Environmental Statement

Appendix 8.6: Bat Survey

Land at Lower Berse Farm, Wrexham

On behalf of Redrow Homes Ltd

July 2024

THE ENVIRONMENT PARTNERSHIP



RUTHIN ROAD

WREXHAM

BAT SURVEY TECHNICAL REPORT

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CONTENTS PAGE

1.0 Introduction 3
2.0 Site Description 4
3.0 Legislation 5
4.0 Methods 9
5.0 Evaluation Method 27
6.0 Results 30
7.0 Evaluation 46
8.0 Conclusions 48
References 52

TABLES PAGE

Table 1. Ecological sources of information. 9
Table 2. Bat roost habitat suitability categorisation descriptions for trees. 10
Table 3. Evaluation of bat roost habitat suitability of trees and required levels of further survey. 10
Table 4. Habitat suitability categorisation descriptions for commuting and foraging bats. 12
Table 5. Survey details for activity transect surveys undertaken from April to October 2021 across the north and south transect routes. 14
Table 6. Static monitoring detector locations and recording periods. 18
Table 7. Summary of nocturnal emergence/ re-entry survey dates, start and end times and conditions for surveys of moderate and high roost habitat suitability trees completed in 2021. 23
Table 8. Species rarity in England (adapted from Wray et al. 2010). 27
Table 9. Valuing commuting habitat for bats. 28
Table 10. Valuing foraging habitat for bats. 28
Table 11. Scoring system for commuting and foraging habitats. 29
Table 12: Evaluation of the site for commuting bats. 46
Table 13: Evaluation of the site for foraging bats. 47

FIGURES PAGE

Figure 1. Site location within the context of the wider landscape. 4
Figure 2. Species assemblage recorded during activity transect surveys across the site in 2021. 32

Figure 3. Seasonal variation in bat activity recorded during activity transect surveys in 2021. 33

Figure 4. Seasonal variation in bat species activity recorded during activity transect surveys in 2021. 33

Figure 5. Seasonal variation in noctule and Myotis species activity recorded during activity transect surveys in 2021. 34

Figure 6. Variation in bat species assemblage between the north and south transect routes. 35

Figure 7. Species assemblage recorded during static monitoring surveys in 2021. 36

Figure 8. Seasonal variation in activity recorded during static monitoring throughout 2021. 37

Figure 9. Seasonal variation in bat species activity recorded during static monitoring throughout 2021. 37

Figure 10. Seasonal variation in Myotis species, noctule and brown long-eared activity recorded during static monitoring undertaken in 2021. 38

Figure 11. Seasonal variation in lesser horseshoe activity recorded during static monitoring undertaken in 2021. 39

Figure 12. Percentage BAI (brh) contributed by pipistrelle social calls recorded during each static monitoring period. 39

Figure 13. Spatial variation in bat activity recorded during static monitoring surveys in 2021. 40

Figure 14. Spatial variation in common and soprano pipistrelle activity recorded during the static monitoring survey in Area 1. 41

Figure 15. Spatial variation in lesser horseshoe activity recorded during the static monitoring survey in 2021..... 42

Figure 16. Percentage BAI (brh) contributed by pipistrelle social calls recorded across the whole static monitoring survey at each static location. 42

Figure 17. Tree T172 with roost feature located at 5.0m circled. Taken viewing south. 43

Figure 18. Trunk cavity on north-west aspect of alder tree T172. 44

APPENDICES

APPENDIX A: Preliminary Ground Level Roost Assessment of Trees Data Table

APPENDIX B: Average Weather Data Recorded during Static Monitoring Periods

APPENDIX C: Sonogram Recordings of Soprano Pipistrelle Emergence from Tree 25 during Nocturnal Survey on 18/08/2021

DRAWINGS

Drawing G8745.021 - Bat Tree Roost Habitat Suitability Plan

Drawing G8745.022 - Bat Transect Route and Static Detector Locations

Drawing G8745.023 - Bat Transect Survey Results - Visit 1 15.04.2021

Drawing G8745.024 - Bat Transect Survey Results - Visit 2 12.05.2021

Drawing G8745.025 - Bat Transect Survey Results - Visit 3 17.06.2021

Drawing G8745.026 - Bat Transect Survey Results - Visit 4 08.07.2021

Drawing G8745.027 - Bat Transect Survey Results - Visit 5 18.08.2021

Drawing G8745.028 - Bat Transect Survey Results - Visit 6 09.09.2021

Drawing G8745.029 - Bat Transect Survey Results - Visit 7 07.10.2021

Drawing G8745.030 - Bat Nocturnal Emergence Re-entry Survey General Observations and Results Plan

1.0 Introduction

1.1 The Environment Partnership (TEP) was commissioned in March 2021 by Redrow Homes North West Ltd to undertake bat surveys at land adjacent to Lower Berse Farm, located south of Ruthin Road, Wrexham and hereafter referred to as the 'site'.

1.2 The proposals for the site include an outline planning application for a residential development for up to 1520 dwellings, plus associated roads, open space, community facilities, a site for a primary school and a Waste Water Treatment Plant (if necessary). The site has an area of approximately 72.85 hectares.

1.3 Lower Berse Farm is situated in the north-west corner of the site and is composed of several barns, storage sheds and outbuildings in addition to some Grade II* listed farmhouse buildings. Other development adjacent to the site includes a residential dwelling and a communications aerial installation to the centre of the site, though these are excluded from the application redline boundary. None of the structures within or adjacent to the site have been assessed as to their bat roost habitat suitability, as at the time of survey these areas were not identified as being impacted by the proposed development.

1.4 Bat surveys undertaken to inform the outline planning application include:

- A preliminary Ground Level Tree Assessment of trees within and immediately adjacent to the site, to determine bat roost habitat suitability;
- Bat activity transect surveys of habitats within the site;
- Static monitoring surveys of bat activity along woodland edge, ditch and hedgerow and mature tree habitat, which may be affected by the proposed development and likely provide valuable bat foraging/commuting habitat; and
- Nocturnal emergence/ re-entry surveys of trees identified as having bat roost habitat suitability during the preliminary Ground Level Tree Assessment, which will likely be directly impacted by the proposed development.

1.5 The objectives of this report are to:

- Identify suitable bat roosting habitat (trees) within and immediately adjacent to the site;
- Assess bat activity and species assemblage within the site and identify habitats or features used by foraging and commuting bats;
- Identify if bats are roosting within any of the trees identified during the preliminary Ground Level Tree Assessment that may be impacted by the proposed development and characterise confirmed bat roosts, including species and type and status of roosts; and
- Provide an evaluation of the bat species and populations using the site.

2.0 Site Description

2.1 The site is located on the western side of Wrexham and is adjoined by the A525 (Ruthin Road) to the north, beyond which there are established areas of housing and the emerging Western Gateway Business Park. To the west the site is separated from the wider arable landscape by Berse Lane and the A483 dual carriageway. To the south the site adjoins part of the Village of Bersham and is directly bounded by the B5099 (Bersham Road). Figure 1 illustrates the location of the site in the context of the wider landscape.

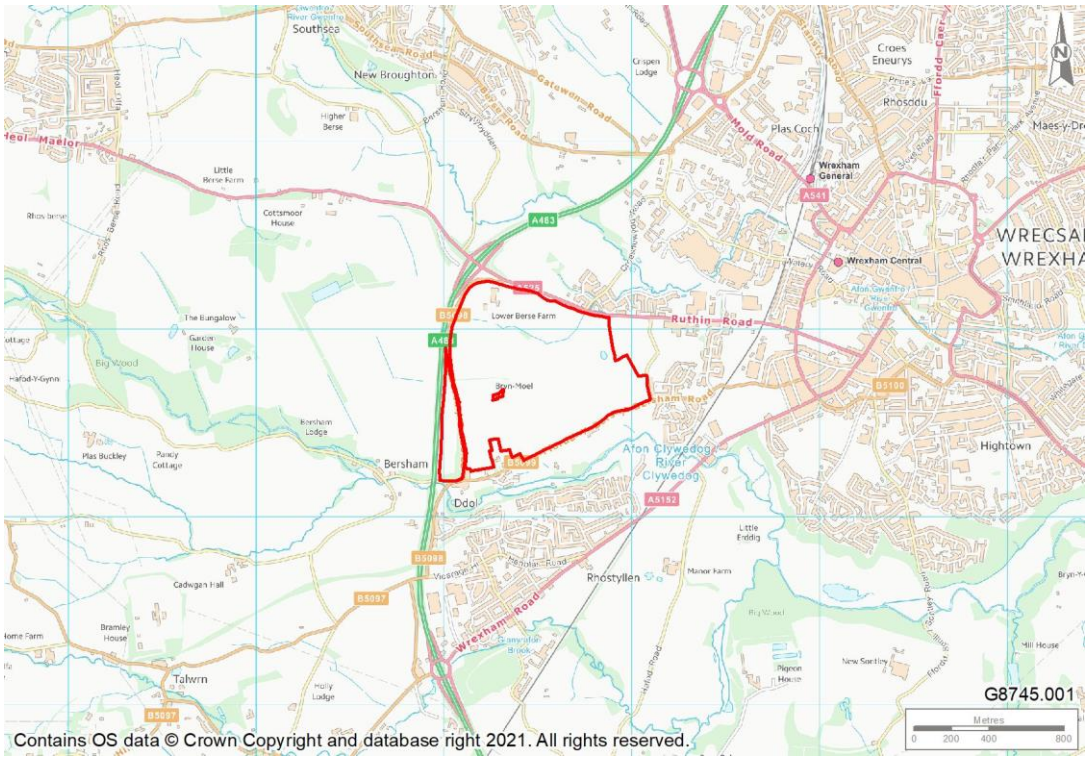


Figure 1. Site location within the context of the wider landscape.

2.2 The site is currently used for agricultural purposes including crop production and cattle grazing in association with Lower Berse Farm. Lower Berse Farm is situated in the north-west corner of the site and is composed of several barns, storage sheds and outbuildings in addition to some Grade II* listed farmhouse buildings. Other development includes a residential dwelling and a communications aerial installation to the centre of the site, though these are excluded from the application site itself and lie outside of the redline boundary.

2.3 The site is located at approximate central grid reference SJ 31500 49800. Habitats within the site consist predominantly of arable land and improved grassland, bordered by native species-rich, intact hedgerows with trees. Within the site there are small pockets of dense semi-natural broad-leaved woodland, continuous scrub and tall ruderal vegetation. A wet ditch runs within the northern half of the site and there is a single pond associated within Lower Berse Farm.

3.0 Legislation

3.1 All bat species and their roosts are legally protected in the UK.

International Legislation

3.2 The principal international legislation relating to bats is summarised as follows:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)[1]

3.3 The Bern Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1,000 wild animal species.

Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention[2] or CMS)

3.4 The Bonn Convention (CMS) provides strict protection for endangered migratory species. The UK has currently ratified legally binding Agreements under the convention relating to bats (EUROBATS). This agreement recognises that endangered migratory species can only be properly protected if activities are carried out over the entire migratory range of the species, and it aims to protect all species of bats identified in Europe through legislation, education, conservation measures and international co-operation.

Convention on Biological Diversity (Biodiversity Convention[3] or CBD)

3.5 The CBD provides a legal framework for biodiversity conservation. Within the UK, delivery of the CBD and the Strategic Plan for Biodiversity 2011-2020[4] is guided by the UK Post-2010 Biodiversity Framework[5].

National Legislation

3.6 The legal obligations of the multiple Conventions to which the UK is a Contracting Party are also enacted through a suite of national environmental legislation. The most relevant national legislation relating to bats is summarised as follows:

1 Convention on the Conservation of European Wildlife and Natural Habitats. Bern, 1979 https://www.coe.int/
2 Convention on the Conservation of Migratory Species of Wild Animals, Bonn, June 1979 https://www.cms.int/
3 Convention on Biological Diversity, Rio de Janeiro, June 1992https://www.cbd.int/
4 In October 2010, at the 10th Conference of the Parties to the CBD in Nagoya, Japan, the Parties adopted a new 'Strategic Plan for Biodiversity 2011–2020' along with its 20 'Aichi targets'. https://www.cbd.int/sp/
5 The framework is overseen by the Environment Departments of the four UK governments working through the Four Countries' Biodiversity Group. It demonstrates how the UK, through each of the four countries, contributes to achieving the 'Aichi targets', and identifies the activities required to complement the individual country biodiversity strategies https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/

Conservation of Habitats and Species Regulations 2017[6] (2017 Regulations)

3.7 The 2017 Regulations transpose the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) into domestic law, affording protection to certain habitats and species. Species listed under Schedule 2 of the 2017 Regulations, referred to as 'European Protected Species' (EPS), including their breeding sites and resting places, are protected under Regulations 42 and 43. This makes it illegal to:

- Deliberately capture, injure, or kill any such animal;
- Deliberately disturb such an animal;
- Deliberately take or destroy the eggs of such an animal; and
- Damage or destroy a breeding site or resting place of such an animal.

3.8 Disturbance is defined in the 2017 Regulations as an activity which is likely to impair a species' ability to survive, to breed or reproduce, to rear or nurture young or, in the case of animals hibernating or migratory species, to hibernate, migrate or which may affect significantly the local distribution or abundance of the species.

3.9 A bat's resting place is known as a roost site and as bats tend to be faithful to roost sites, but their biology is such that different roost site characteristics are preferred at different times of the year by different species for different functions, a bat roost is considered to be afforded protection even when it is not occupied.

3.10 Under Regulation 55 of the 2017 Regulations, licences can be granted by Natural Resources Wales (NRW) in respect of development to permit activities that would otherwise be unlawful, providing that the following 'three tests' are passed, namely:

- The proposed development is for reasons of overriding public interest (or other purpose prescribed by Regulation 55(2));
- There is no satisfactory alternative (Regulation 55(9)(a); and
- The action authorised will not be detrimental to the maintenance of the population of the site concerned at a favourable conservation status in their natural range (Regulation 55(9)(b)).

3.11 Under Regulation 9(1) of the Conservation Regulations 2017 (as amended), competent authorities *'must exercise their functions which are relevant to nature conservation… so as to secure compliance with the requirements of the Directives'*. Regulation 9(3) requires a competent authority, in exercising any of its function, to *'have regard to the requirements of the Directives so far as they be affected by the exercise of those functions'*. Local planning authorities must therefore consider the above three 'tests' when determining if planning permission should be granted for developments likely to cause an offence under the 2017 Regulations.

6 Conservation of Habitats and Species Regulations 2017 (SI 2017/1012) https://www.legislation.gov.uk/uksi/2017/1012/

Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[7] (2019 Regulations)

3.12 The 2019 Regulations amend the 2017 Regulations to make them operable following the withdrawal of the United Kingdom from the European Union (EU). Most of the changes involve transferral of functions from European Commission to the appropriate authorities in Wales, affording protection to certain habitats and species.

3.13 Under the 2019 Regulations, Special Areas of Conservation (SAC) and Special Protection Areas (SPA) in the UK no longer form part of the EU's 'Natura 2000' ecological network, but instead (along with new SACs and SPAs designated under the 2019 Regulations) form the new National Site Network (NSN). Proposals which may significantly affect a site belonging to the NSN require (by Regulations 63 and 64 of the 2017 Regulations, as amended by Regulations 24 and 25 of the 2019 Regulations, respectively) competent authorities to undertake an Appropriate Assessment of the implications of proposals in view of that site's conservation objectives. This process is commonly referred to as a 'Habitats Regulations Assessment' (HRA).

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

3.14 The WCA is a major legal instrument for wildlife protection in the UK. The obligations of the Bern Convention[1] (the protection of wild plant and animal species and their natural habitats) are transposed into law for Wales by the WCA. The legal requirement for the protection of migratory species listed by the Bonn Convention[2] is also provided by the WCA.

The Countryside and Rights of Way Act 2000 (Part III)[9] (CROW)

3.15 The CROW deals specifically with wildlife protection and nature conservation. It requires that Government Departments have regard for the conservation of biodiversity, in accordance with the CBD. In addition, it requires that Government Departments publish a list of living organisms and habitat types that are considered to be of principal importance in conserving biodiversity. The CROW also amends the WCA, expanding the terms of offences to include reckless activity.

The Environment (Wales) Act 2016[10]

3.16 Section 7[11] (S7) of The Environment (Wales) Act 2016 requires The Welsh Ministers to publish, review and revise lists of living organisms and types of habitats in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. This is known as the S7 list. The S7 list includes priority habitats and priority species drawn from earlier lists of United Kingdom Biodiversity Action Plan (UKBAP) Priority Species and Habitats.

7 Conservation of Habitats and Species Regulations 2019 (SI 2019/579) https://www.legislation.gov.uk/uksi/2019/579/
8 Wildlife and Countryside Act 1981 c. 69 https://www.legislation.gov.uk/ukpga/1981/69/
9 Countryside and Rights of Way Act 2000 c. 37 https://www.legislation.gov.uk/ukpga/2000/37/
10 Environment (Wales) Act 2016 c.3 https://www.legislation.gov.uk/anaw/2016/3/section/6/enacted
11 Environment (Wales) Act 2016 c.3 https://www.legislation.gov.uk/anaw/2016/3/section/7/enacted

Local Biodiversity Action Plans (LBAPs)

3.17 LBAPs are designed to conserve and enhance local biodiversity by setting targets and co-ordinating actions for biodiversity conservation.

3.18 Lesser horseshoe bat *Rhinolophus hipposideros* recorded within the site and surrounding locality is identified as notable species listed under the Wrexham Local Biodiversity Action Plan (LBAP)[12].

12 Wrexham Biodiversity Action Plan (2002) Joint Nature Conservation Committee https://webarchive.nationalarchives.gov.uk/20110303154000/http://www.ukbap.org.uk/lbap.aspx?id=499#6

4.0 Methods

4.1 The following bat surveys were undertaken in accordance with the Bat Conservation Trust (BCT) Good Practice Guidelines (Collins, 2016[13]).

Desk Based Records

4.2 Sources used for collating information regarding historic bat species records and protected sites within the locality that may provide habitat suitable for bat roosting, foraging and commuting, are listed in Table 1.

4.3 Records give a useful indication of the distribution of bat species in the locality that may use the habitat resources within the site for roosting, foraging and commuting between connected habitats in the wider landscape. Absence of records cannot be taken to represent actual absence in the field.

Table 1. Ecological sources of information.

Source of Information	Nature of Information
Natural Resources Wales (NRW)	Statutory designated wildlife sites of international importance ≤10 km. Statutory designated wildlife sites of national importance ≤5 km. Statutory designated wildlife sites of local importance ≤2 km.
LANDMAP	Notable habitats within and adjacent to the site.
Cofnod	Protected species records ≤2 km. Non-statutory designated wildlife sites of local importance ≤2 km.
ArcMap10	Ordnance and aerial survey mapping.

Preliminary Ground Level Tree Assessment for Bat Roost Habitat

4.4 The preliminary Ground Level Tree Assessment (GLTA) of trees within and immediately adjacent to the site was undertaken by TEP Senior Ecologist Lindsey Roberts (Accredited Agent under John Crowder's Natural Resources Wales Survey Licence: S089169/1) from 18th-20th May 2021.

4.5 The GLTA included a detailed inspection of the exterior of the trees from ground level, using high power binoculars, for any evidence of use by bats and any Potential Roost Features (PRFs), which may provide suitable bat roosting habitat.

4.6 Most tree roosts are created by one or a combination of the following features:

- Old woodpecker holes;
- Splits in trunk, bough or large branches;
- Rot holes in trunk, bough or large branches;
- Holes formed by two boughs or branches growing in contact;
- Loose or lifting bark; or
- Underneath a covering of dense latticed creeper, usually ivy *Hedera helix*.

13 Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines. (3rd edn). The Bat Conservation Trust, London.

4.7 Based on the PRF characteristics, trees were categorised for their roost habitat suitability in accordance with the BCT 2016 Guidelines. The criteria for roost habitat suitability categorisation is summarised in Table 2.

Table 2. Bat roost habitat suitability categorisation descriptions for trees.

Tree Habitat Categorisation	Tree Characteristics	PRFs
Negligible	Typically small / young trees which have not developed any potential features described above.	No PRFs are present.
Low	A tree of sufficient size and age to contain PRFs but possibly with none yet present or likely to be present, or PRF observed with only very limited roosting opportunities (as per BS 8596:2015).	One or more PRFs that could be used by individual bats opportunistically, but which is not suitable to be used on a regular basis or by larger numbers of bats.
Moderate	Large / mature trees with one of more features such as woodpecker holes, sheltered rot holes, vertical or horizontal cracks in stems or branches, other hollows or cavities, partially detached platey bark, partially detached or overlapping mature ivy (>50 mm stem diameters) or other suitable cavity or cavity forming feature.	A tree with one or more PRFs that could be used by bats, but which are unlikely to support a roost of high conservation status (i.e., not suitable for maternity or hibernation use).
High		A tree with one of more PRFs that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time (e.g., maternity/hibernation) due to their size, shelter, protection, conditions and surrounding habitat.

4.8 If PRFs may have been obscured by the angle of view, elevation or vegetation, but were likely to be present due to the age, size and apparent health of the tree, a precautionary approach was taken, and trees were categorised as having moderate or high bat roost habitat suitability.

4.9 Considering the density of trees within woodland areas and along hedgerows, it was not considered appropriate to individually identify trees within the site determined as having negligible bat roost habitat suitability. Data is presented only for those trees assessed to have low, moderate or high bat roost habitat suitability located within areas identified as potentially being impacted by the proposed development.

4.10 A summary of general further survey requirements depending on bat roost habitat suitability categorisation is provided in Table 3.

Table 3. Evaluation of bat roost habitat suitability of trees and required levels of further survey.

Roost Habitat Suitability	Further Survey Requirements if Trees are to be Impacted by Future Proposals
Negligible	No further survey required.
Low	Aerial inspection to further assess PRFs and confirm roost suitability and presence/likely absence of a bat roosts where PRFs could not be fully assessed from a ground level vantage point. Aerial inspection undertaken during the winter to better assess PRFs. Where aerial inspection is not feasible, precautionary soft felling/pruning measures must be adhered to under supervision of a licensed bat ecologist.

Roost Habitat Suitability	Further Survey Requirements if Trees are to be Impacted by Future Proposals
Moderate	Aerial inspection to further assess PRFs and confirm roost suitability and presence/likely absence of a bat roost. Subject to aerial inspection verifying roost status (or being inaccessible for aerial inspection), two separate nocturnal survey visits, including one dusk emergence survey and a separate dawn re-entry survey undertaken between May to September with at least one survey undertaken between May to August.
High	Aerial inspection to further assess PRFs and confirm roost suitability and presence/likely absence of a bat roost. Subject to aerial inspection verifying roost status (or being inaccessible for aerial inspection), three separate nocturnal survey visits, including at least one dusk emergence survey and a separate dawn re-entry survey (the third visit being either a dusk emergence or dawn re-entry survey) undertaken between May to September with at least two surveys undertaken between May to August.

Limitations

4.11 Optimal conditions for identifying tree PRFs are when trees are not in leaf. According to the BCT 2016 Guidelines, the recommended survey window for GLTA is between December and March (inclusive). As the GLTA was carried out in May, this is considered a sub-optimal season for survey. Poor light and dense foliage (including ivy cover) can cause PRFs to be missed from ground level vantage points. Periods of rain were also experienced during the GLTA. Rain can reduce apparent suitability of PRFs, as staining from bat roosts can be less obvious and damp bark colouration can affect visibility.

