	Common pipistrelle	1	Heard but not seen.
21:10	F	Common pipistrelle	1	Heard but not seen.
21:11 – 21:14	F	Common pipistrelle	1	Heard but not seen.
21:13	F	Soprano pipistrelle	1	Heard but not seen.
21:16- 21:19	F-A	Common pipistrelle	2	Continuous foraging up and down path.