4.12 These limitations were overcome during the GLTA, as where PRFs were obscured by the angle of view, elevation or vegetation or were less evident due to damp discolouration of bark but were likely to be present due to the age, size and apparent health of the tree, a precautionary approach was taken, and trees were categorised as having moderate or high bat roost habitat suitability. This assessment has been undertaken based on the 'worst case scenario' following review of the results of the GLTA and bat activity surveys within the site and is considered to be sufficient to allow a robust assessment of the proposed development.

Activity Transect Surveys

4.13 Desk based scoping and review of historic data for the site from bat activity surveys undertaken by TEP during the peak bat active season (May to August inclusive) in 2014, allowed for habitats within the site to be categorised as to their suitability to support foraging and commuting bats. The site was categorised as having moderate habitat suitability for commuting and foraging bats, as it has a variety of woodland, scrub, grassland and arable habitats with associated edge habitat and clearings providing a variety of microclimates for invertebrate prey. Hedgerows, treelines and ditches within the site also provide linear features for bat commuting between habitats. However, the dominant habitats within the site are arable fields likely sprayed with pesticides, with indirect connectivity to rural habitats in the wider landscape due to the bounding A483, A525 (Ruthin Road), B5099 (Bersham Road) and surrounding residential development associated with Wrexham to the north, east and south.

4.14 For details of categorisation of foraging and commuting habitats for bats see Table 4.

Table 4. Habitat suitability categorisation descriptions for commuting and foraging bats.

Suitability	Commuting/ Foraging Habitats
Negligible	Negligible features on site likely to be used by commuting or foraging bats. A general lack of linear features and low habitat, structural or floristic diversity.
Low	Habitat that could be used by small numbers of commuting bats (e.g., a gappy hedgerow or an un-vegetated stream) or foraging bats (e.g., a lone tree or small patch of scrub) but which is isolated from the surrounding countryside. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting (e.g., lines of trees or scrub or linked back gardens), or for foraging (e.g., trees, scrub, water, grassland).
High	Continuous high-quality habitat that is strongly connected with the wider landscape that is likely to be used regularly by commuting bats (e.g., river valley, vegetated stream, woodland edge, hedgerows with trees) or foraging bats (e.g., broad-leaved woodland, grazed parkland, tree-lined watercourses or ponds). Site is close to and connected to known roosts.

4.15 Due to the moderate habitat suitability of the site for commuting and foraging bats, bat activity surveys undertaken in 2021 included transect survey visits each month through the bat active season (April to October inclusive).

4.16 Two pre-determined transect routes were designed to cover all features likely to be of value to foraging and commuting bats and were surveyed to sample bat activity across the bat active season. Activity transect surveys were also designed to establish bat species assemblage and where bat dispersal behaviour may be more significantly impacted by the proposed development. The two transect routes, north and south, are illustrated at the Bat Transect Route and Static Detector Locations Drawing G8745.022.

4.17 Activity transect surveys were undertaken by a suitably experienced lead surveyor and an experienced TEP trained assistant surveyor. Each activity transect route was walked at a slow steady pace, by the two surveyors with full spectrum (Elekon Batlogger M) detectors and supporting Batbox Duet heterodynes.

4.18 Bat passes[14] were recorded, together with the maximum number of bats observed, the species identified, and any other contextual data such as flight direction, social calling or feeding buzzes. The surveys commenced at sunset and continued for at least 120 minutes after sunset. The routes were reversed on alternating visits to optimise sampling efficacy and started at a different sampling point during each visit.

4.19 Standardised methods of measuring and recording weather parameters were used e.g., cloud cover (oktas) and wind (Beaufort Scale). Surveys were scheduled during optimum weather conditions comprising dusk temperatures of ≥10°C and no rain or strong winds (>4 on the Beaufort Scale). Where sub-optimal weather conditions were recorded during surveys, surveyors noted whether bat activity was affected to determine whether surveys remained valid.

4.20 Table 5 summarises the activity transect dates, times and start and end weather conditions for each of survey visits.

[14] A bat pass is defined as the number of bat calls in a continuous sequence; each sequence or pass is separated by 1 second or more in which no calls are recorded (Hundt, 2012).

Table 5. Survey details for activity transect surveys undertaken from April to October 2021 across the north and south transect routes.

Visit	Date	Survey Lead	Sunset	Start	End	Temperature (°C)		Wind[15]		Cloud[16]		Precipitation	Moon Phase[17]
						Start	End	Start	End	Start	End		
North Transect Route													
1	15/04/2021	Steph Davies	20:11	20:11	22:29	9.0	9.0	0	0	0	0	None.	Waxing Crescent
2	12/05/2021	Rosie Langley	20:58	20:58	23:20	11.0	8.0	1	1	7	6	Heavy rain shower prior to survey 19:00-20:30. None during survey.	New Moon
3	17/06/2021	Rosie Langley	21:41	21:41	00:07	13.0	13.0	1	1	1	1	None.	First Quarter
4	08/07/2021	Rosie Langley	21:37	21:37	23:42	18.0	14.0	1	1	2	7	None.	Waning Crescent
5	18/08/2021	Lindsey Roberts	20:33	20:33	23:07	17.0	15.0	2	3	8	7	None.	Waxing Gibbous
6	09/09/2021	Lindsey Roberts	19:43	19:43	21:43	21.0	19.0	1	1	8	4	Moderate to heavy between 20:29-20:45 and 20:50-21:25. Occasional light intermittent drizzle throughout.	Waxing Crescent
7	07/10/2021	Clare Gower	18:38	18:36	20:40	19.0	16.0	1	1	7	6	None.	Waxing Crescent
South Transect Route													
1	15/04/2021	Lindsey Roberts	20:11	20:11	22:25	10.0	9.0	0	0	0	0	None.	Waxing Crescent

15 Wind strength is reported using the Beaufort Scale of Wind Force, this scale runs from 0 to 12, information on the conditions denoted by scores are as follows: 0 – Calm (vertical smoke); 1 - Light Air (slight smoke drift); 2 - Light Breeze (leaves gently rustle); 3 - Gentle Breeze (small twigs constantly move); 4 - Moderate Breeze (small branches begin to move) and 5 - Fresh breeze (small trees in leaf begin to sway).

16 Cloud cover is reported in oktas or eighths (i.e., 0 oktas represents the complete absence of cloud, 1 okta cloud cover of 1 eighth or less, and so on to 8 oktas which represents full cloud cover), with the additional convention that 9 oktas represents sky obscured by fog or mist.

17 Moon Phase: New Moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Third Quarter, Waning Crescent.

Visit	Date	Survey Lead	Sunset	Start	End	Temperature (°C)		Wind[15]		Cloud[16]		Precipitation	Moon Phase[17]
						Start	End	Start	End	Start	End		
2	12/05/2021	Lindsey Roberts	20:58	20:58	23:05	11.0	7.0	1	1	7	7	Heavy rain shower prior to survey 19:00-20:30. None during survey.	New Moon
3	17/06/2021	Steph Davies	21:41	21:41	23:41	14.0	11.0	1	1	2	0	None	First Quarter
4	08/07/2021	Steph Davies	21:37	21:37	23:37	17.0	13.0	0	0	2	2	None.	Waning Crescent
5	12/08/2021	Lindsey Roberts	20:46	20:46	22:51	18.0	17.0	2	3	3	4	None.	Waxing Crescent
6	09/09/2021	Steph Davies	19:43	19:43	21:43	20.0	18.0	1	1	8	8	Moderate to heavy between 20:29-20:45 and 20:50-21:25. Occasional light intermittent drizzle throughout.	Waxing Crescent
7	07/10/2021	Steph Davies	18:38	18:38	20:38	20.0	19.0	2	0	8	8	None.	Waxing Crescent

Limitations

Weather Constraints

4.21 Some limitations with regard to sub-optimal weather conditions including; temperatures below 10°C and high levels of moon illuminance were encountered during the activity transect surveys. During the first and second activity transect surveys in April and May, temperatures were cool, dropping to 9.0ºC in April and 7.0ºC in May at the end of the surveys. This is typical of weather conditions during spring months and, as bat activity was still recorded during these surveys this was not considered to be a significant constraint.

4.22 Moon illuminance was >50% with a waxing gibbous recorded during the August survey (Visit 5) of the north route. Moon illuminance may affect bat activity as some bat species are light-phobic and therefore activity by these species could be reduced on nights with high moon illuminance. However, given the presence of mature hedgerows, trees and blocks of woodland around the site that provide more sheltered habitat for bat foraging and commuting and the fact that moon illuminance >50% was recorded during the north transect on a single visit only, moon illuminance was not identified as a constraint to bat activity data.

4.23 During the September (Visit 6) activity transect survey moderate to heavy rain was recorded between 20:29 hrs - 20:45 hrs and 20:50 hrs - 21:25 hrs. Occasional light intermittent drizzle was also recorded throughout the survey. Rain recorded throughout ≥50% of the transect survey constrains the data recorded during Visit 6. Bat activity was not recorded towards the end of the survey and during the heavy showers. The Visit 6 activity transect surveys were not repeated as the level of survey effort included monthly activity transect surveys of two routes in combination with static monitoring and therefore whilst Visit 6 survey data was limited, overall, the rain during Visit 6 surveys did not impair confidence in the interpretation of the baseline data.

Equipment Failure

4.24 The Elekon Batlogger M failed to record activity within the north transect route during the October (Visit 7) activity transect survey however, observational manual data continued to be recorded by surveyors. This limitation has been taken into consideration in the interpretation of the baseline data.

4.25 The Elekon Batlogger M failed to record activity within the north transect route during the August (Visit 5) activity transect survey on 12th August 2021. Use of an alternative detector to record bat activity was not possible at the time of survey. The August (Visit 5) activity transect survey of the north transect route was therefore repeated on 18th August 2021 to prevent this limitation from constraining data.

Static Monitoring Surveys

4.26 Static monitoring of bat activity within the site was undertaken in conjunction with the activity transect survey visits. Four Anabat Express frequency division detectors were deployed monthly in cohesion with bat activity transect surveys from April to October 2021. Static monitoring provides further information about bat species assemblage and activity levels within the site, complementing the activity transect survey data.

4.27 Static monitoring was undertaken along woodland edge, ditch and hedgerow and mature tree habitat, which may be affected by the proposed development and where features likely to provide valuable bat foraging/commuting habitat within and adjacent to the site were noted.

4.28 The static monitoring detectors were set to record for a minimum of five consecutive nights during favourable weather conditions to monitor bat activity. Detectors were deployed with standardised sensitivity settings. The static detector locations are shown on the Bat Transect Route and Static Detector Locations Drawing G8745.022 and survey details are provided in Table 6.

Table 6. Static monitoring detector locations and recording periods.

Location	Survey Visit	Survey Dates	Number of Nights Analysed Data	Errors	Description of Detector Location and Orientation of Microphone
A	1	15/04/21-26/04/21	11.0	-	Located on an elder *Sambucus nigra* tree on the southern side of a narrow belt of semi-natural broad-leaved woodland in the north of the site. A ditch flows through the woodland and the microphone was directed southwards to capture activity along the woodland edge bounding poor semi-improved grassland.
	2	12/05/21-20/05/21	8.0	-	
	3	17/06/21-24/06/21	8.0	-	
	4	08/07/21-19/07/21	11.0	-	
	5	12/08/21-14/08/21	2.5	Batteries died on third night.	
	6	09/09/21-16/09/21	7.0	-	
	7	07/10/21-14/10/21	7.0	-	
B	1	-	-	Failed power connect, so detector did not turn on as programmed.	Located on a fence post within a hazel *Corylus avellana* dominated section of a native species-rich hedge with trees in the east of the site. The hedgerow forms the northern boundary of an old green lane, which traverses the site west to east. The microphone was directed northwards to capture activity along the old green lane in the eastern half of the site.
	2	12/05/21-16/05/21	4.5	Batteries died on fifth night.	
	3	17/06/21-28/06/21	11.0	-	
	4	08/07/21-19/07/21	11.0	-	
	5	12/08/21-14/08/21	2.0	Batteries died before third night.	
	6	09/09/21-16/09/21	7.0	-	
	7	07/10/21-10/10/21	3.5	Batteries died on fourth night.	
C	1	15/04/21-22/04/21	7.5	-	Located on a hawthorn *Crataegus monogyna* tree within a native species-rich hedge with trees in the centre of the site. The hedgerow forms the southern boundary of an old green lane, which traverses the site west to east. The static detector was located next to some mature oaks Quercus
	2	12/05/21-19/05/21	8.0	-	
	3	17/06/21-19/06/21	2.0	Batteries died before third night.	

Location	Survey Visit	Survey Dates	Number of Nights Analysed Data	Errors	Description of Detector Location and Orientation of Microphone
	4	08/07/21-19/07/21	11.0	-	robur at a node where several hedgerows intersect. The microphone was directed northwards to capture activity along and within the old green lane.
	5	12/08/21-19/08/21	7.0	-	
	6	09/09/21-16/09/21	7.0	-	
	7	-	-	Failed power connect, so detector did not turn on as programmed.	
D	1	15/04/21-26/04/21	11.0	-	Located on a fence post and attached to a sycamore *Acer pseudoplatanus* on the western side of a belt of semi-natural broad-leaved woodland in the south-west of the site. The microphone was directed westwards to capture activity along the woodland edge bounding improved grassland.
	2	12/05/21-14/05/21	2.5	Batteries died on the third night.	
	3	17/06/21-25/06/21	8.0	-	
	4	08/07/21-19/07/21	11.0	-	
	5	12/08/21-19/08/21	7.0	-	
	6	09/09/21-16/09/21	7.0	-	
	7	07/10/21-14/10/21	7.0	-	

Limitations

Weather Constraints

4.29 Weather constraints were encountered during the first and second periods of static monitoring in April and May 2021. Average temperatures on five nights during monitoring in April dropped below 10.0ºC, with average temperatures below 6.0ºC only recorded on two nights during this period. Average temperatures on two nights during monitoring in May dropped below 10.0ºC, though remained >6.0ºC during this period. Bat activity is known to be limited at temperatures below 10.0ºC (Slack and Tinsley, 2015) however, this is typical of weather conditions during spring months particularly in northern habitats and, as bat activity was still recorded during these nights, this was not considered to be a significant constraint.

4.30 During the May (Visit 2), June (Visit 3) and September (Visit 6) static monitoring periods occasional light, scattered rain showers and drizzle were recorded during several nights. Occasional light, scattered rain was also recorded on single nights during the July (Visit 4) and October (Visit 7) static monitoring periods. Bat activity was recorded during these static monitoring periods and given the level of survey effort included monthly activity transect surveys in combination with static monitoring surveys, overall, the rain during these monitoring periods did not impair confidence in the interpretation of the baseline data.

4.31 A summary of average weather data recorded during static monitoring periods is provided in Table B1 at Appendix B.

Equipment Failure

4.32 As detailed in Table 6, static detector failure was experienced at static detector locations A, B and C during the static monitoring surveys, resulting in fewer than the minimum five nights of bat activity data being recorded. Across all static monitoring periods an average of at least five nights of activity were recorded at each location. Equipment failure during the static monitoring periods was generally a result of a failed connection to power causing the detector to not turn on as programmed or an excessive drain of the batteries resulting in power failure. The detectors did not make any recordings during these instances.

4.33 Overall limitations to length of static detector monitoring periods did not impair confidence in the interpretation of the baseline data, as detectors recorded at the various static detector locations across the bat active period and did not consistently fail in the same locations. Reduced or failed monitoring also did not occur at all static detector locations during a single static monitoring period. The level of survey effort with static monitoring surveys undertaken monthly at four locations, in combination with activity transect surveys allowed for interpretation of the baseline data and these limitations were taken into consideration when reflecting on habitat use within the site by bats in the locality.

Nocturnal Emergence/ Re-entry Surveys

4.34 In total 13 trees were identified from the GLTA as having moderate or high roost habitat suitability with regard to bats and being located within potentially impacted areas associated with the proposed development at the early design stage. Locations of trees with bat roost habitat suitability are shown on the Bat Tree Roost Habitat Suitability Plan Drawing G8745.021. These trees were therefore subject to nocturnal emergence/ re-entry surveys in accordance with their evaluation (moderate or high suitability receiving two or three nocturnal emergence/ re-entry surveys, respectively).

4.35 Trees T76, T165, T168, H167.1, T170, G27c.2, G27c.3, G27d.1 and G27d.2 were categorised as having moderate bat roost habitat suitability and therefore required a dusk emergence survey and a dawn re-entry survey, with at least one nocturnal emergence/ re-entry survey undertaken during May to August.

4.36 Trees T160, T166, T172 and T178 were categorised as having high bat roost habitat suitability and therefore required three nocturnal emergence/ re-entry surveys, including at least one dusk emergence survey and one dawn re-entry survey. The third survey visit was either a dusk emergence survey or a dawn re-entry survey depending on varying visibility around trees and weather conditions at the time of survey. For trees with high bat roost habitat suitability, at least two of the nocturnal emergence/ re-entry surveys were undertaken during May to August.

4.37 Nocturnal emergence/ re-entry surveys were scheduled at least a minimum of two weeks apart within the bat active season (May to September inclusive) during July and August.

4.38 Surveys were undertaken during optimum weather conditions comprising dusk temperatures of ≥10°C, pre-dawn temperatures of ≥6°C and no rain or strong winds (>4 on the Beaufort Scale). Where sub-optimal weather conditions were recorded during surveys, surveyors noted whether bat activity was affected to determine whether surveys remained valid.

4.39 A pair of surveyors were positioned at each tree identified as requiring nocturnal emergence/ re-entry surveys. Trees were only surveyed by individual surveyors when PRFs were located on a single aspect and other surveyors were located nearby (for health and safety reasons). During each survey observations such as bat species, the number of bats entering or leaving the tree, the location of entry and exit points, behaviours such as close interest in other trees or features and commuting or passing bats were recorded.

4.40 The nocturnal emergence/ re-entry surveys were undertaken by a suitably experienced lead surveyor and experienced TEP trained assistant surveyors. Surveyors used a heterodyne (e.g., Batbox Duet or Pettersson D230) and frequency division (e.g., Anabat Express) or full spectrum (e.g., Elekon Batlogger M) detectors during surveys. Additional equipment included walkie-talkies, so surveyors could communicate about potential roosting behaviour and activity.

4.41 Dusk emergence surveys commenced 15 minutes prior to sunset and finished 1.5 hours after sunset. Dawn re-entry surveys commenced 1.5 hours before sunrise and finished 15 minutes after sunrise.

4.42 The details of the nocturnal emergence/ re-entry surveys including start and finish times, weather conditions and sunset and sunrise times are provided in Table 7.

Limitations

4.43 Windier conditions were recorded at the beginning of the third nocturnal emergence/ re-entry survey of tree T178, with fresh breezes (5 - Beaufort Scale) >18mph noted at the start of the survey. Whilst wind conditions were not optimum, they remained <18mph for the majority of the survey and bat activity was recorded. The wind conditions during this survey were therefore not a significant constraint.

Table 7. Summary of nocturnal emergence/ re-entry survey dates, start and end times and conditions for surveys of moderate and high roost habitat suitability trees completed in 2021.

Tree Number	Date of Survey	Sunrise/ Sunset	Start Time	End Time	Temperature (°C)		Wind[18]		Cloud[19]		Rain		Moon Phase[20]
					Start	End	Start	End	Start	End	Start	End	
Visit 1													
T160	20/07/21	21:25	21:10	22:55	22.0	17.0	0	1	0	0	None	None	Waxing Gibbous
T165	21/07/21	05:12	03:42	05:27	14.0	15.0	1	1	0	0	None	None	Waxing Gibbous
T166	20/07/21	21:25	21:10	22:55	22.0	17.0	1	1	0	0	None	None	Waxing Gibbous
T168	21/07/21	05:12	03:42	05:27	16.0	14.0	0	1	0	0	None	None	Waxing Gibbous
T170	21/07/21	05:12	03:42	05:27	15.0	14.0	2	2	0	0	None	None	Waxing Gibbous
T172	20/07/21	21:25	21:10	22:55	22.0	21.0	1	1	0	0	None	None	Waxing Gibbous
T178	20/07/21	21:25	21:10	22:55	22.0	19.0	0	0	0	0	None	None	Waxing Gibbous
H167.1	21/07/21	05:12	03:42	05:27	16.0	14.0	0	1	0	0	None	None	Waxing Gibbous
G27c.2	21/07/21	05:12	03:42	05:27	17.0	15.0	0	0	0	0	None	None	Waxing Gibbous
G27c.3	21/07/21	05:12	03:42	05:27	17.0	15.0	0	0	0	0	None	None	Waxing Gibbous
G27c.7	29/07/21	21:12	20:57	22:42	19.0	21.0	0	0	6	6	None	None	Waning Gibbous
G27d.1	29/07/21	21:12	20:57	22:42	19.0	17.0	0	0	7	6	None	None	Waning Gibbous

18 Wind strength is reported using the Beaufort Scale of Wind Force, this scale runs from 0 to 12, information on the conditions denoted by scores are as follows: 0 – Calm (vertical smoke); 1 - Light Air (slight smoke drift); 2 - Light Breeze (leaves gently rustle); 3 - Gentle Breeze (small twigs constantly move); 4 - Moderate Breeze (small branches begin to move) and 5 - Fresh breeze (small trees in leaf begin to sway).

19 Cloud cover is reported in oktas or eighths (i.e., 0 oktas represents the complete absence of cloud, 1 okta cloud cover of 1 eighth or less, and so on to 8 oktas which represents full cloud cover), with the additional convention that 9 oktas represents sky obscured by fog or mist.

20 Moon Phase: New Moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Third Quarter, Waning Crescent.

Tree Number	Date of Survey	Sunrise/ Sunset	Start Time	End Time	Temperature (°C)		Wind[18]		Cloud[19]		Rain		Moon Phase[20]
					Start	End	Start	End	Start	End	Start	End	
G27d.2	29/07/21	21:12	20:57	22:42	16.0	14.0	1	1	4	4	None	None	Waning Gibbous
Visit 2													
T160	04/08/21	05:34	04:04	05:49	11.0	10.0	1	1	1	1	None	None	Waning Crescent
T165	03/08/21	21:03	20:48	22:33	17.0	13.0	2	1	1	0	None	None	Waning Crescent
T166	04/08/21	05:34	04:04	05:49	12.0	10.0	0	0	0	1	None	None	Waning Crescent
T168	03/08/21	21:03	20:48	22:33	17.0	14.0	1	1	1	1	None	None	Waning Crescent
T170	03/08/21	21:03	20:48	22:33	17.0	14.0	1	1	1	1	None	None	Waning Crescent
T172	04/08/21	05:34	04:04	05:49	12.0	10.0	0	0	0	1	None	None	Waning Crescent
T178	04/08/21	05:34	04:04	05:49	11.0	11.0	1	1	1	1	None	None	Waning Crescent
H167.1	03/08/21	21:03	20:48	22:33	17.0	14.0	1	1	1	1	None	None	Waning Crescent
G27c.2	03/08/21	21:03	20:48	22:33	18.0	16.0	2	2	3	1	None	None	Waning Crescent
G27c.3	03/08/21	21:03	20:48	22:33	18.0	16.0	2	2	3	1	None	None	Waning Crescent
G27c.7	19/08/21	05:59	04:29	06:14	14.0	13.0	1	1	6	2	None	None	Waxing Gibbous
G27d.1	19/08/21	05:59	04:29	06:14	14.0	13.0	1	1	7	3	None	None	Waxing Gibbous
G27d.2	19/08/21	05:59	04:29	06:14	14.0	14.0	1	1	6	5	None	None	Waxing Gibbous
Visit 3													
T160	18/08/21	20:33	20:18	22:03	16.0	15.0	4	2	8	8	None	None	Waxing Gibbous
T166	18/08/21	20:33	20:18	22:03	16.0	15.0	4	4	8	8	None	None	Waxing Gibbous

Tree Number	Date of Survey	Sunrise/ Sunset	Start Time	End Time	Temperature (°C)		Wind[18]		Cloud[19]		Rain		Moon Phase[20]
					Start	End	Start	End	Start	End	Start	End	
T172	18/08/21	20:33	20:18	22:03	16.0	15.0	4	3	8	8	None	None	Waxing Gibbous
T178	18/08/21	20:33	20:18	22:03	16.0	15.0	5	4	8	8	None	None	Waxing Gibbous

Sonogram Analysis

4.44 Recorded sonograms during activity transect surveys, static monitoring surveys and nocturnal emergence/ re-entry surveys were analysed using Kaleidoscope Pro Analysis software. Data analysis was completed by TEP Consultant Ecologists Annabel Walker-Evans and Emma Hickson and TEP Senior Ecologist Graham Roberts.

4.45 Activity transect survey data was automatically geo-referenced and digitally mapped using GIS. Each species is colour coded and flight directions are provided where behaviour was observed.

4.46 For the purposes of presentation, data has been transformed to calculate Bat Activity Indices (BAI). For the majority of datasets and statistical analysis the BAI represents bat registrations per hour (brh), to account for different night lengths throughout the recording period.

4.47 BAIs quantify the amount of use bats make of an area i.e., activity levels, not abundance. Consistency has been achieved throughout the static monitoring periods in regard to detector model, sensitivity and calibration, position and orientation and also subsequent sonogram analysis. High confidence can therefore be placed in the relative activity levels presented.

Limitations

4.48 Bats vary their calls dependent on the habitats they fly in and on their activity (commuting, foraging, social interaction, etc.). It is not always possible to identify bat calls to species level owing to the overlap of call parameters between some species and/or poor-quality recordings (e.g., brief, and distant passes). In these cases, it is accepted that species are identified to genus level or group level (e.g., *Myotis* species, *Myotis/Plecotus* and *Nyctalus/Eptesicus*) (Russ, 2012[21]). Where call parameters are inconclusive the species has been labelled as 'unidentified'. This ensures the dataset is interpreted accurately and transparently.

4.49 The detectability of some bat species, such as *Plecotus* sp. is lower than that of, for example, *Nyctalus* sp. and *Pipistrellus* sp.. The echolocation calls of *Plecotus* sp. are comparatively more difficult to detect with bat detectors, and their particular hunting strategies take them into less open habitats, where survey transect routes may not venture. Careful interpretation has been applied when comparing survey results across species to account for this limitation.

[21] Russ, J. (ed.), (2012). British Bat Calls: A Guide to Species Identification. Pelargic Publishing, Exeter.

5.0 Evaluation Method

5.1 For the purposes of this assessment and of assigning value to bats, the guidance set out in Wray *et al*. 2010 has been reviewed.

5.2 The guidance provided by Wray *et al.* (2010) includes a framework for identifying the importance of bats in the landscape through the evaluation of bat roosts and habitats. Applying this framework, bats can be valued according to species rarity (Table 8).

Table 8. Species rarity in England (adapted from Wray et al. 2010).

Rarity	Species
Common *(population over 100,000)*	Common pipistrelle *Pipistrellus pipistrellus* Soprano pipistrelle *Pipistrellus pygmaeus* Brown long-eared *Plecotus auritus*
Rarer *(population 10,000 to 100,000)*	Lesser horseshoe *Rhinolophus hipposideros* Daubenton's *Myotis daubentonii* Natterer's *Myotis nattereri* Whiskered *Myotis mystacinus* Brandt's *Myotis brandti* Leisler's *Nyctalus leisleri* Noctule *Nyctalus noctula* Serotine *Eptesicus serotinus* Nathusius' pipistrelle *Pipistrellus nathusii*
Rarest *(population under 10,000)*	Greater horseshoe *Rhinolophus ferrumequinum* Bechstein's *Myotis bechsteinii* Barbastelle *Barbastella barbastellus* Grey long-eared *Plecotus austriacus* Alcathoe *Myotis alcathoe* Greater mouse-eared *Myotis*

5.3 Wray *et al.* (2010) identifies a numerical scoring system which can be applied to commuting habitat (Table 9) and foraging habitat (Table 10). The score derived from these evaluations is then applied to the geographical scale proposed by the CIEEM EcIA guidelines (Table 11).

Table 9. Valuing commuting habitat for bats.

Species (Score)		Number Of Bats (Score)		Roosts/Potential Roosts Nearby (Score)		Type and Complexity of Linear Features (Score)	
Common	**2**	Individual bats	**5**	None.	**1**	Absence of (other) linear features.	**1**
Rarer	**5**	Small number of bats	**10**	Small numbers.	**3**	Un-vegetated fences and large field sizes.	**2**
Rarest	**20**	Large number of bats	**20**	Moderate number/unknown.	**4**	Walls, gappy or flailed hedgerows, isolated well-grown hedgerows, and moderate field size.	**3**
				Large number of roosts, or close to a SSSI for the species.	**5**	Well-grown and well-connected hedgerows, small field size.	**4**
				Close to or within a SAC for the species.	**20**	Complex network of mature well-established hedgerows, small fields and rivers/streams.	**5**

Table 10. Valuing foraging habitat for bats.

Species (Score)		Number Of Bats (Score)		Roosts/Potential Roosts Nearby (Score)		Type and Complexity of Features (Score)	
Common	**2**	Individual bats	**5**	None.	**1**	Industrial or other site without established vegetation.	**1**
Rarer	**5**	Small number of bats	**10**	Small numbers.	**3**	Suburban areas or intensive arable land.	**2**
Rarest	**20**	Large number of bats	**20**	Moderate number/unknown.	**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**
				Close to or within a SAC for the species.	**20**	Mosaic of pasture, woodlands and wetland areas.	**5**

Table 11. Scoring system for commuting and foraging habitats.

Score	Geographic Value
1 – 10	Not important
11 – 20	Local
21 – 30	County
31 – 40	Regional
41 – 50	National

6.0 Results

Desk Based Records

6.1 Numerous bat records (487 records) were returned from the desk study data search. Records are detailed within the Ecology Desk Study (TEP Report Ref: 8745.001 V1.0). Species recorded within 2 km of the site and within the site included:

- Common pipistrelle *Pipistrellus pipistrellus* (EPS, WCA5, S7);
- Soprano pipistrelle *Pipistrellus pygmaeus* (EPS, WCA5, S7);
- Pipistrelle species *Pipistrellus* sp. (EPS, WCA5, S7);
- Noctule *Nyctalus noctula* (EPS, WCA5, S7);
- Brown long-eared *Plecotus auritus* (EPS, WCA5, S7);
- Daubenton's bat *Myotis daubentonii* (EPS, WCA5);
- Whiskered/Brandt's bat *Myotis mystacinus/brandtii*; (EPS, WCA5);
- Natterer's bat *Myotis nattereri* (EPS, WCA5);
- *Myotis* species (EPS, WCA5); and
- Lesser horseshoe *Rhinolophus hipposideros* (EPS, WCA5, S7, LBAP).

6.2 Roost records were not identified within the desk study data however, given that the number of records of bats within the locality and the site exceed 480 and at least eight species have been recorded within the site locality, bat roosts are likely to be present within the surrounding landscape.

6.3 Data from the BCT National Bat Monitoring Programme (NBMP) 2022[22] indicated that population trends for species recorded within the site, have remained stable within the UK since baseline monitoring from 1999. All species showed similar trends at UK and country level based on data from summer surveys, though Daubenton's bat showed a significant increase from the Waterway Survey for Wales.

6.4 There are four internationally statutory designated wildlife sites within 10 km of the site; Johnstown Newt Sites Special Area of Conservation (SAC), Clwyd/Berwyn and South Clwyd Mountains SAC, Midland Meres and Mosses Phase 2 Ramsar and River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC. None of the internationally statutory designated wildlife sites are designated for the presence of bat species.

6.5 There are five nationally statutory designated wildlife sites within 5 km of the site; Gatewen Marsh Site of Special Scientific Interest (SSSI), Stryt Las A'r Hafod SSSI, Sontley Marsh SSSI, Coedwig Ffosil/Brymbo Fossil Forest SSSI and Ruabon/Llantysilio Mountains and Minera SSSI. There are no statutory locally designated wildlife sites within 2 km of the site. However, there are ten non-statutory locally designated wildlife sites within 2 km of the site.

6.6 Designated wildlife sites within the locality include habitats likely to support roosting, foraging and commuting bats within the wider landscape including; woodland, grassland, scrub, wetlands, watercourses and waterbodies.

[22] https://cdn.bats.org.uk/uploads/pdf/Our%20Work/NBMP/NBMP-annual-report-2022.pdf?v=1686740083&_gl=1*1mraloc*_ga*MTkzNjYzMjQzOC4xNjc1MjYwNzIz*_ga_G28378TB9V*MTY5MTY4MDMxNi4xOC4xLjE2OTE2ODAzMzcuMC4wLjA.

Preliminary Ground Level Tree Assessment for Bat Roost Habitat

6.7 The GLTA identified 80 trees (including individuals in groups and woodland blocks) with low to high bat roost habitat suitability. Approximate tree locations and roost habitat suitability categorisation are illustrated at the Bat Tree Roost Habitat Suitability Plan Drawing G8745.021.

6.8 The site includes a variety of habitats suitable for bat foraging and commuting including a pond, ditches, small areas of broad-leaved woodland, hedgerow, scrub and grassland. The majority of trees identified as having bat roost habitat suitability during the GLTA are located within or at the edge of areas of semi-natural broad-leaved woodland or along established hedgerows around arable field boundaries. Habitats within the site connect to the River Clywedog and associated mature riparian woodland habitat that traverses the landscape from west to east. Higher quality surrounding habitats are likely to increase the potential for use of trees with roost habitat suitability by bats, due to these features providing corridors for bat foraging and commuting.

6.9 Full details of assessed trees and their identified PRFs are reported at Appendix A. In summary, of the 80 trees identified during the GLTA as having bat roost habitat suitability:

- 14 trees have high roost habitat suitability;
- 35 trees have moderate roost habitat suitability; and
- 31 trees have low roost habitat suitability.

6.10 Trees categorised as having high bat roost habitat suitability generally exhibited numerous small PRFs or a few larger PRFs suitable for use by larger numbers of bats or PRFs that were assessed as providing suitable habitat for roosts with high conservation significance (maternity roosts). PRFs included woodpecker holes, large trunk cavities, large wounds, branch cavities and tear-outs.

6.11 Trees categorised as having moderate bat roost habitat suitability included several smaller PRFs or individual larger PRFs suitable for use by small numbers of bats. In some circumstances trees were of an age and size where PRFs may be present, and absence could not be confirmed from a ground level inspection due to restricted visibility. Examples of PRFs noted on moderate trees include trunk cavities, pruning cuts, transverse-snaps, branch cavities and small wounds.

6.12 Trees categorised as having low bat roost habitat suitability frequently had small PRFs suitable for use by individual bats or had no obvious PRFs but were of a size where PRFs may be present though the trees appeared in good health with no indication of damage or decay likely to lead to PRF creation. PRFs noted included small transverse-snaps where smaller branches had broken away, shallow tear-outs, wounds and on occasion where small deadwood was noted in the tree canopies.

6.13 Trees identified as having negligible bat roost habitat suitability generally included individual young and scrubby trees scattered within groups, hedgerows and woodland blocks. Negligible trees also included semi-mature and mature specimens that were in good health and had no PRFs as a result of decay, disease or damage.

6.14 The total number of trees identified from the GLTA as having low, moderate or high roost habitat suitability with regard to bats that are located within impacted areas associated with the proposed development has yet to be determined.

Activity Transect Surveys

Bat Species Assemblage

6.15 The activity transect surveys within the site recorded at least four species across the seven survey visits undertaken from April to October. Species recorded included common pipistrelle, soprano pipistrelle, *Myotis* species and noctule. A total of 875 bat registrations were recorded across all seven activity transect surveys. Common pipistrelle produced the majority of the contacts recorded during the activity transect surveys (62.4%). Figure 2 summarises the composition of the species assemblage recorded during the seven activity transect surveys.

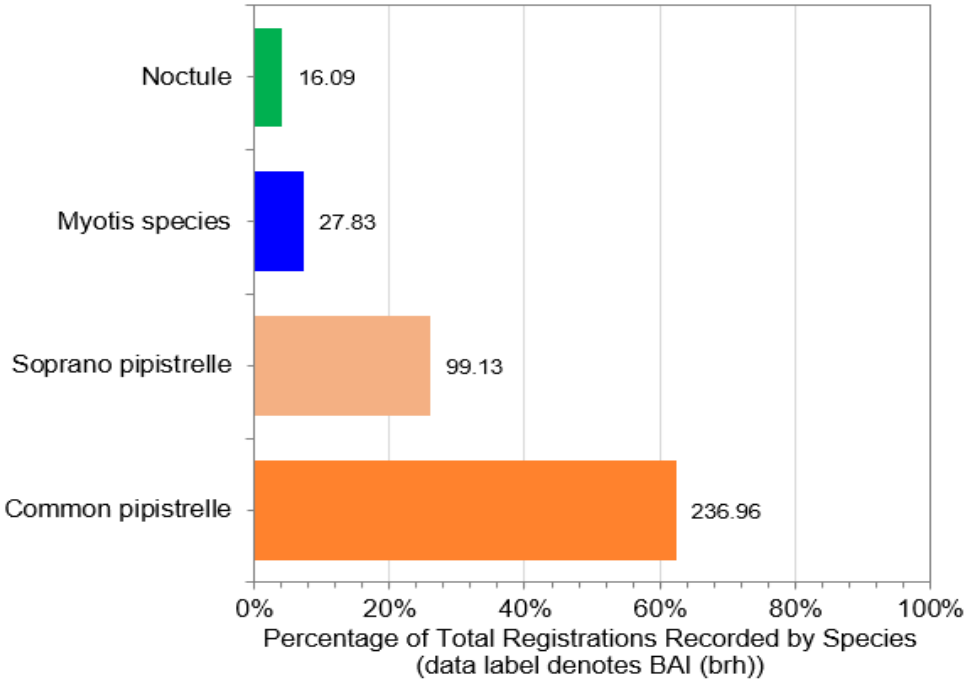


Figure 2. Species assemblage recorded during activity transect surveys across the site in 2021.

Seasonal Variation in Activity

6.16 Figure 3 summarises the bat activity index (BAI) (bats registrations per hour (brh)) recorded during each activity transect survey combining data across the north and south transect routes. The BAI was greatest during Visit 5 in August 2021 (67.53 brh) and lowest during Visit 1 in April 2021 (3.31 brh). Bat activity recorded during surveys in August 2021 were significantly higher than that recorded during other months.

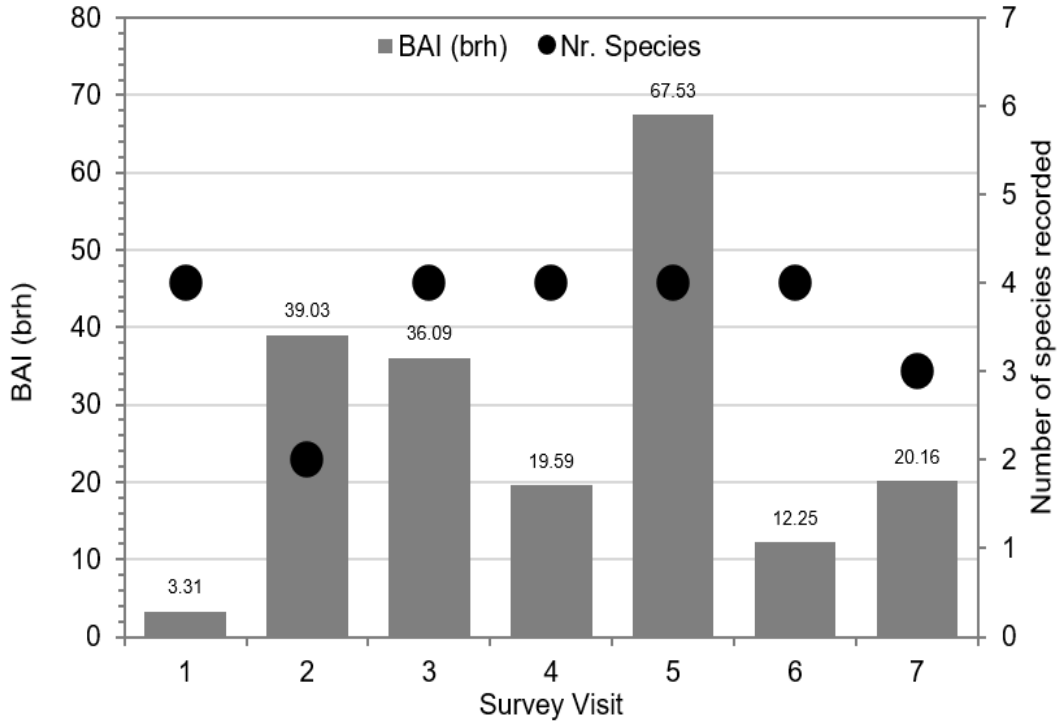


Figure 3. Seasonal variation in bat activity recorded during activity transect surveys in 2021.

6.17 Common pipistrelle was recorded during each activity transect survey, with highest activity levels recorded during Visit 5 (43.23 brh) in August 2021 compared to other survey visits (Figure 4).

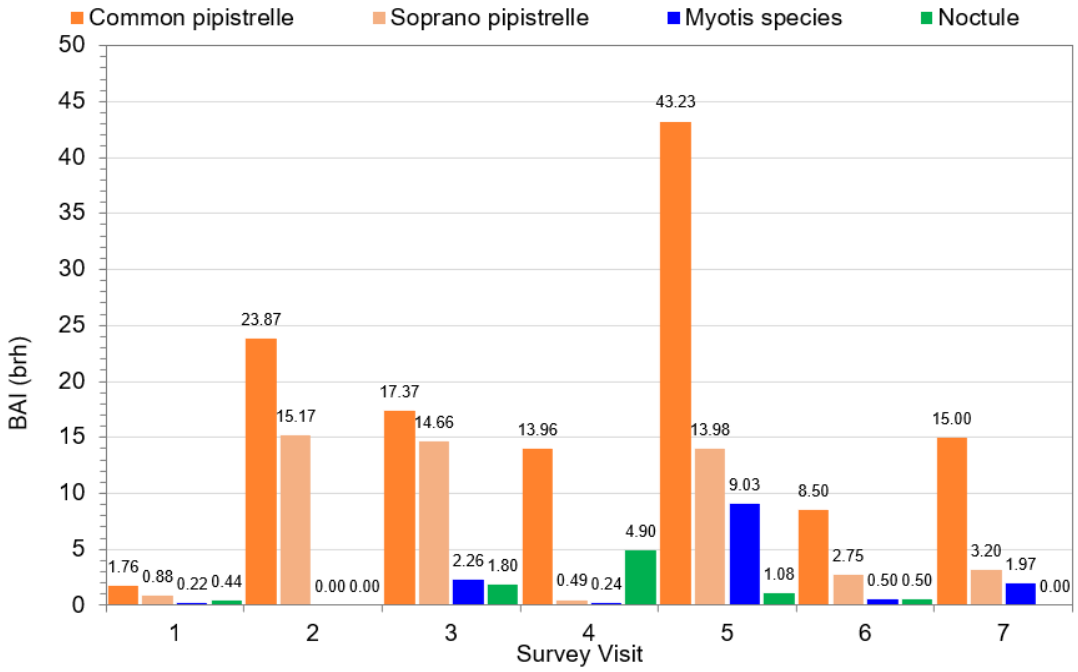


Figure 4. Seasonal variation in bat species activity recorded during activity transect surveys in 2021.

6.18 Soprano pipistrelle was also recorded during each activity transect survey. Soprano pipistrelle activity was highest during Visit 2 (15.17 brh) in May 2021, though similar levels of activity were recorded during Visit 3 (14.66 brh) in June 2021 and Visit 5 (13.98 brh) in August 2021.

6.19 Noctule was recorded during five of the seven activity transect surveys (during April, June, July, August and September) at comparatively low rates as shown in Figures 4 and 5. Noctule activity was highest during Visit 4 (4.90 brh) in July 2021.

6.20 *Myotis* species were recorded during six of the seven activity transect surveys, not being recorded during Visit 2 in May 2021. *Myotis* species were also recorded at comparatively low rates as shown in Figure 5. Myotis activity was highest during Visit 5 (9.03 brh) in August 2021.

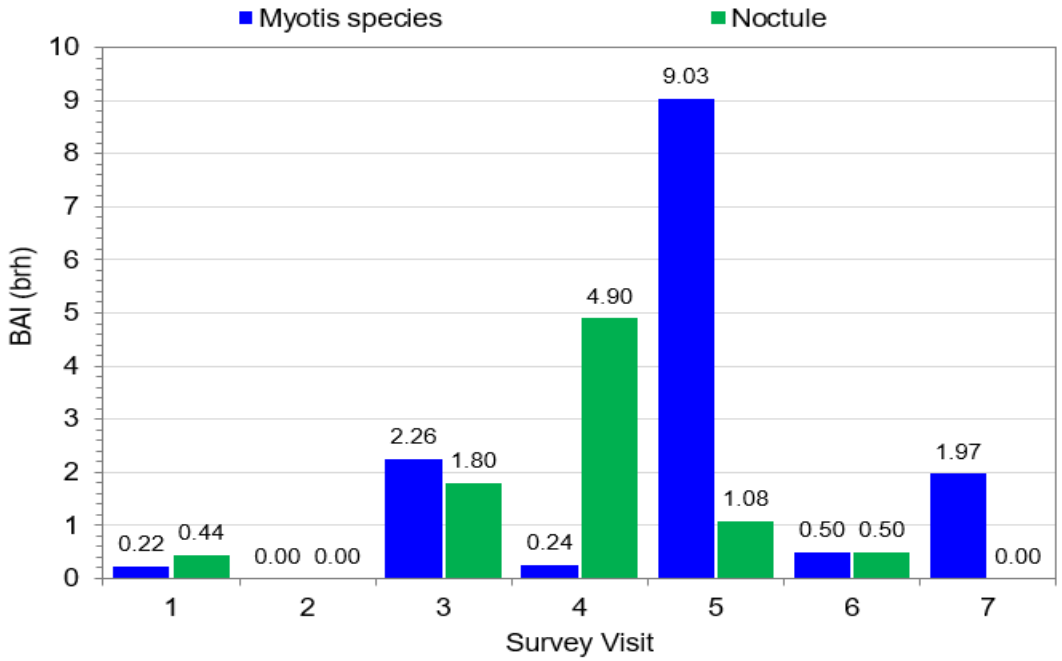


Figure 5. Seasonal variation in noctule and Myotis species activity recorded during activity transect surveys in 2021.

Spatial Variation in Activity

6.21 Bat activity was recorded throughout the seven activity transect surveys. Highest levels of activity were noted along the woodland edge habitat in the north of the site following the ditch, along the woodland edge and mature trees in the south-west of the site and in particular along the old green lane with mature double hedgerows and numerous mature trees traversing the site. Activity was particularly noted along the edge of old green lane to the north and south with bats foraging over and above the tree canopies. Elsewhere within the site, activity was generally noted along hedgerows and around mature tree canopies. The spatial distributions of species recorded during the activity transect surveys are illustrated on the Bat Transect Survey Results Drawings G8745.023-G8745.029.

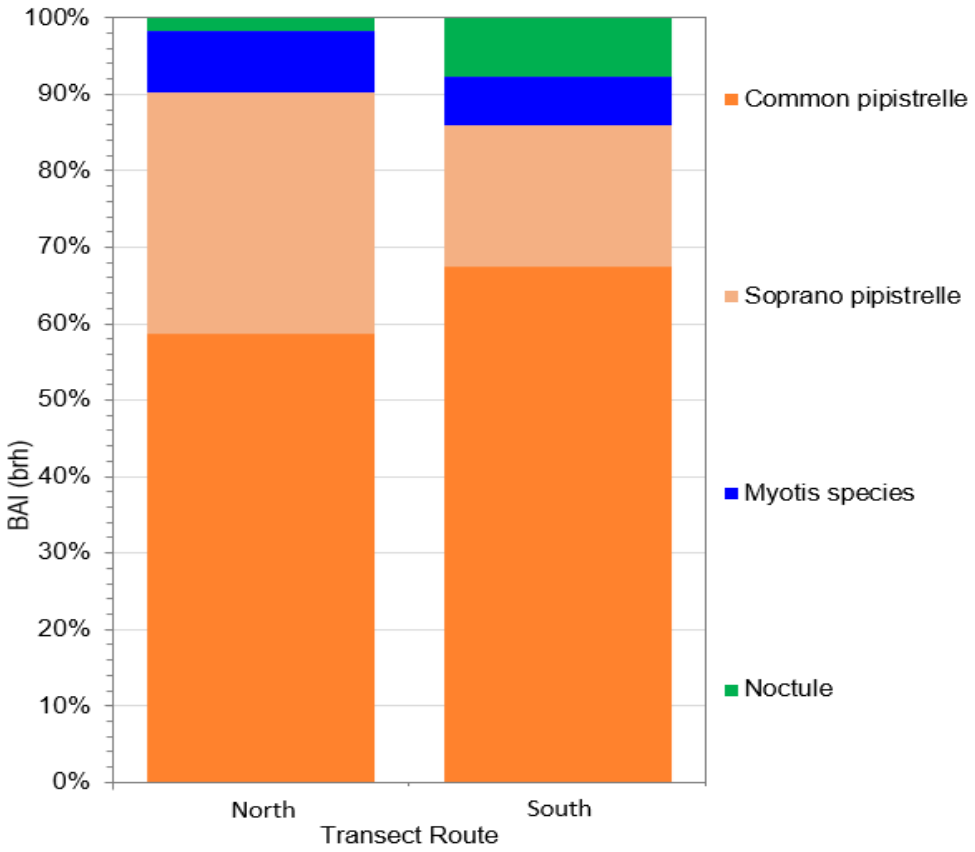


Figure 6. Variation in bat species assemblage between the north and south transect routes.

6.22 There was not significant variation between the species assemblage recorded along the north and south activity transect routes. Pipistrelle species contributed the majority of bat activity recorded in both the north and south of the site.

Static Monitoring Surveys

Bat Species Assemblage

6.23 Findings from the static detector monitoring data indicate an assemblage of at least six species within the site; common and soprano pipistrelle, noctule, brown long-eared, *Myotis* species and lesser horseshoe. Based on call characteristics, it should be noted that accuracy of call diagnostics for *Myotis* species is variable within the data and for the purposes of evaluating the species assemblage at this preliminary state, *Myotis* species have been grouped.

6.24 A total of 8898 bat passes were recorded over all four locations and seven monitoring periods. Common and soprano pipistrelle were recorded most frequently accounting for 83.98% of all the contacts recorded during static monitoring. Figure 7 summarises the composition of the species assemblage recorded during the static monitoring surveys.

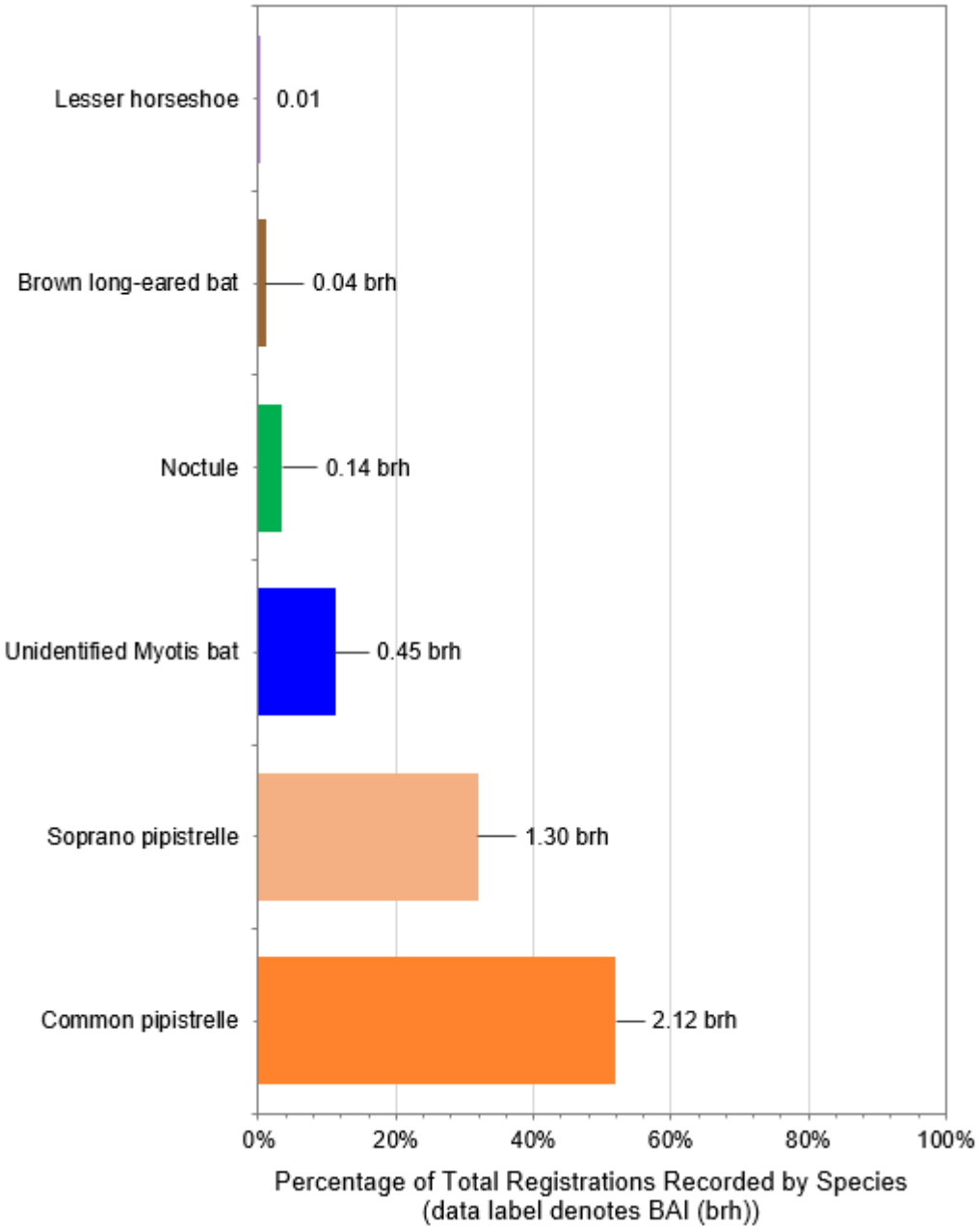


Figure 7. Species assemblage recorded during static monitoring surveys in 2021.

Seasonal Variation in Activity

6.25 Figure 8 summarises the total BAI (brh) during each static monitoring period. The BAI was greatest during Visit 7 in October 2021 (10.06 brh) and lowest during Visit 1 in April 2021 (2.15 brh).

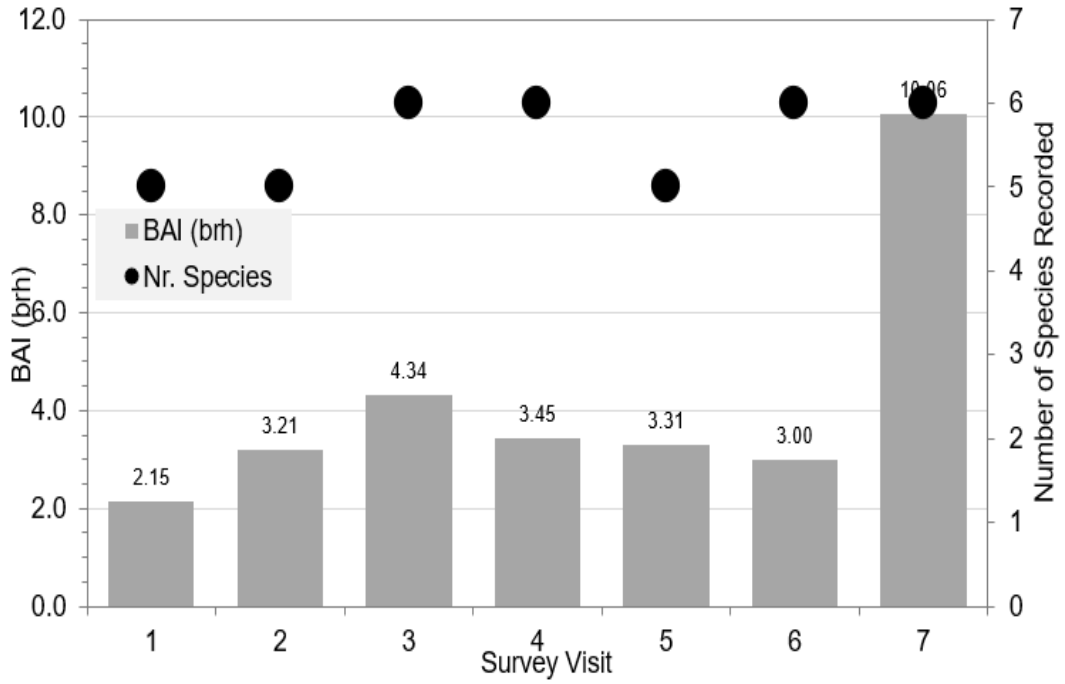


Figure 8. Seasonal variation in activity recorded during static monitoring throughout 2021.

6.26 Common and soprano pipistrelle were recorded during each static monitoring period. Highest activity levels for common and soprano pipistrelle were recorded during Visit 7 in October 2021 (Figure 9). Common pipistrelle activity was more frequently recorded than soprano pipistrelle activity during each static monitoring period with the exception of during Visit 5 in August and during Visit 7 in October 2021 (Figure 9).

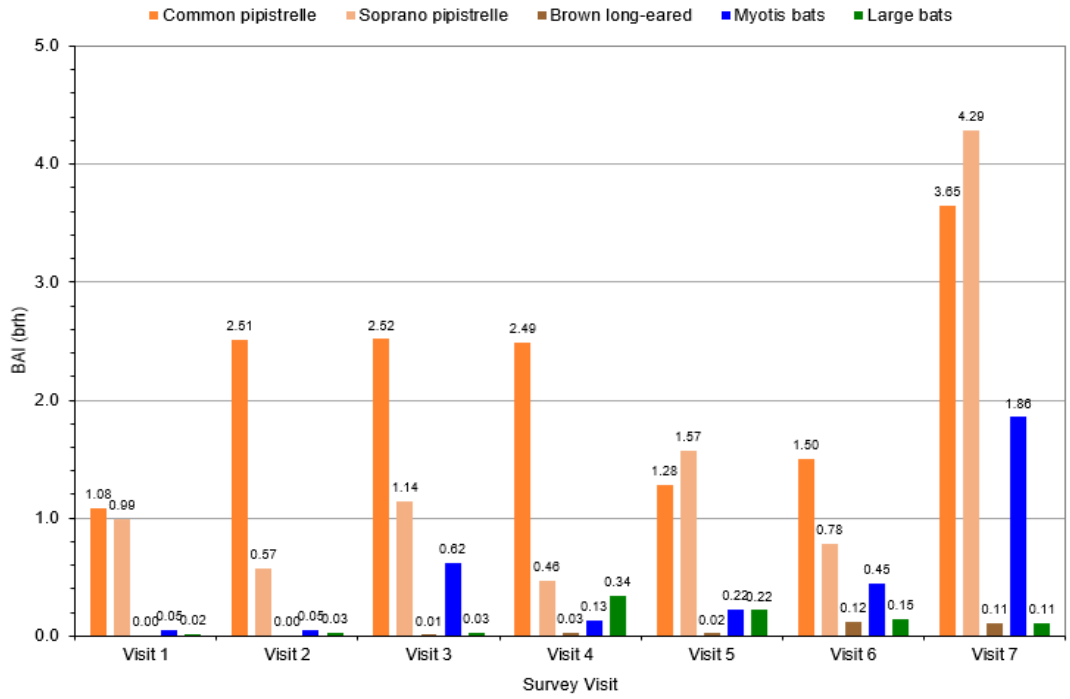


Figure 9. Seasonal variation in bat species activity recorded during static monitoring throughout 2021.

6.27 *Myotis* species were recorded during every static monitoring period though with low activity levels. The highest levels of *Myotis* species activity of 1.86 brh were recorded during Visit 7 in October 2021.

6.28 Noctules were also recorded during each static monitoring period with low activity levels. The highest levels of noctule activity of 0.34 brh were recorded during Visit 4 in July 2021 (Figure 10).

6.29 Brown long-eared was recorded during static monitoring Visits 3-7 with low activity levels. The highest levels of brown long-eared activity of 0.12 brh were recorded during Visit 6 in September 2021.

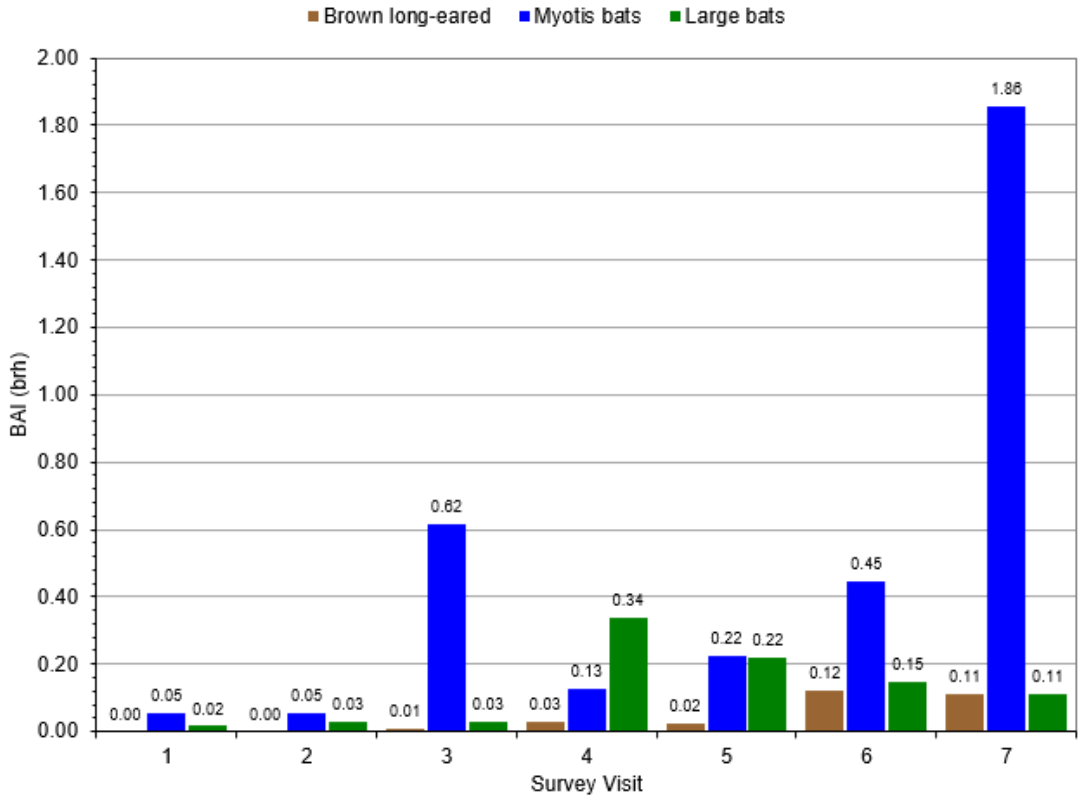


Figure 10. Seasonal variation in Myotis species, noctule and brown long-eared activity recorded during static monitoring undertaken in 2021.

6.30 Figure 11 summarises the lesser horseshoe BAI (brh) recorded during each monitoring period. The BAI recorded for lesser horseshoe was greatest during Visit 7 in October 2021 (0.041 brh) though remained at very low levels compared to other species recorded across the site throughout the seasons.

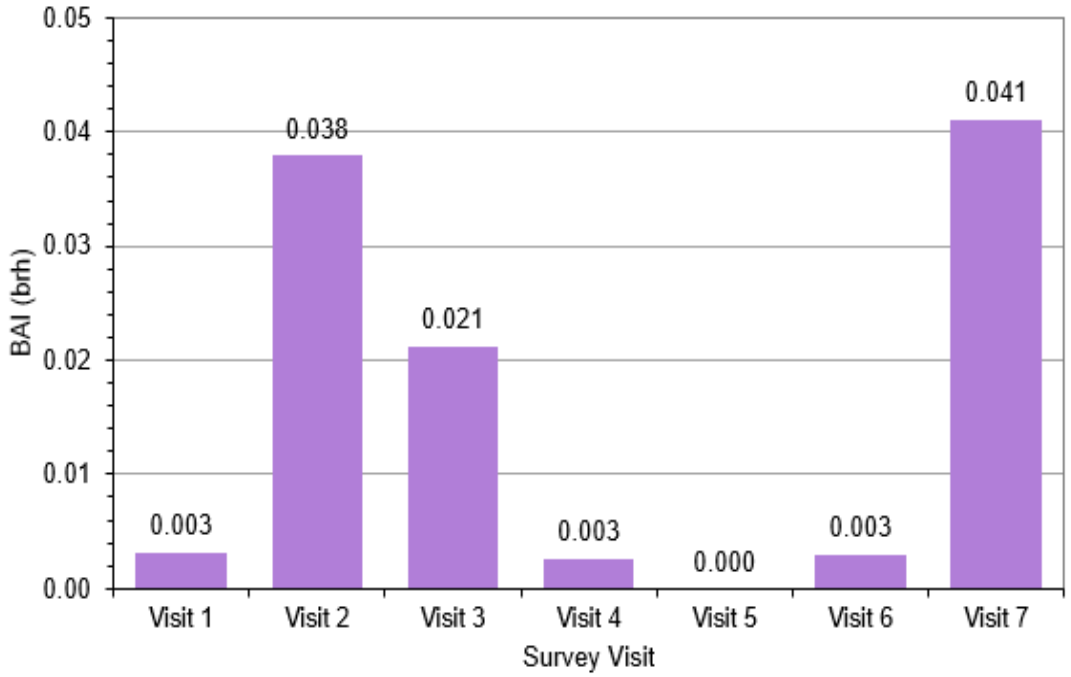


Figure 11. Seasonal variation in lesser horseshoe activity recorded during static monitoring undertaken in 2021.

6.31 Numerous social calls from common and soprano pipistrelle were recorded during static monitoring surveys. Figure 12 summarises the percentage BAI (brh) contributed by pipistrelle social calls recorded during each static monitoring period.

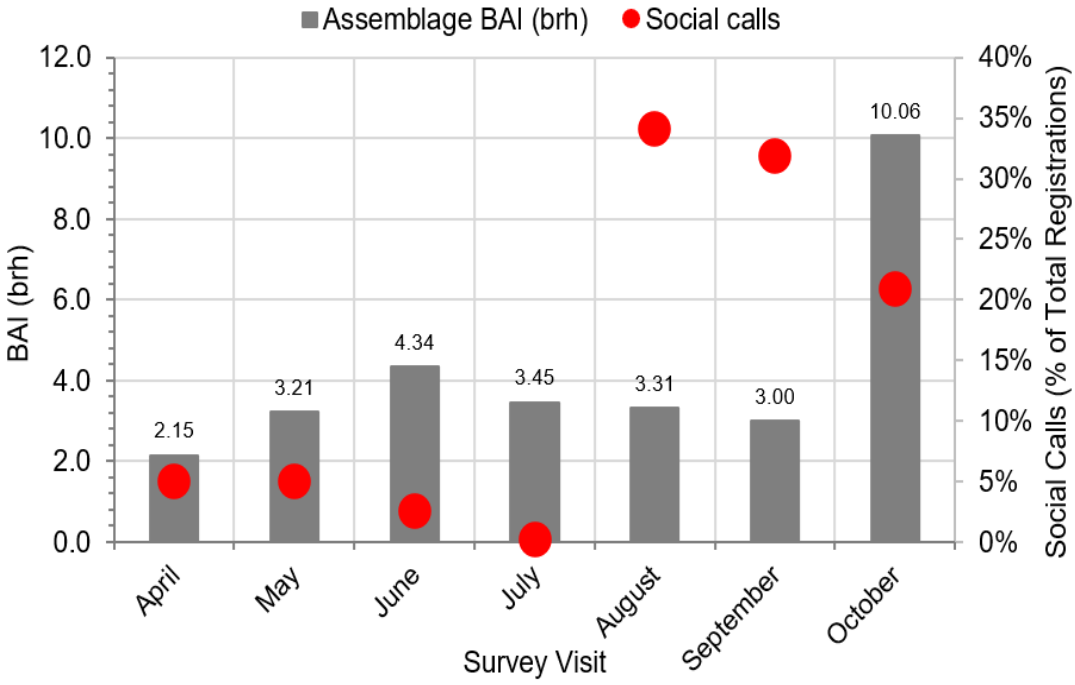


Figure 12. Percentage BAI (brh) contributed by pipistrelle social calls recorded during each static monitoring period.

6.32 The highest percentage BAI (brh) contributed by pipistrelle social calls was recorded during Visit 5 in August 2021 (1.13 brh), though pipistrelle social calls contributed between 20-34% of registrations during August, September and October 2021. The highest number of pipistrelle social calls were recorded during Visit 7 in October 2021 (2.11 brh).

6.33 Few pipistrelle social calls were recorded during Visit 4 in July 2021 with only 0.01 brh contributed by social calls. This accounted for only 0.03% of total bat registrations recorded during Visit 4.

Spatial Variation in Activity

6.34 Figure 13 summarises the BAI (brh) across the whole static monitoring survey recorded at each static detector location. The BAI was greatest at static location B (8.07 brh) than at all other static locations. The BAI was lowest at static location C (1.72 brh).

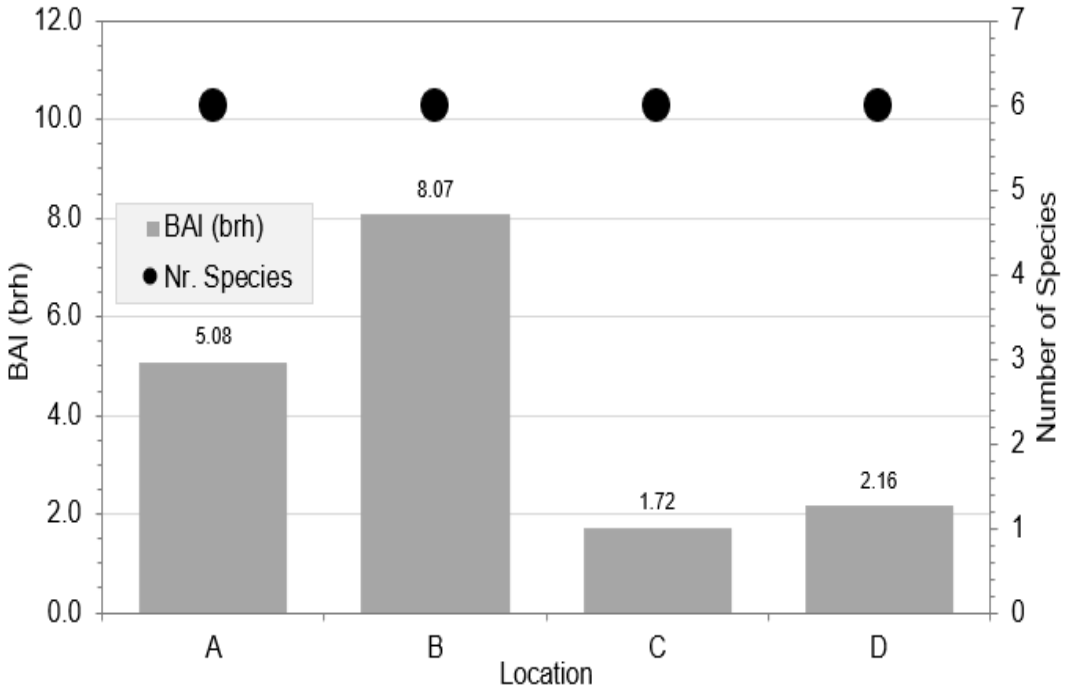


Figure 13. Spatial variation in bat activity recorded during static monitoring surveys in 2021.

6.35 Figure 14 summarises the BAI (brh) recorded across the whole static monitoring survey at each static location for bat species recorded during surveys. Common pipistrelle activity was highest at static location B (3.82 brh) and lowest at static location D (0.84 brh) across all surveys. Soprano pipistrelle activity was highest at static location B (3.07 brh) and lowest at static location C (0.24 brh) (Figure 14).

6.36 Figure 14 also summarises the BAI (brh) recorded across the whole static monitoring survey at each static location for *Myotis* species, noctule and brown long-eared. *Myotis* species activity was highest at static location B (0.88 brh) and lowest at static location C (0.08 brh) across all surveys. Noctule activity was highest at static location B (0.24 brh) and lowest at static location A (0.03 brh) across all surveys. Brown long-eared activity was highest at static location C (0.08 brh) and lowest at static location A (0.01 brh) (Figure 14).

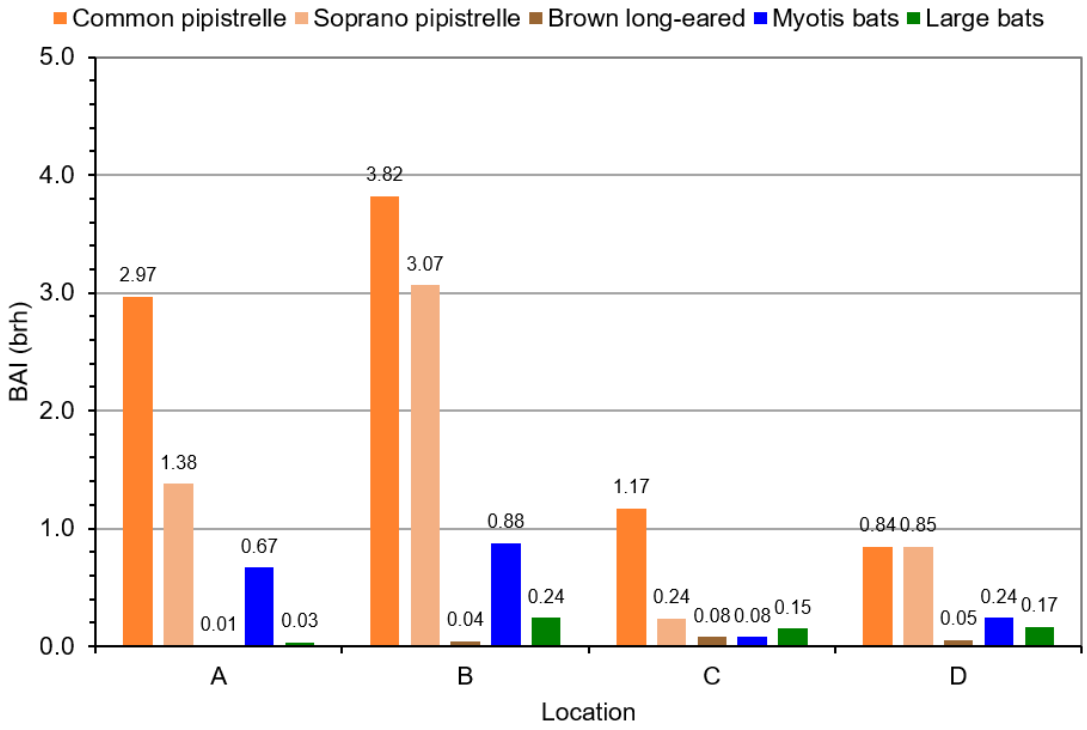


Figure 14. Spatial variation in common and soprano pipistrelle activity recorded during the static monitoring survey in Area 1.

6.37 Figure 15 summarises the lesser horseshoe BAI (brh) recorded across the whole static monitoring survey at each static location. The BAI recorded for lesser horseshoe was highest at static location A (0.029 brh) and lowest at static location C (0.002 brh) across all surveys.

6.38 Overall, there are no significant differences between bat activity at each static monitoring location for any species.

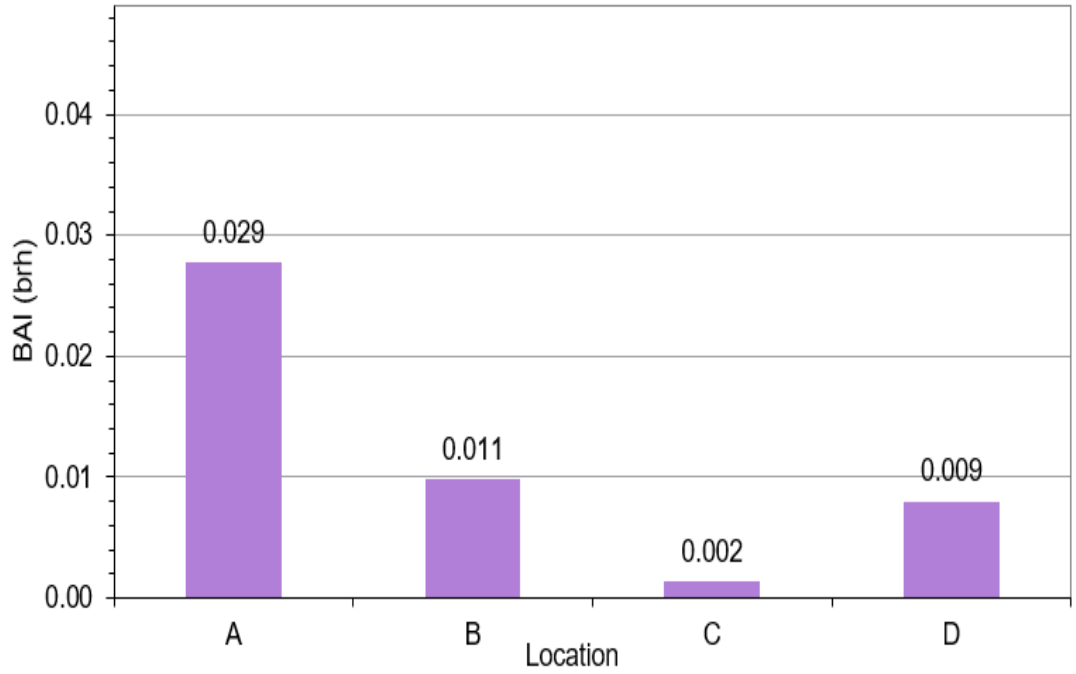


Figure 15. Spatial variation in lesser horseshoe activity recorded during the static monitoring survey in 2021.

6.39 Numerous social calls from common and soprano pipistrelle were recorded during static monitoring surveys. Figure 16 summarises the percentage BAI (brh) contributed by pipistrelle social calls recorded across the whole static monitoring survey at each static location.

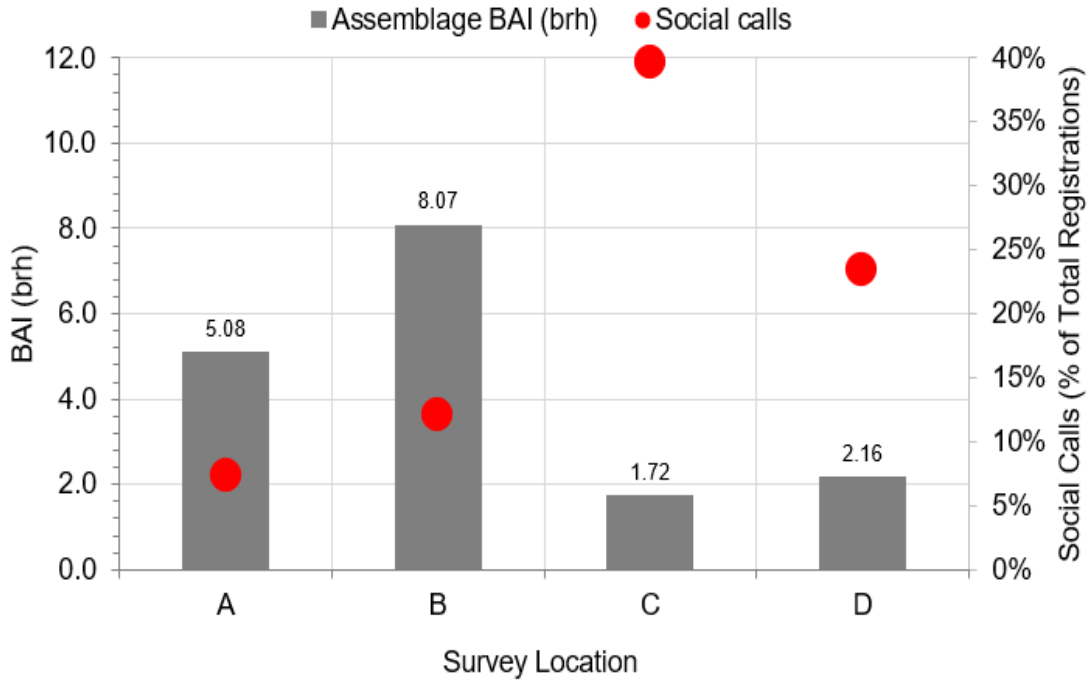


Figure 16. Percentage BAI (brh) contributed by pipistrelle social calls recorded across the whole static monitoring survey at each static location.

6.40 The highest percentage BAI (brh) contributed by pipistrelle social calls was recorded at static location C (0.68 brh), with pipistrelle social calls providing 40% of registrations. The highest number of pipistrelle social calls were recorded at static location B (0.98 brh), though these provided only 12% of total registrations (BAI).

Nocturnal Emergence/ Re-entry Surveys

6.41 Nocturnal emergence/ re-entry surveys of trees T76, T165, T168, H167.1, T170, G27c.2, G27c.3, G27d.1 and G27d.2 categorised as having moderate bat roost habitat suitability and trees T160, T166 and T178 categorised as having high bat roost habitat suitability did not identify the presence of any tree roosts.

6.42 During the third nocturnal emergence survey of tree T172 undertaken on 18th August 2021, two soprano pipistrelles were recorded emerging from the trunk cavity on the north-west aspect, located at approximately 5.0 m height (Figure 17). The roost feature entry point is north-west facing and shown in close up in Figure 18.



Figure 17. Tree T172 with roost feature located at 5.0m circled. Taken viewing south.



Figure 18. Trunk cavity on north-west aspect of alder tree T172.

6.43 The soprano pipistrelles were noted foraging in the area around tree T172 and along the associated trees and hedgerows to the east and west and further along the woodland edge to the west. The first soprano pipistrelle was noted emerging at 20:45 hrs, 12 minutes after sunset and the second soprano pipistrelle was noted emerging at 20:53 hrs, 20 minutes after sunset. The sonograms correlating with the surveyor observations of the two emergence times is provided at Appendix C and confirms the identification of soprano pipistrelle roosting. Social calls were noted from the bats after emergence and during foraging.

6.44 Bat roosting was only noted at tree T172 during the third nocturnal emergence/ re-entry survey. Due to only two individuals being recorded emerging from the roost site during the third nocturnal emergence/ re-entry survey visit undertaken in August 2021, the roost has been characterised as a day roost. A day roost is a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer.

6.45 During the nocturnal emergence/ re-entry surveys several bat species were recorded foraging and commuting around tree locations. Bat species recorded during nocturnal emergence/ re-entry surveys included species noted within desk study records for the site and locality:

- Common pipistrelle (EPS, WCA5, S7);
- Soprano pipistrelle (EPS, WCA5, S7);
- Pipistrelle species (EPS, WCA5, S7);
- Noctule (EPS, WCA5, S7);
- Brown long-eared (EPS, WCA5, S7);
- *Myotis* species (EPS, WCA5); and
- Lesser horseshoe (EPS, WCA5, S7, LBAP).

6.46 Surveyors noted frequent foraging activity around trees and along hedgerow and mature tree boundary features in the north of the site. In general, foraging and commuting activity was recorded along linear features such as woodland edge habitat and hedgerow and mature treelines and above and round tree canopies where invertebrate prey abundance and diversity is likely to be higher than within open grassland grazing and arable fields. Bat activity observations recorded during nocturnal emergence/ re-entry surveys are illustrated on the Bat Nocturnal Emergence/ Re-entry Survey General Observations and Results Plan G8745.030.

6.47 Lesser horseshoe contacts were noted along the hedgerow in the north of the site associated with tree T178 and the old green lane. Contacts from lesser horseshoe and brown long-eared bats were less numerous than those of other species, which may be expected given the rarity of lesser horseshoe and the quieter calls of brown long-eared. Noctule were frequently noted foraging high above the site or commuting across the site along treelines and hedgerows. Common and soprano pipistrelle activity was most abundantly recorded.

6.48 First and last contact times for bat species recorded during nocturnal emergence/ re-entry surveys can be indicative of potential distance of trees from roost sites for individual bats recorded. Typical emergence times for the species recorded during nocturnal emergence/ re-entry surveys include:

- Noctule typically emerge 5-10 minutes after sunset (occasionally just before);
- Common and soprano pipistrelle typically emerge 20-30 minutes after sunset (occasionally just before);
- *Myotis* species typically emerge 30-60 minutes after sunset (dependent on species);
- Brown long-eared typically emerge 45-65 minutes after sunset; and
- Lesser horseshoe typically emerge 40-50 minutes after sunset.

6.49 Bats are likely to use a variety of roost sites within the wider landscape depending on variables such as their age, sex and roost habitat preferences and the season. Timings of first and last contacts for all bat species recorded by surveyors during the nocturnal emergence/ re-entry surveys, indicate bats are roosting within the surrounding locality.

7.0 Evaluation

7.1 During nocturnal emergence/ re-entry surveys of trees within the site a single day roost of soprano pipistrelle was recorded in tree T172. Whilst no additional roosts were identified during nocturnal emergence/ re-entry surveys, the trees and habitats within the site likely fall within the Core Sustenance Zones (CSZs) for roost sites within the wider landscape and bats within these populations could use the identified trees as part of their wider roost habitat resource. A precautionary roost score has been assigned for each species due to the absence of detailed roost records. The precautionary roost score has been based on roost resources within the site and the likely presence of roost sites within the site locality.

7.2 Based on data analysis to date, the evaluation of the site is of Local importance for commuting and foraging common and soprano pipistrelle, noctule, brown long-eared, *Myotis* species and lesser horseshoe bats.

7.3 Tables 12 and 13 summarise this evaluation for commuting and foraging bats respectively, applying the framework set out in Chapter 5.0.

Table 12: Evaluation of the site for commuting bats.

Species (Score)	Number of Bats (Score)	Roosts/Potential Roosts Nearby (Score)	Type And Complexity of Linear Features (Score)	Value (Score)
Common pipistrelle (2)	Small number of bats (10)	Moderate/unknown number (4)	Large field sizes with woodland edge habitat and well-grown and well-connected hedgerows with mature trees (4)	Local (20)
Soprano pipistrelle (2)	Small number of bats (10)	Moderate/unknown number (4)	Large field sizes with woodland edge habitat and well-grown and well-connected hedgerows with mature trees (4)	Local (20)
Noctule (5)	Individual bats (5)	Moderate/unknown number (4)	Large field sizes with woodland edge habitat and well-grown and well-connected hedgerows with mature trees (4)	Local (18)
Brown long-eared (2)	Small number of bats (10)	Moderate/unknown number (4)	Large field sizes with woodland edge habitat and well-grown and well-connected hedgerows with mature trees (4)	Local (20)
Myotis species (5)	Individual bats (5)	Moderate/unknown number (4)	Large field sizes with woodland edge habitat and well-grown and well-connected hedgerows with mature trees (4)	Local (18)
Lesser horseshoe (5)	Individual bats (5)	Moderate/unknown number (4)	Large field sizes with woodland edge habitat and well-grown and well-connected hedgerows with mature trees (4)	Local (18)

Table 13: Evaluation of the site for foraging bats.

Species (Score)	Number of Bats (Score)	Roosts/Potential Roosts Nearby (Score)	Type And Complexity of Features (Score)	Value (Score)
Common pipistrelle (2)	Small number of bats (10)	Moderate/unknown number (4)	Larger or connected woodland blocks, mixed agriculture (4)	Local (20)
Soprano pipistrelle (2)	Small number of bats (10)	Moderate/unknown number (4)	Larger or connected woodland blocks, mixed agriculture (4)	Local (20)
Noctule (5)	Individual bats (5)	Moderate/unknown number (4)	Larger or connected woodland blocks, mixed agriculture (4)	Local (18)
Brown long-eared (2)	Small number of bats (10)	Moderate/unknown number (4)	Larger or connected woodland blocks, mixed agriculture (4)	Local (20)
Myotis species (5)	Individual bats (5)	Moderate/unknown number (4)	Larger or connected woodland blocks, mixed agriculture (4)	Local (18)
Lesser horseshoe (5)	Individual bats (5)	Moderate/unknown number (4)	Larger or connected woodland blocks, mixed agriculture (4)	Local (18)

8.0 Conclusions

Species Composition

8.1 Species diversity within the site during activity transect surveys, static detector monitoring surveys and nocturnal emergence/ re-entry surveys was relatively high. At least six species were identified throughout surveys though common and soprano pipistrelle activity was dominant within the site. The site supports a range of both common species (common pipistrelle, soprano pipistrelle and brown long-eared) and rarer species (noctule, *Myotis* species and lesser horseshoe) as categorised by Wray *et al*. 2010 according to distribution and rarity. Whilst *Myotis* species were not identified to species level, there is potential for the four species recorded within desk study data (Daubenton's bat, whiskered bat, Brandt's bat and Natterer's bat) to be present within the site and the surrounding locality.

8.2 The species assemblage recorded reflects the habitat types sampled. Dominance of common pipistrelle and frequency of soprano pipistrelle activity within the site correlates with the presence of suitable pipistrelle roost habitat located within 2 km of the site. Higher activity levels of common pipistrelle and soprano pipistrelle are also illustrative of the flexible habitat requirements of these species. Common and soprano pipistrelles are found in almost all habitats, though with preference for woodland and water when available.

8.3 *Myotis* species and noctule were occasionally recorded during static detector monitoring surveys and activity transect surveys and were observed during nocturnal emergence/ re-entry surveys. Occasional occurrence of noctule and *Myotis* species is indicative of these species preference for higher quality foraging habitat including expanses of woodland, riparian habitats and tree lines. Noctule often also rely on a high density of high-flying insects. Whilst the site has some small areas of woodland habitat and numerous mature hedgerows and treelines, larger expanses of more mature woodland likely to support a higher abundance of invertebrate prey are present within the wider landscape to the south and west.

8.4 Brown long-eared were recorded within the site during static detector monitoring surveys and nocturnal emergence/ re-entry surveys. Brown long-eared bat can be relatively difficult to detect due to their low amplitude, particularly with increased background noise when walking through crops or long grass. For evaluation purposes a precautionary number of bats score has been assigned for brown long-eared, accounting for overall detectability. Brown long-eared generally favour deciduous woodland within 3 km of their roost sites and rarely cross open areas.

8.5 Lesser horseshoe were recorded within the site during static detector monitoring surveys and nocturnal emergence/ re-entry surveys. Lesser horseshoe can be relatively difficult to detect due to their quiet calls rarely being detected from >5.0 m distance. The site is located at the edge of lesser horseshoe population ranges in north-east Wales and for evaluation purposes a number of bats score has been assigned, accounting for overall detectability and rarity. Lesser horseshoe favour habitats characterised by structural richness, largely including broad-leaved woodland and wooded riparian corridors in addition to mature treelines and hedgerows. Lesser horseshoe often forage within 2.5 km of their roost sites and during commuting follow linear structures such as hedges, woodland edges and ditches.

Foraging and Commuting Habitat

8.6 Bat foraging and commuting activity recorded during activity transect surveys was greatest during Visit 5 in August 2021 (67.53 brh) and lowest during Visit 1 in April 2021 (3.31 brh). The lowest activity levels during April may be anticipated due to the generally colder conditions during early spring and as bats are less active whilst transitioning after hibernation. The highest levels of bat foraging and commuting activity during activity transect surveys was recorded during Visit 5 in August 2021, which may correlate to improved weather conditions during the summer months allowing for greater prey abundance and as bat populations may be higher during this period following dispersal of maternity roosts in the wider landscape. However, given the limitations to the surveys in September and October it is considered that foraging and commuting activity may have been higher during these months than reflected in the activity transect data, particularly when reviewed with static monitoring data.

8.7 During static monitoring survey the BAI was greatest for Visit 7 in October 2021 (10.06 brh) and lowest for Visit 1 in April 2021 (2.15 brh). Overall, there are no significant differences between bat activity across the seasons. However, pipistrelle social calls contributed between 20-34% of registrations during August, September and October 2021 during static monitoring survey. This may reflect bats being more abundant in the locality following dispersal of maternity roosts in the wider landscape and the autumnal mating period resulting in increased territorial behaviour and attraction of mates. The highest number of pipistrelle social calls were recorded during Visit 7 in October 2021.

8.8 Despite limitations associated with the detector recording at static location B the overall BAI was greatest at static location B across the surveys than at all other static locations. The BAI recorded at static location B demonstrates the value of the old green lane feature within the site for foraging and commuting bats. Whilst the BAI was lowest at static location C, this was directed into the old green lane and activity levels recorded likely reflect the habitat preferences of species within site. For example, brown long-eared activity was highest at static location C and this species is strongly associated with broad-leaved trees, particularly preferring cluttered understorey, which would be provided within the old green lane.

8.9 Intensive arable habitat is dominant within the majority of the site and bat activity was generally distributed along linear boundary features interconnecting fields. Highest levels of activity were noted along the woodland edge habitat in the north of the site following the ditch, along the woodland edge and mature trees in the south-west of the site and in particular along the old green lane, with mature double hedgerows and numerous mature trees traversing the site. The old green lane traversing the site provides a valuable landscape feature for bats foraging over and above the mature tree canopies and commuting around the site and wider landscape. Habitat diversity across the site is limited however, the numerous mature hedgerows and tree canopies provide cover and are likely to support a higher abundance of invertebrate prey for foraging and commuting bats.

8.10 The predominant habitats lost within the proposed development include arable fields and improved and poor semi-improved grassland, with limited floristic diversity within the fields and margins. The use of the fields for arable crops also increases the potential for use of herbicides and pesticides, which further reduces floristic diversity and prey abundance. Whilst these habitats are poor for bat foraging and commuting, they connect to edge habitat used by bats within the site that is largely undisturbed.

8.11 The site is adjoined by the A525 (Ruthin Road) to the north and to the west is separated from the wider arable landscape by Berse Lane and the A483 dual carriageway. However, the site does have direct connectivity to rural habitats and riparian habitats associated with the River Clywedog to the south of the site and the bounding B5099 (Bersham Road). The numerous linear hedgerows, ditch features, mature trees and woodland edge habitat within the site are used by a variety of bat species within the immediate locality. Whilst the site may not provide optimum foraging opportunities for bats, boundary habitats likely contribute to the local bat populations CSZs and provide valuable commuting features.

8.12 Based on preliminary data analysis, the evaluation of the site is of Local importance for commuting and foraging common and soprano pipistrelle, noctule, brown long-eared, *Myotis* species and lesser horseshoe bats.

Roost Habitat

8.13 The total number of trees identified from the GLTA as having low, moderate or high roost habitat suitability with regard to bats that are located within impacted areas associated with the proposed development has yet to be determined. However, it is likely that removal and pruning of some trees with bat roost habitat suitability will be required to facilitate the proposed development.

8.14 Potential roost habitat suitable for bats is provided by trees within and adjacent to the site and by residential buildings nearby and within the site. A single soprano pipistrelle day roost was recorded at tree T172 located within the site during nocturnal emergence/ re-entry surveys.

8.15 Bats are transitionary in their use of tree roost habitat and also roost opportunistically when seeking shelter or refuge. Trees within the site with roost habitat suitability may therefore be used by bats within the wider landscape as part of their wider roost habitat resource.

8.16 The CSZs for the six species recorded within the site during nocturnal emergence/ re-entry surveys, activity transect surveys and static detector monitoring surveys as sited in the BCT 2016 Guidelines include:

- Common pipistrelle - 2 km
- Soprano pipistrelle - 3 km
- Noctule - 4 km
- Brown long-eared - 3 km
- *Myotis* species - 1-4 km
- Lesser horseshoe - 2 km

8.17 Given these six species have been recorded within the site, it can be concluded that the site falls within the CSZ for roosts associated with these species present in the wider landscape. Habitats within the site are therefore of value to supporting bat roosts within the wider landscape and the proposed development may impact roost viability, sustainability and resilience within the site and surrounding locality.

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APPENDIX A: Preliminary Ground Level Roost Assessment of Trees Data Table

Table A1. Preliminary Ground Level Tree Assessment data for trees identified as having bat roost habitat suitability during 2021.

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G174.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31319 50006	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 800 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present though none are evident, the tree appears to have some superficial damage in the canopy with pegs of dead wood where branches have snapped and withered but is largely in good health.	Moderate
G174.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31307 50021	Ash Fraxinus excelsior. 14.0 m approximate height. 800 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Leafy ivy and foliage obscuring view of stem in places. Size and age where PRFs may be present though none are evident, the tree appears to have no damage or decay in the canopy and is in good health.	Low
G174.3	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31292 50030	Ash Fraxinus excelsior. 18.0 m approximate height. 800 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Leafy ivy and foliage obscuring view of stem in places. Size and age where PRFs may be present though none are evident, the tree appears to have no damage or decay in the canopy and is in good health.	Low
G27a.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31144 49733	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Size and age where more PRFs may be present though the tree appears to be in good health.	Low

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G27a.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31137 49733	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Size and age where more PRFs may be present though the tree appears to be in good health.	Low
G27b.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31387 49717	Pedunculate oak Quercus robur. 16.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Size and age where PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped but is largely in good health.	Moderate
G27b.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31366 49726	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Wound, east limb south aspect, 4.0 m height. Wound, west limb south aspect, 4.0 m height. Possibility of foliage obscured PRFs.	PRF on east limb extends for ~1.0 m. Foliage and leafy ivy obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped but is largely in good health.	Moderate
G27b.3	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31342 49736	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Branch cavity, south aspect, 4.0 m height. Branch cavity, south aspect, 9.5 m height. Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Size and age where more PRFs may be present though the tree appears to be in good health. Branch cavities appear to be shallow from ground level.	Low

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G27c.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31745 49763	Ash Fraxinus excelsior. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem. Ivy does not form a PRF in itself. Size and age where PRFs may be present though none are evident, though the tree has ash die back.	Low
G27c.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31749 49772	Ash Fraxinus excelsior. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Trunk cavity, north aspect, 1.5 m height. Possibility of foliage obscured PRFs.	Trunk cavity formed from basal decay but obscured by adjacent holly branches. Too high to provide thermal dynamically stable hibernation habitat and entrance is partially obscured by holly making access less desirable. Not likely suitable for more than small numbers of bats or opportunistic individuals given obstruction and height. Light cover of leafy ivy obscuring view of stem 1.5-18.0 m. Ivy does not form a PRF in itself.	Moderate
G27c.3	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31758 49775	Ash Fraxinus excelsior. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Branch cavity, north aspect, 5.0 m height. Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem. Ivy does not form a PRF in itself. Tree tagged 1082.	Moderate
G27c.4	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31764 49778	Ash Fraxinus excelsior. 12.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Transverse-snaps x2, north aspect, 5.0 m height. Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem. Ivy does not form a PRF in itself. Tree has ash die back and may have PRFs present as a result, though none are evident. Recently broken limbs in the canopy appear to have yet developed cavities due to decay.	Low

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G27c.5	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31628 49729	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Transverse-snap, south aspect, 6.0 m height. Tear-out, west aspect, 6.0 m height. Tear-out, west aspect, 6.0 m height. Size and age.	Size and age where PRFs may be present though only a couple evident from ground level and these appear to likely be minor superficial damage with shallow or no cavities present. Tree appears in good health.	Low
G27c.6	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31607 49732	Pedunculate oak Quercus robur. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Leafy foliage obscuring view of stem in places. Size and age where PRFs may be present though only minor superficial damage with small broken branches at 3.0 m height but appears in good health.	Low
G27c.7	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31561 49727	Pedunculate oak Quercus robur. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Transverse-snap, north aspect, 3.5 m height. Possibility of foliage obscured PRFs. Size and age.	Leafy ivy and foliage obscuring view of stem in places. Size and age where PRFs may be present though only one evident from ground level. The tree is tagged 1273 appears to have minor superficial damage with small broken branches and some deadwood in the canopy but appears in good health.	Moderate
G27c.8	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31453 49722	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Squirrel hole, south-west aspect, 2.5 m height. Branch cavity, south-west aspect, 9.0 m height. Possibility of foliage obscured PRFs. Size and age.	Leafy ivy and foliage obscuring view of stem in places. Size and age where additional PRFs may be present particularly as a couple are evident from ground level.	High

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G27c.9	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31429 49711	Pedunculate oak Quercus robur. 12.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present though none are evident, the tree appears to have some superficial damage in the canopy with pegs of dead wood where branches have snapped and withered but is largely in good health.	Moderate
G27c.10	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31414 49711	Pedunculate oak Quercus robur. 14.0 m approximate height. 1050 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present though none are evident, the tree appears to have some superficial damage in the canopy with pegs of dead wood where branches have snapped but is largely in good health.	Moderate
G27d.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31830 49792	Ash Fraxinus excelsior. 14.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Trunk cavity, north aspect, 1.5-2.0 m height. Possibility of foliage obscured PRFs.	Four large stems. Trunk cavity formed from wound decay. Not likely suitable for more than small numbers of bats or opportunistic individuals. Light cover of leafy ivy obscuring view of stem 3.0-13.0 m. Ivy does not form a PRF in itself.	Moderate
G27d.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31878 49809	Pedunculate oak Quercus robur. 14.0 m approximate height. 550 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Leafy ivy and foliage obscuring view of large double stems in places. Size and age where PRFs may be present though none are evident, the tree appears to have no damage or decay in the canopy and is in good health.	Moderate

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G35.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31227 49266	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 450 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches but otherwise appears in good health.	Low
G35.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31235 49269	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 450 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches but otherwise appears in good health.	Low
G35.3	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31245 49272	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 450 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches but otherwise appears in good health.	Low
G49.1	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31317 49649	Holly Ilex aquifolium. 14.0 m approximate height. 650 mm approximate stem dbh. Mature. In good condition.	Tear-out, north aspect, 5.5 m height. Branch cavity, north-east aspect, 5.0 m height.	PRFs appear well occluded from ground level though cavities may be present. The tree appears largely in good health.	Low
G54.1	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31377 49636	Pedunculate oak Quercus robur. 14.0 m approximate height. 780 mm approximate stem dbh. Mature. In good condition.	Branch cavity, north limb south-west aspect, 6.0 m height. Transverse-snap, south aspect, 8.0 m height. Transverse-snap, south aspect, 6.0 m height. Transverse-snap, central limb north aspect, 3.0 m height. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present, and a few are evident from ground level. A few PRFs that may allow large numbers of bats to roost.	High

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
G54.2	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31367 49640	Pedunculate oak Quercus robur. 16.0 m approximate height. 870 mm approximate stem dbh. Mature. In poor condition.	Transverse-snaps, north-east aspect, 14.0 m height. Possibility of foliage obscured PRFs. Size and age.	Transverse snaps include minor broken branches, though PRFs appear fairly small and may not extend to cavities. Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood but is largely in good health.	Moderate
H167.1	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31564 49925	Pedunculate oak Quercus robur. 5.0 m approximate height. 500 mm approximate stem dbh. Mature. In good condition.	Branch cavity, south aspect, 3.0 m height. Possibility of foliage obscured PRFs. Size and age.	Light cover of leafy ivy obscuring view of stem. Ivy does not form a PRF in itself. Size and age where PRFs may be present though none are evident, the tree appears to have some superficial damage in the canopy.	Moderate
T9	Category C trees of low quality with an estimated lifespan of at least 10 years or young trees with a stem diameter below 150 mm. Trees with no material conservation or other cultural value. SJ 31093 49497	Pedunculate oak Quercus robur. 6.0 m approximate height. 610 mm approximate stem dbh. Very mature. In poor condition.	Lifted bark, east aspect, 4.0 m height. Wound, east aspect, 5.0 m height. Size and age.	Tree is tagged 1176. Wound appears shallow from ground level. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy.	Low
T10	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31105 49443	Pedunculate oak Quercus robur. 18.0 m approximate height. 850 mm approximate stem dbh. Mature. In good condition.	Pruning-cut, south aspect, 8.0 m height. Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches but otherwise appears in good health. Pruning-cut appears unlikely to have much depth from ground level.	Low

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
T11	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31119 49446	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches but otherwise appears in good health.	Low
T14	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31216 49463	Pedunculate oak Quercus robur. 19.0 m approximate height. 1120 mm approximate stem dbh. Very mature. In good condition.	Branch cavity, north-west aspect, 8.0 m height. Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches and dead wood.	Moderate
T17	Category C trees of low quality with an estimated lifespan of at least 10 years or young trees with a stem diameter below 150 mm. Trees present in groups of woodlands, but without this conferring on them significantly greater collective landscape value; and/or tree offering low or only temporary/transient landscape benefits. SJ 31227 49538	Field maple Acer campestre. 14.0 m approximate height. 510 mm approximate stem dbh. Mature. In fair condition.	Trunk cavity, south aspect, 5.5 m height. Trunk cavity, north-west aspect, 4.0 m height. Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Of an age where more PRFs may be present in addition to the few noted small PRFs.	Moderate
T18	Category U trees in such a condition that their existing value would be lost within 10 years, and which should, in the current context be removed for arboricultural reasons. SJ 31226 49550	Ash Fraxinus excelsior. 22.0 m approximate height. 1500 mm approximate stem dbh. Very mature. In poor condition.	Branch cavity, south aspect, upwards facing, 16.0 m height. Possibility of foliage obscured PRFs. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches.	Moderate

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
T20	Category U trees in such a condition that their existing value would be lost within 10 years, and which should, in the current context be removed for arboricultural reasons. SJ 31247 49622	Ash Fraxinus excelsior. 18.0 m approximate height. 800 mm approximate stem dbh. Very mature. In poor condition.	Wound, north-east aspect, 6.0 m height. Possibility of foliage obscured PRFs. Size and age.	Birds nest within trunk wound. Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Size and age where more PRFs may be present. The tree appears to have some damage in the canopy with occasional, small, snapped branches and dead wood. Tree tagged 1332.	Moderate
T24	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31348 49724	Pedunculate oak Quercus robur. 20.0 m approximate height. 1500 mm approximate stem dbh. Very mature/veteran. In good condition.	Branch cavity, north aspect, 6.5 m height. Branch cavity, south-east aspect, 4.0 m height. Transverse-snap, south-west aspect, 9.5 m height. Trunk cavity, north-west aspect, 5.0 m height. Squirrel hole, north-west aspect, 7.0 m height. Woodpecker holes x2, west limb north-west aspect, 9.0 m height. Size and age.	Size and age where more PRFs may be present. The tree appears to have several PRFs with capacity for large cavities suitable to support large numbers of bats or maternity roosting. Tree appears in good health.	High
T36	Category U trees in such a condition that their existing value would be lost within 10 years, and which should, in the current context be removed for arboricultural reasons. SJ 31186 49257	Ash Fraxinus excelsior. 18.0 m approximate height. 840 mm approximate stem dbh. Very mature. In poor condition.	Trunk cavity, north aspect, 2.5 m height. Possibility of foliage obscured PRFs.	Foliage leafy obscuring view of stem in places. The tree appears to have some damage and disease in the canopy with occasional, small, snapped branches and some decaying wood and wounds from ash die back.	Moderate

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T37	Category U trees in such a condition that their existing value would be lost within 10 years, and which should, in the current context be removed for arboricultural reasons. SJ 31183 49256	Ash Fraxinus excelsior. 12.0 m approximate height. 640 mm approximate stem dbh. Very mature. In poor condition.	Wound, west aspect, 4.0 m height. Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. The tree appears to have some damage and disease in the canopy with occasional, small, snapped branches and some decaying wood on a main branch from 4.0 m-6.0 m. Wound appears unlikely to have much depth from ground level. Tree has ash die back.	Low
T41	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31231 49515	Pedunculate oak Quercus robur. 16.0 m approximate height. 780 mm approximate stem dbh. Mature. In fair condition.	Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Ivy does not provide a PRF in itself. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with occasional, small, snapped branches and dead wood.	Moderate
T44	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31241 49569	Pedunculate oak Quercus robur. 14.0 m approximate height. 1000 mm approximate stem dbh. Very mature. In fair condition.	Trunk cavity, north aspect, 2.5 m height. Transverse-snap, east aspect, 7.5 m height. Transverse-snap, west aspect, 9.0 m height. Possibility of foliage obscured PRFs. Size and age.	Foliage and leafy ivy obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage with dead wood in the canopy in addition to the few noted small PRFs.	Moderate
T45	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31239 49577	Pedunculate oak Quercus robur. 16.0 m approximate height. 520 mm approximate stem dbh. Mature. In good condition.	Lifted bark, south-west aspect, 6.0 m height. Branch cavity, south-east aspect, 4.5 m height. Transverse-snap, north-west aspect, 5.0 m height. Possibility of foliage obscured PRFs.	Foliage and leafy ivy obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy in addition to a few small PRFs. The tree is largely in good health.	Moderate

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T46	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31250 49605	Sycamore Acer pseudoplatanus. 17.0 m approximate height. 810 mm approximate stem dbh. Mature. In good condition.	Wound, north aspect, 4.0 m height. Wound, north aspect, 4.0 m height. Possibility of foliage obscured PRFs. Size and age.	Wounds appear small from ground level. Foliage and leafy ivy obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood which is well occluded. The tree is largely in good health.	Moderate
T51	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31420 49684	Pedunculate oak Quercus robur. 16.0 m approximate height. 1000 mm approximate stem dbh. Very mature. In fair condition.	Branch cavity, south-west aspect, 8.0 m height. Possibility of foliage obscured PRFs. Size and age.	Located within a former pond area. Branch cavity is a fine split, likely with limited depth. Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present though only one is evident, the tree appears to have some superficial damage in the canopy with pegs of dead wood where branches have snapped but is largely in good health.	Moderate
T55	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31356 49643	Pedunculate oak Quercus robur. 12.0 m approximate height. 840 mm approximate stem dbh. Mature. In fair condition.	Tear-out, north-west aspect, 6.5 m height. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present though not evident from ground level. Tear-out is on a main limb with a swelling in the branch, possibly providing a cavity large enough for small numbers of bats. The tree appears to have some superficial damage in the canopy with pegs of dead wood where branches have snapped but is largely in good health.	Moderate

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T57	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31334 49602	Pedunculate oak Quercus robur. 10.0 m approximate height. 1250 mm approximate stem dbh. Mature. In good condition.	Branch cavity, north-west aspect, 6.0 m height. Pruning-cut, north-west aspect, 6.0 m height. Possibility of foliage obscured PRFs. Size and age.	Branch cavity has some signs of decay. Both PRFs appear fairly small and may not extend to cavities. Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped but is largely in good health.	Moderate
T76	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31639 49702	Pedunculate oak Quercus robur. 14.0 m approximate height. 740 mm approximate stem dbh. Mature. In good condition.	Branch cavity, east limb south-west aspect, 6.0 m height. Possibility of foliage obscured PRFs. Size and age.	Leafy ivy and foliage obscuring view of stem in places. Size and age where PRFs may be present though only one evident from ground level. The tree appears to have minor superficial damage with small broken branches and some deadwood in the canopy but appears in good health.	Moderate
T91	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31229 50253	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 1180 mm approximate stem dbh. Very mature. In fair condition.	Wound, east branch west aspect, 3.5 m height. Tear-outs, all aspects, 5.0 m height. Size and age.	Tree near Berse Lane with large, even canopy. The wound on the eastern limb may extend into the main branch. Several small tear-outs are present that may provide cavities and given the size and age and there may be more PRFs present in the canopy not evident from ground level.	High
T110	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31089 50019	Ash Fraxinus excelsior. 10.0 m approximate height. 750 mm approximate stem dbh. Very mature. In fair condition.	Branch cavity, south-west aspect, 4.5 m height. Longitudinal crack, south-west aspect, 3.5 m height.	Branch cavity does not have signs of decay and longitudinal crack is narrow. Both PRFs appear fairly small and may not extend to cavities. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped.	Low

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T117	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31220 50040	Pedunculate oak Quercus robur. 16.0 m approximate height. 1120 mm approximate stem dbh. Very mature. In good condition.	Branch cavity, north branch east aspect, 4.0 m height. Branch cavity, north-east aspect, 4.0 m height. Size and age.	Tree has tag 1194. The branch cavities are only small. Small amounts of deadwood are present in the canopy. Tree is of a size and age where PRFs may be present though not evident from ground level.	Moderate
T135	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees with clearly identifiable conservation or other cultural benefits. SJ 31244 49765	Field maple Acer campestre. 7.0 m approximate height. 490 mm approximate stem dbh. Very mature. In fair condition.	Trunk cavity, north aspect, 2.5 m height. Branch cavity, north aspect, 4.0 m height. Possibility of foliage obscured PRFs.	Both PRFs appear fairly small and may not extend to cavities. The branch cavity is on a narrow branch. Foliage leafy and obscuring view of stem in places. Tree tagged 1204.	Moderate
T136	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees with clearly identifiable conservation or other cultural benefits. SJ 31241 49782	Ash Fraxinus excelsior. 10.0 m approximate height. 820 mm approximate stem dbh. Very mature. In fair condition.	Branch cavity, north-west aspect, 3.0 m height. Trunk cavity, north-west aspect, 3.5 m height.	Both PRFs appear fairly small and shallow from ground level and may not extend to cavities large enough for roosting bats.	Low
T138	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31244 49847	Pedunculate oak Quercus robur. 17.0 m approximate height. 860 mm approximate stem dbh. Mature. In fair condition.	Branch cavity, south aspect, 3.0 m height. Branch cavity, north aspect, 4.5 m height. Branch cavity, north aspect, 4.5 m height. Possibility of foliage obscured PRFs. Size and age.	PRFs appear fairly small and may not extend to cavities. Foliage leafy and obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped but is largely in good health.	Moderate
T139	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31244 49854	Pedunculate oak Quercus robur. 17.0 m approximate height. 730 mm approximate stem dbh. Mature. In fair condition.	Trunk cavity, north aspect, 7.5 m height. Branch cavity, north aspect, 5.0 m height. Possibility of foliage obscured PRFs. Size and age.	PRFs appear fairly small and may not extend to cavities. Foliage leafy and obscuring view of stem in places. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped but is largely in good health.	Moderate

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T140	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31242 49872	Pedunculate oak Quercus robur. 18.0 m approximate height. 910 mm approximate stem dbh. Mature. In fair condition.	Branch cavity, south limb north aspect, 4.0 m height. Transverse-snap, east limb north aspect, 8.0 m height. Size and age.	PRFs appear fairly small though may extend to cavities. Size and age where more PRFs may be present. The tree appears to have some superficial damage in the canopy with minor dead wood where branches have snapped but is largely in good health.	Moderate
T146	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31248 50232	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 1560 mm approximate stem dbh. Very mature. In poor condition.	Pruning-cut, north-west aspect, 4.0 m height. Size and age.	Pruning-cut is large, and decay has set in. Tree is of a size and age where there may be more PRFs present in the canopy not evident from ground level.	High
T148	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31266 50248	Sycamore Acer pseudoplatanus. 18.0 m approximate height. 1060 mm approximate stem dbh. Very mature. In good condition.	Pruning-cut, south-west aspect, 3.5 m height. Trunk cavity, east aspect, 3.0 m height. Size and age.	Pruning cut may be used by squirrels for nesting/shelter. The tear-out is large and exposes the heartwood. Tree is of a size and age where there may be more PRFs present in the canopy not evident from ground level.	High
T160	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31686 49839	Sycamore Acer pseudoplatanus. 19.0 m approximate height. 1200 mm approximate stem dbh. Mature. In fair condition.	Trunk cavity, east limb west aspect, 5.0-6.0 m height. Size and age.	Main stem with decaying and damaged section, possible trunk cavity is large and extends within. Tree is also of a size and age where PRFs may be present though not evident from ground level. Tree is tagged 1247 (eastern aspect).	High
T165	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31619 49939	Pedunculate oak Quercus robur. 16.0 m approximate height. 800 mm approximate stem dbh. Mature. In good condition.	Branch cavity, south aspect, 2.5 m height. Branch cavity, south aspect, 3.5 m height. Size and age.	The branch cavities are only small. Small amounts of deadwood are present in the canopy though superficial. Tree is of a size and age where PRFs may be present though not evident from ground level.	Moderate

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T166	Category B trees of moderate quality with an estimated lifespan of at least 20 years. Trees present in numbers, usually as groups of woodlands that form distinctive landscape features. SJ 31607 49933	Pedunculate oak Quercus robur. 15.0 m approximate height. 710 mm approximate stem dbh. Mature. In good condition.	Wound, east aspect, 6.0 m height. Branch cavity, south aspect, 4.0 m height. Branch cavity, east aspect, 6.0 m height. Branch cavity, west aspect, 7.0 m height. Pruning-cut, south aspect, 6.0 m height. Size and age.	Several PRFs evident. Some deadwood, retained pegs of wood and snapped branches are present in the canopy though mostly superficial but the tree is of a size and age where more PRFs may be present though not evident from ground level.	High
T168	Category C trees of low quality with an estimated lifespan of at least 10 years or young trees with a stem diameter below 150 mm. Trees present in groups of woodlands, but without this conferring on them significantly greater collective landscape value; and/or tree offering low or only temporary/transient landscape benefits. SJ 31558 49927	Ash Fraxinus excelsior. 15.0 m approximate height. 760 mm approximate stem dbh. Very mature. In fair/poor condition.	Possibility of foliage obscured PRFs. Size and age.	Light cover of leafy ivy obscuring view of stem. Ivy does not form a PRF in itself. Size and age where PRFs may be present though none are evident, the tree appears to have some superficial damage in the canopy and has ash die back.	Moderate
T170	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31543 49919	Pedunculate oak Quercus robur. 15.0 m approximate height. 800 mm approximate stem dbh. Mature. In fair condition.	Transverse-snap, south aspect, 7.0 m height. Possibility of foliage obscured PRFs. Size and age.	Foliage leafy and obscuring view of stem in places. Size and age where PRFs may be present though none are evident, the tree appears to have some superficial damage in the canopy but is largely in good health.	Moderate
T172	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands of significant conservation, historical, commemorative or other value. SJ 31537 49931	Common alder Alnus glutinosa. 7.0 m approximate height. 710 mm approximate stem dbh. Veteran. In poor condition.	Trunk cavity, north-west aspect, 5.0 m height. Size and age.	Trunk cavity is in the main stem and likely to be large given decay and deadwood evident, extending downwards. The cavity has been created through a break in the main stem. Only as limited canopy remains. The tree is of a size and age where decay and damage are likely to have created a large PRF.	High

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T178	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31544 50024	Pedunculate oak Quercus robur. 15.0 m approximate height. 360 mm approximate stem dbh. Mature. In fair condition.	Trunk cavity, south-east aspect, 4.0 m height. Transverse-snap, south aspect, 2.5 m height. Transverse-snap, east limb south aspect, 4.5 m height. Size and age.	Trunk cavity is in the main stem and extends approximately 0.5 m. The transverse-snaps contain pegs of dead wood, though with gaps around. Tree is of a size and age where there may be more PRFs present in the canopy not evident from ground level.	High
W4.1	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31055 49659.	Pedunculate oak Quercus robur. 20.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem from 1.5-6.0m though tree appears in good health and unlikely to have PRFs. Ivy does not form a PRF in itself.	Low
W4.2	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31055 49632.	Hawthorn Crataegus monogyna. 20.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem from at ~8.0m. Ivy has thick stems suitable for opportunistic individual bat roosting.	Low
W4.3	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31058 49623.	Sycamore Acer pseudoplatanus. 20.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Tear-out, north aspect, 3.5 m height. Wound, north aspect, 3.5 m height. Wound, east aspect, 3.0 m height.	Tear-out ~0.50 m long on leading branch, unknown how far the PRF extends internally though decay appears yet to have set in. Wound seems occluded from ground level and unlikely to provide cavity with depth. Wound provides limited gap between bark and heartwood.	Low

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W4.4	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31067 49608.	Sycamore Acer pseudoplatanus. 16.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem from 1.5-10.0m though tree appears in good health and unlikely to have PRFs. Ivy does not form a PRF in itself.	Low
W4.5	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31069 49581.	European larch Larix decidua. 8.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem from 1.5-8.0m though tree appears in good health and unlikely to have PRFs. Ivy does not form a PRF in itself.	Low
W4.6	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31066 49566.	Sycamore Acer pseudoplatanus. 15.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem from 4.0-8.0m though tree appears in good health and unlikely to have PRFs. Some cracked bark evident though no cavities established. Ivy does not form a PRF in itself.	Low
W4.7	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31069 49557.	Ash Fraxinus excelsior. 12.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stems from 2.0-8.0m though tree appears in good health and unlikely to have PRFs. Superficial damage to north-west limb though no cavities established. Ivy does not form a PRF in itself.	Low
W4.8	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31068 49533.	Ash Fraxinus excelsior. 10.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Wound, south-east aspect, 5.5 m height.	Wound on northern main stem with some decay possible. Superficial damage on west facing main branch.	Low

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W4.9	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31068 49491.	Ash Fraxinus excelsior. 11.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Wound, north aspect, 7.0 m height.	Wound on main limb near union though likely due to ash die back. No other PRFs evident. Forked stem with some very light ivy cover.	Low
W4.10	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31085 49461	Pedunculate oak Quercus robur. 7.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Trunk cavity, north aspect, 2.0 m height. Trunk cavity, south aspect, 4.0 m height.	Trunk cavity may provide internal access further up main stem and leaf litter is present in the cavity. Trunk cavity includes dead wood with decay evident.	High
W4.11	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31079 49416	Pedunculate oak Quercus robur. 10.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Trunk cavity, north-east aspect, upwards facing, 8.0 m height.	Trunk cavity may provide internal access further down main stem with split extending 1.0m. Trunk cavity possibly created where main stem has snapped. Heartwood is evident on some smaller branches though the tree appears in fairly good health.	Moderate
W4.12	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31085 49407	Pedunculate oak Quercus robur. 12.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs.	Light cover of leafy ivy obscuring view of stem from 2.5-8.0 m though tree appears in good health and unlikely to have PRFs. Ivy does not form a PRF in itself.	Low
W4.13	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31093 49392	Silver birch Betula pendula. 9.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Woodpecker holes x3, north-east aspect, 7.5-8.5 m height. Woodpecker holes x2, north aspect, 5.0 m height. Woodpecker hole x1, east aspect, 3.5 m height.	Standing deadwood with abundant woodpecker activity and no branches or canopy remaining. Some holes may be foraging but it is likely that large cavities are present within the stem.	High

Tree Ref.	BS 5837: 2012 Framework for Tree Categorisation and Grid Reference	Tree Description e.g., species, height, DBH, age, condition	Nature of PRF i.e., type, aspect and height	PRF Description	Roost Habitat Suitability
W4.14	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31075 49377	Pedunculate oak Quercus robur. 12.0 m approximate height. 1025 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Light cover of leafy ivy obscuring view of stem from 2.5-10.0 m. Ivy does not form a PRF in itself. Size and age where PRFs may be present though tree appears in good health and no PRFs are evident.	Low
W4.15	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31080 49323	Silver birch Betula pendula. 5.5 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Woodpecker hole x1, west aspect, 4.5 m height.	Tree is standing deadwood and likely to have a large cavity within the remaining stem.	High
W4.16	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31068 49281	Ash Fraxinus excelsior. 20.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Wound, east aspect, 4.0 m height.	Wound may extend within stem providing a cavity.	Moderate
W4.17	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31065 49281	Pedunculate oak Quercus robur. 20.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Longitudinal crack, west aspect, 6.0m height.	The longitudinal crack extends approximately 1.5 m along a main stem. The tree is forked and has a high canopy.	High
W4.18	Category A trees of high quality with an estimated life expectancy of at least 40 years. Trees, groups or woodlands that provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance. SJ 31043 49239	Sycamore Acer pseudoplatanus. 14.0 m approximate height. 400-850 mm approximate stem dbh. Mature. In good condition.	Possibility of foliage obscured PRFs. Size and age.	Light cover of leafy ivy obscuring view of stem from 3.5-12.0 m. Ivy does not form a PRF in itself. Size and age where PRFs may be present though tree appears in good health and no PRFs are evident.	Low

APPENDIX B: Average Weather Data Recorded during Static Monitoring Periods

Table B1. Weather recorded during static monitoring periods.

Survey Visit	Survey Date	Average Temperature	Prevailing Wind	Wind Speed (mph)	Average Weather Conditions
1	15/04/2021	11.0	N	4.35	Scattered clouds
1	16/04/2021	11.0	SSE	4.97	Scattered clouds
1	17/04/2021	4.5	N	12.00	Fair and clear
1	18/04/2021	6.0	NW	9.00	Fair and clear
1	19/04/2021	15.0	SSE	5.59	Scattered clouds
1	20/04/2021	11.0	NW	11.81	Fair and clear
1	21/04/2021	12.0	ESE	8.70	Partly cloudy
1	22/04/2021	15.0	SE	7.46	Scattered clouds
1	23/04/2021	16.0	ESE	9.94	Fair and clear
1	24/04/2021	7.0	E	18.00	Fair and clear
1	25/04/2021	7.0	E	15.00	Fair and clear
1	26/04/2021	4.0	S	9.00	Fair and clear
2	12/05/2021	11.0	N	4.97	Light rain showers, broken clouds
2	13/05/2021	11.0	NW	9.94	Light rain showers, broken clouds
2	14/05/2021	13.0	SSE	9.32	Scattered clouds
2	15/05/2021	9.0	ESE	14.00	Light rain showers, broken clouds
2	16/05/2021	7.0	SSE	12.00	Partly cloudy
2	17/05/2021	13.0	NW	9.32	Scattered clouds
2	18/05/2021	12.0	SSW	5.59	Scattered clouds
2	19/05/2021	14.0	NNW	10.56	Scattered clouds
2	20/05/2021	11.0	S	16.78	Light rain showers, broken clouds
2	21/05/2021	11.0	NW	13.67	Light rain showers, broken clouds
3	17/06/2021	17.0	NW	14.29	Fair and clear
3	18/06/2021	15.0	NW	11.19	Partly cloudy
3	19/06/2021	13.0	ESE	13.00	Partly cloudy
3	20/06/2021	12.0	E	15.00	Fair and clear
3	21/06/2021	14.0	NE	11.19	Scattered rain showers, mostly cloudy
3	22/06/2021	16.0	NW	12.43	Fair and clear

Survey Visit	Survey Date	Average Temperature	Prevailing Wind	Wind Speed (mph)	Average Weather Conditions
3	23/06/2021	14.0	NNW	6.84	Scattered light drizzle, broken clouds
3	24/06/2021	18.0	NNW	8.08	Scattered clouds
3	25/06/2021	12.0	N	10.56	Scattered light drizzle, broken clouds
3	26/06/2021	11.0	NNE	14.00	Partly cloudy
3	27/06/2021	13.0	ENE	14.00	Mostly cloudy
3	28/06/2021	16.0	N	3.73	Scattered light drizzle, broken clouds
4	08/07/2021	18.0	NNW	10.56	Scattered clouds
4	09/07/2021	18.0	NW	10.56	Scattered clouds
4	10/07/2021	15.0	NW	12.00	Partly cloudy
4	11/07/2021	14.0	WNW	14.00	Partly cloudy
4	12/07/2021	17.0	NW	9.94	Light rain showers, broken clouds
4	13/07/2021	20.0	NW	13.67	Scattered clouds
4	14/07/2021	20.0	NW	11.81	Scattered clouds
4	15/07/2021	19.0	NNW	9.32	Fair and clear
4	16/07/2021	22.0	NW	11.19	Fair and clear
4	17/07/2021	17.0	W	12.00	Fair and clear
4	18/07/2021	16.0	W	10.00	Fair and clear
4	19/07/2021	15.0	NW	9.00	Fair and clear
5	12/08/2021	18.0	SW	14.29	Scattered clouds
5	13/08/2021	19.0	WSW	14.29	Scattered clouds
5	14/08/2021	16.0	E	10.00	Mostly cloudy
5	15/08/2021	15.0	WNW	18.00	Mostly cloudy
5	16/08/2021	16.0	WNW	11.19	Scattered clouds
5	17/08/2021	15.0	NW	12.43	Scattered clouds
5	18/08/2021	16.0	NW	6.84	Scattered clouds
5	19/08/2021	18.0	W	5.59	Scattered clouds
6	09/09/2021	18.0	NW	3.73	Scattered rain showers, scattered clouds
6	10/09/2021	18.0	NW	5.59	Scattered rain showers, scattered clouds
6	11/09/2021	16.0	WNW	16.00	Partly cloudy

Survey Visit	Survey Date	Average Temperature	Prevailing Wind	Wind Speed (mph)	Average Weather Conditions
6	12/09/2021	14.0	ENE	9.00	Scattered rain showers, scattered clouds
6	13/09/2021	16.0	SE	1.86	Scattered rain showers, scattered clouds
6	14/09/2021	16.0	NE	4.35	Scattered clouds
6	15/09/2021	16.0	NW	6.21	Scattered clouds
6	16/09/2021	17.0	NW	4.35	Scattered clouds
7	07/10/2021	18.0	S	8.70	Scattered clouds
7	08/10/2021	16.0	SSE	9.32	Scattered clouds
7	09/10/2021	14.0	WSW	9.00	Scattered rain showers, scattered clouds
7	10/10/2021	13.0	WNW	17.00	Partly cloudy
7	11/10/2021	11.0	NW	3.73	Scattered clouds
7	12/10/2021	13.0	NW	9.94	Scattered clouds
7	13/10/2021	13.0	WNW	4.35	Scattered clouds
7	14/10/2021	14.0	SSW	6.21	Scattered clouds

APPENDIX C: Sonogram Recordings of Soprano Pipistrelle Emergence from Tree 25 during Nocturnal Survey on 18/08/2021

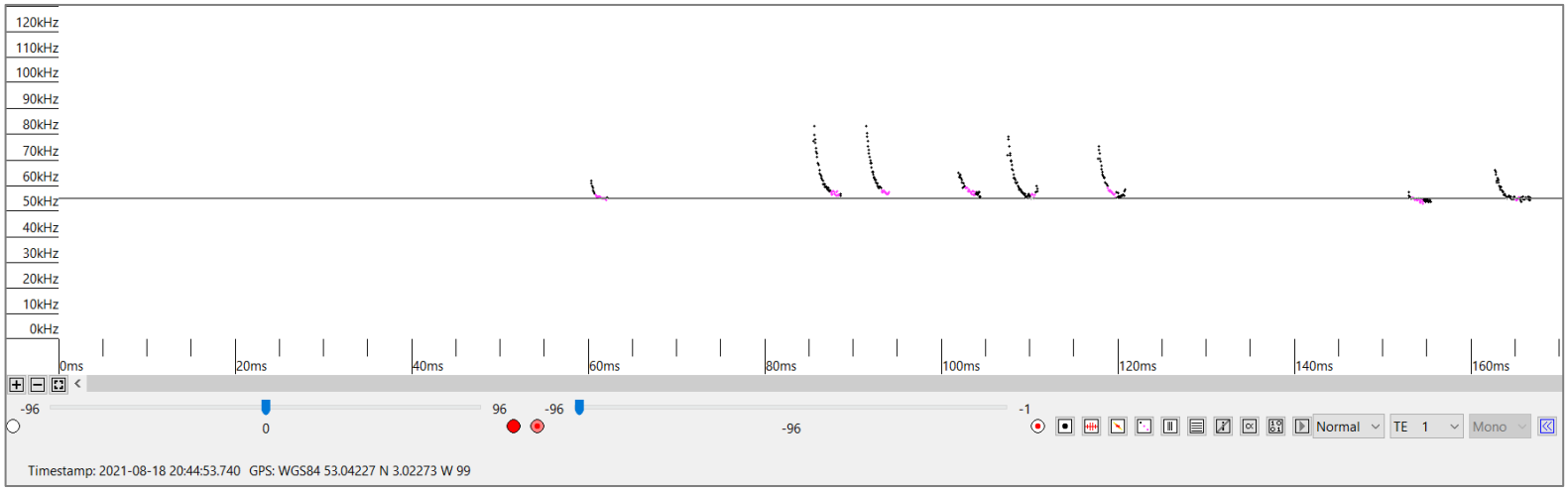


Figure C1. Sonogram produced by soprano pipistrelle observed emerging from tree T172 at 20:45 hrs, 12 minutes after sunset on 18th August 2021.

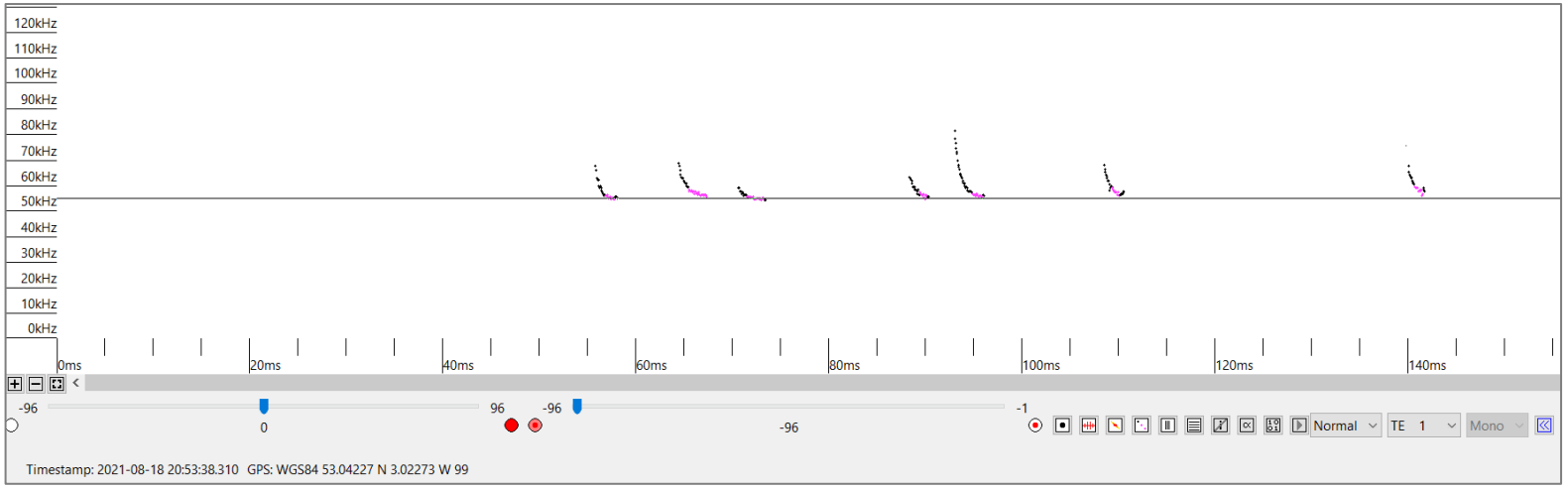
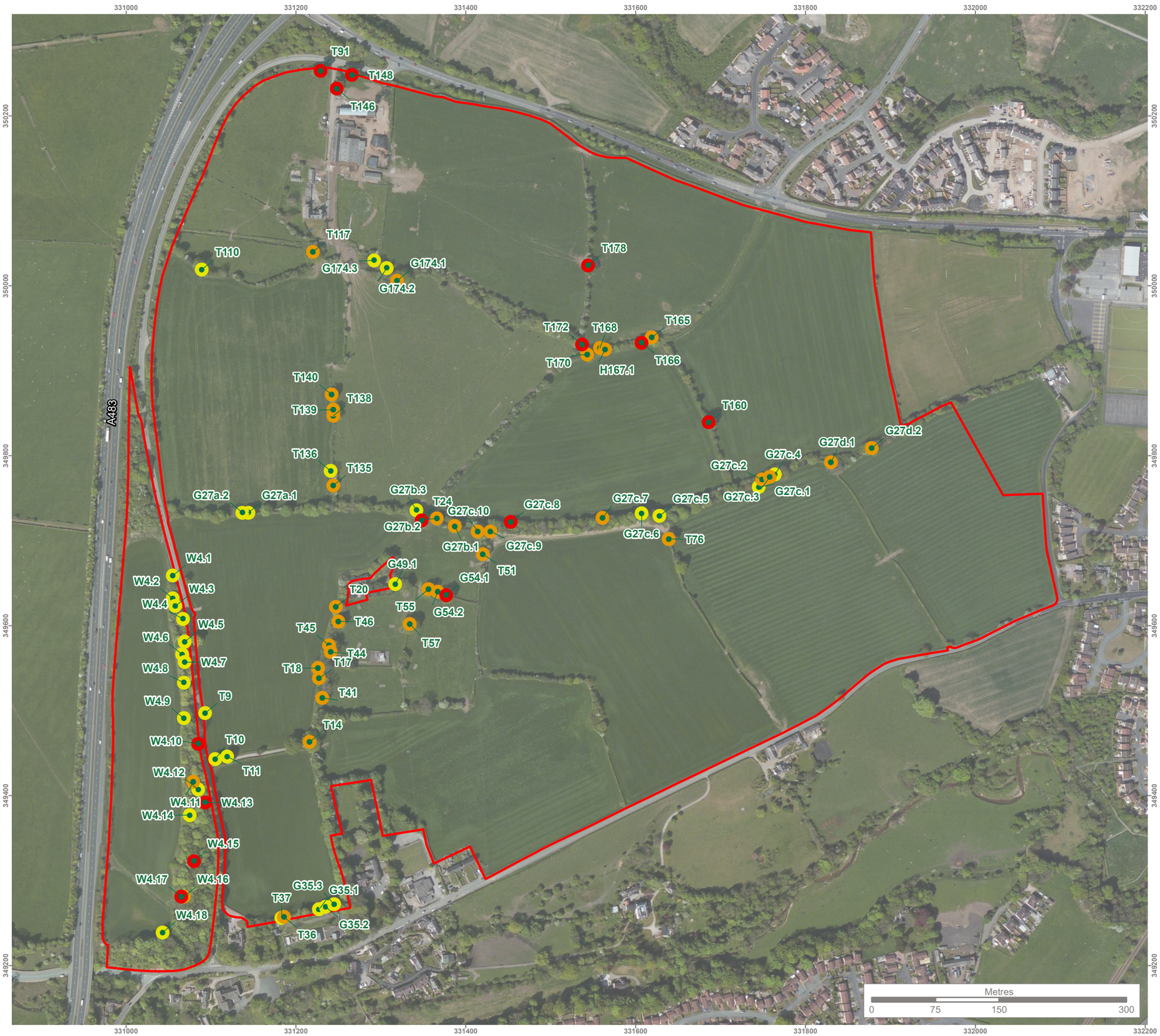


Figure C2. Sonogram produced by soprano pipistrelle observed emerging from tree T172 at 20:53 hrs, 20 minutes after sunset on 18th August 2021.

DRAWINGS

Drawing G8745.021 - Bat Tree Roost Habitat Suitability Plan
Drawing G8745.022 - Bat Transect Route and Static Detector Locations
Drawing G8745.023 - Bat Transect Survey Results - Visit 1 15.04.2021
Drawing G8745.024 - Bat Transect Survey Results - Visit 2 12.05.2021
Drawing G8745.025 - Bat Transect Survey Results - Visit 3 17.06.2021
Drawing G8745.026 - Bat Transect Survey Results - Visit 4 08.07.2021
Drawing G8745.027 - Bat Transect Survey Results - Visit 5 18.08.2021
Drawing G8745.028 - Bat Transect Survey Results - Visit 6 09.09.2021
Drawing G8745.029 - Bat Transect Survey Results - Visit 7 07.10.2021
Drawing G8745.030 - Bat Nocturnal Emergence Re-entry Survey General Observations and Results Plan



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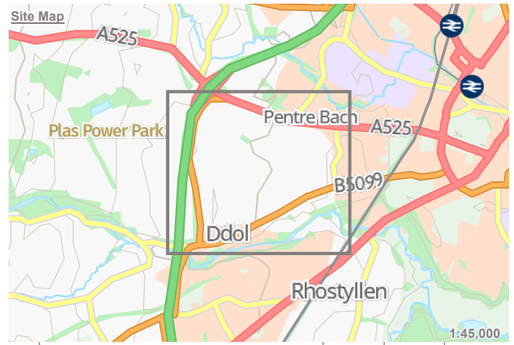
- Site boundary
- Tree with low bat roost habitat suitability
- Tree with moderate bat roost habitat suitability
- Tree with high bat roost habitat suitability

Note:
The locations of habitats and habitat features are indicative.

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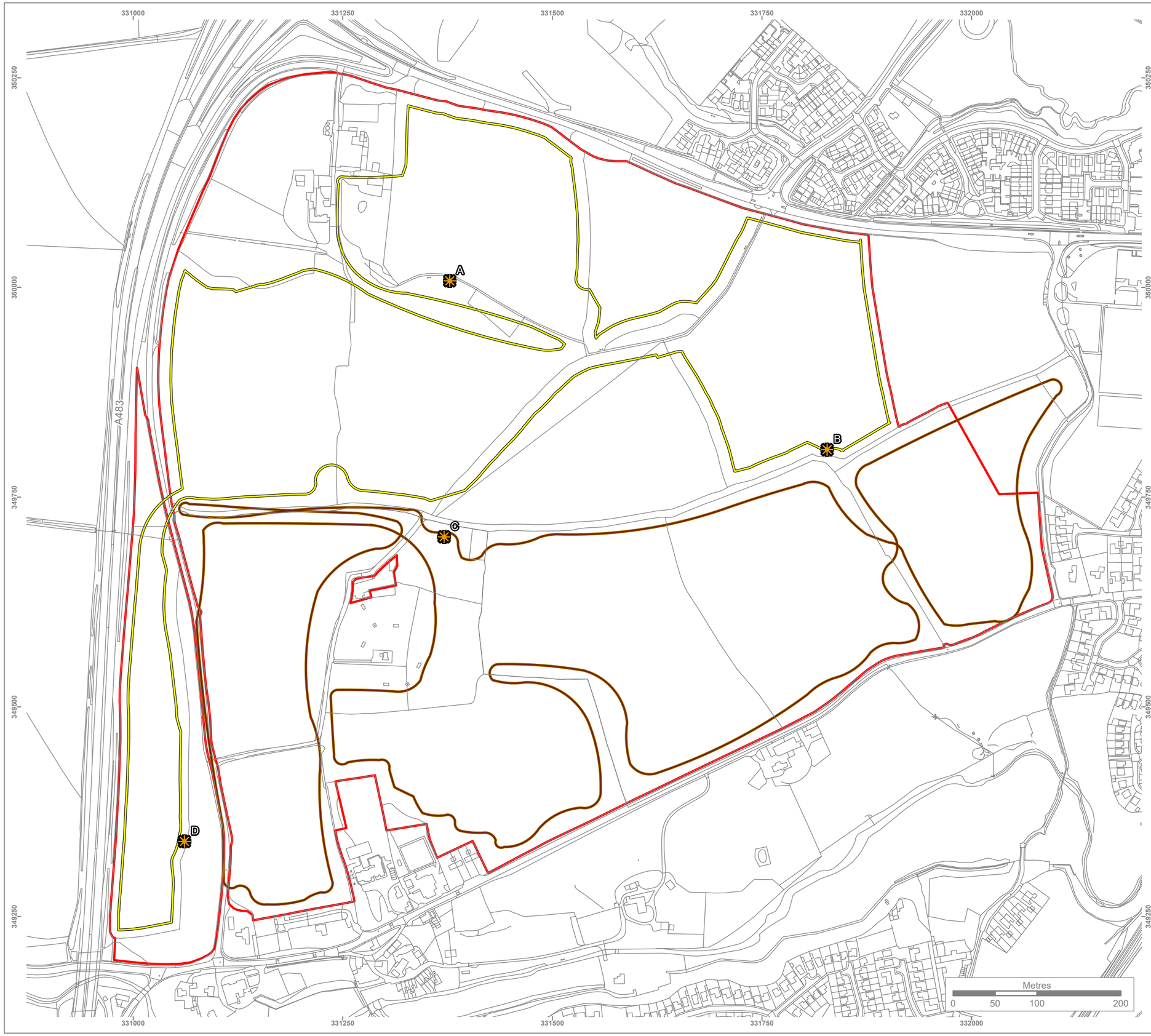
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Title
Bat Tree Roost Habitat Suitability Plan

Drawing Number
G8745.021

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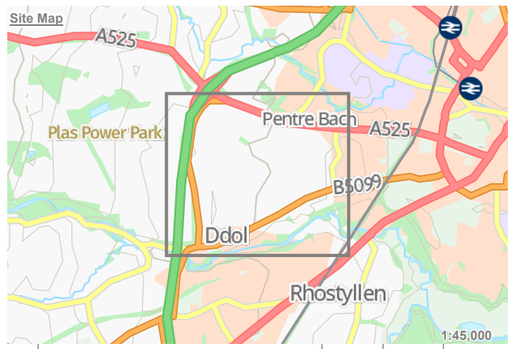


KEY

- Site boundary
- Static detector
- North transect route
- South transect route

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Title
Bat Transect Route and Static Detector Locations

Drawing Number
G8745.022

Drawn	Checked	Approved	Scale	Date
SP	MH	LR	1:4,500 @ A3	08/12/2022



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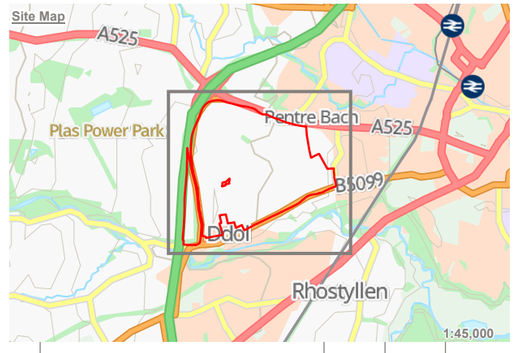
- Site boundary
- Common pipistrelle
- Myotis species
- Noctule
- Bat flightline (colour denotes bat species)

Note:
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Project
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Title
Bat Transect Survey Results
Visit 1 - North Transect 15th April 2021

Drawing Number					Page 1 of 2
Drawn	Checked	Approved	Scale	Date	
SP	MH	LR	1:4,500 @ A3	08/12/2022	



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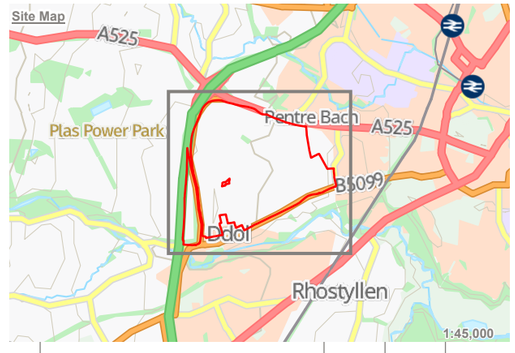
- Site boundary
- Common pipistrelle
- Soprano pipistrelle feeding buzz
- Noctule
- Bat flightline (colour denotes bat species)

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Title
Bat Transect Survey Results
Visit 1 - South Transect 15th April 2021

Drawing Number				
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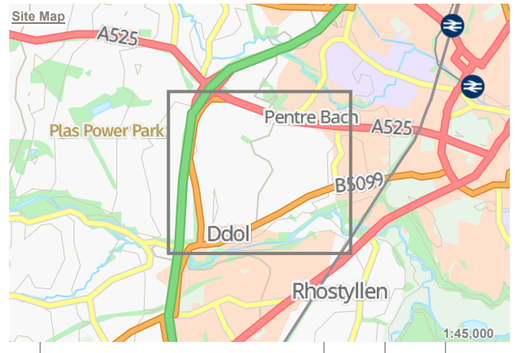
- Site boundary
- Common pipistrelle
- Common pipistrelle social call
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Soprano pipistrelle feeding buzz
- Bat flightline (colour denotes bat species)

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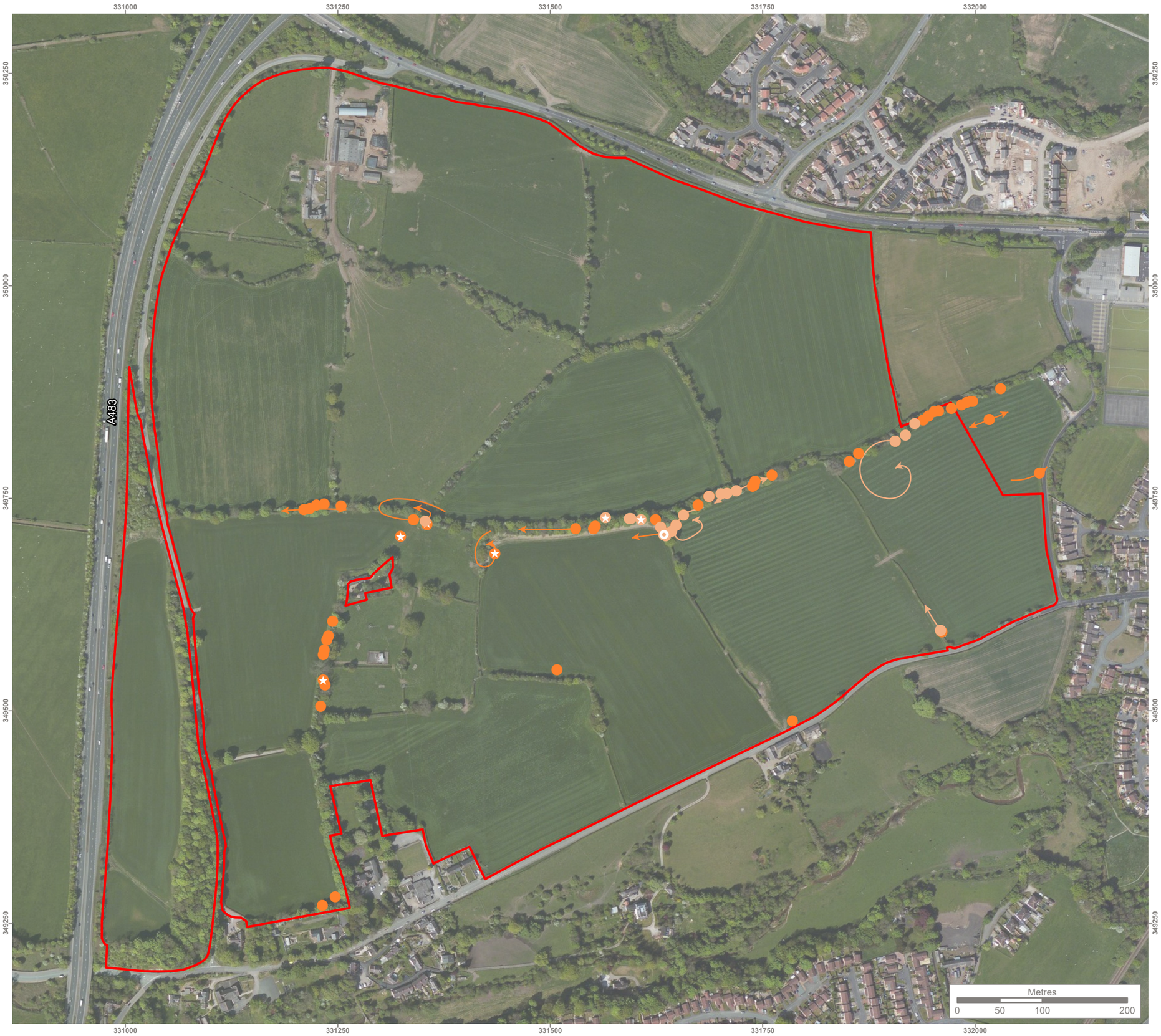
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Title
Bat Transect Survey Results
Visit 2 - North Transect 12th May 2021

Drawing Number	Page
G8745.024.1	Page 1 of 2

Drawn	Checked	Approved	Scale	Date
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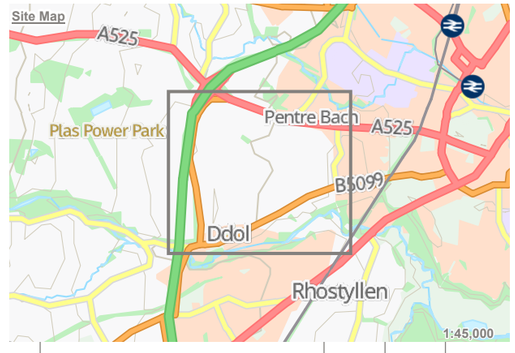
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- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Soprano pipistrelle social call
- Soprano pipistrelle feeding buzz
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Title
Bat Transect Survey Results
Visit 2 - South Transect 12th May 2021

Drawing Number				
G8745.024.2				Page 2 of 2
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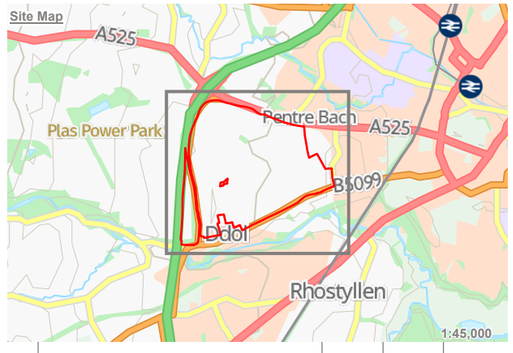
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- Common pipistrelle
- Common pipistrelle social call
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Soprano pipistrelle feeding buzz
- Noctule
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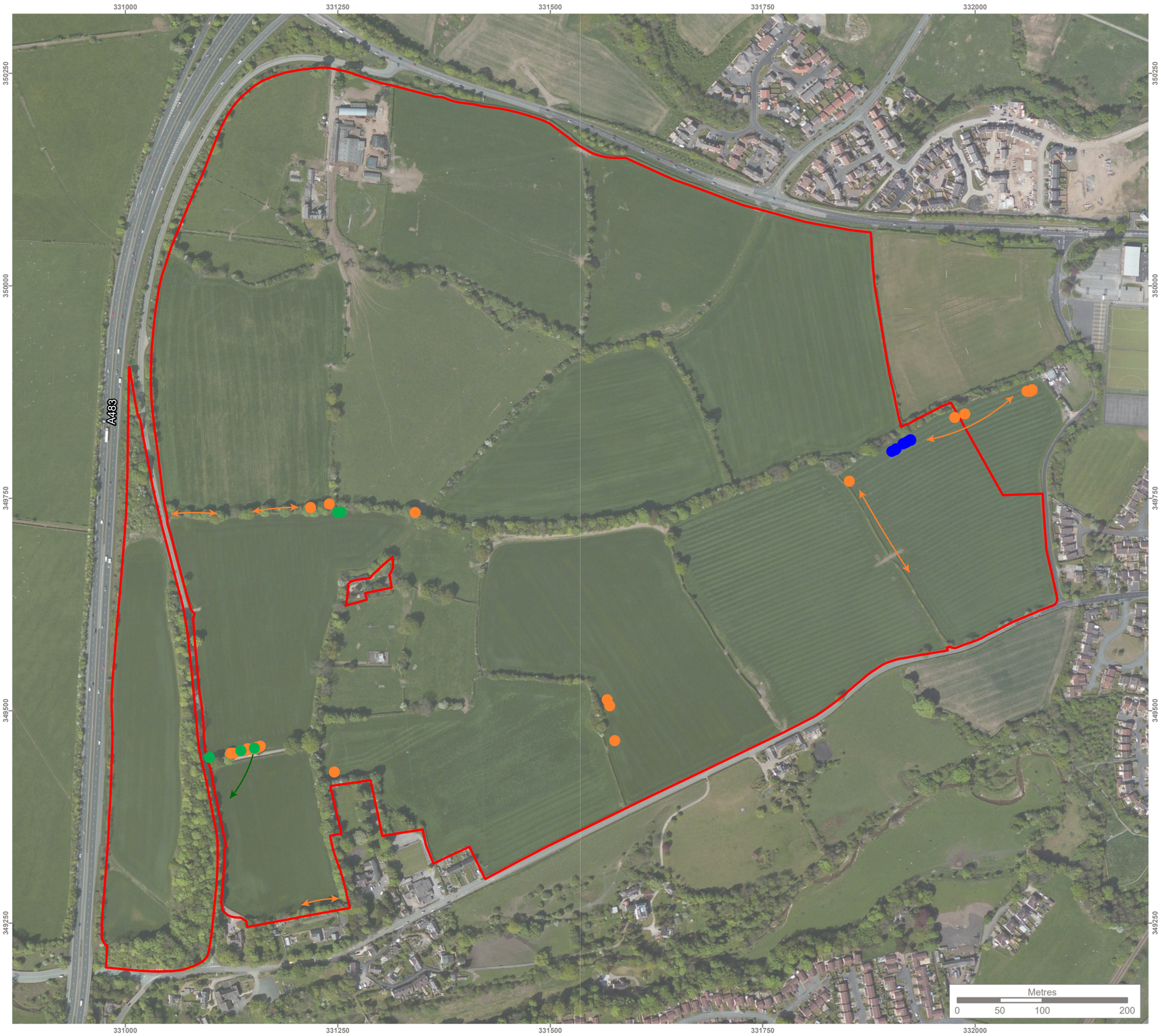
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Title
Bat Transect Survey Results
Visit 3 - North Transect 17th June 2021

Drawing Number	Page
G8745.025.1	Page 1 of 2

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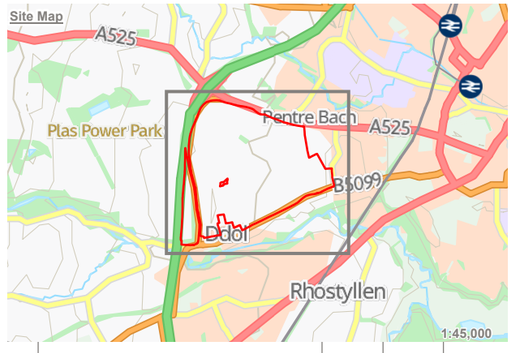
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- Common pipistrelle
- Myotis species
- Noctule
- Bat flightline (colour denotes bat species)

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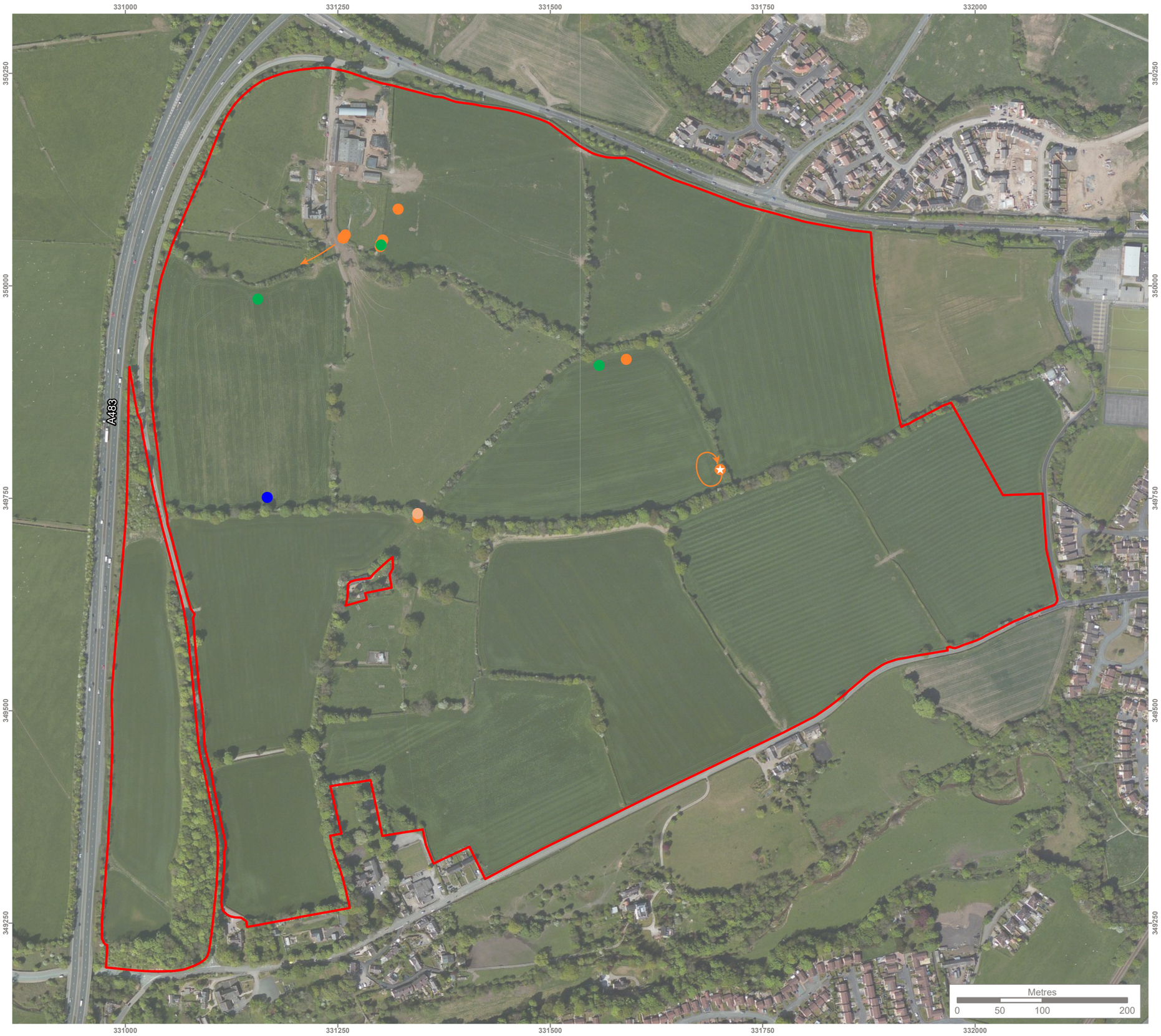
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Visit 3 - South Transect 17th June 2021

Drawing Number	Page
G8745.025.2	Page 2 of 2

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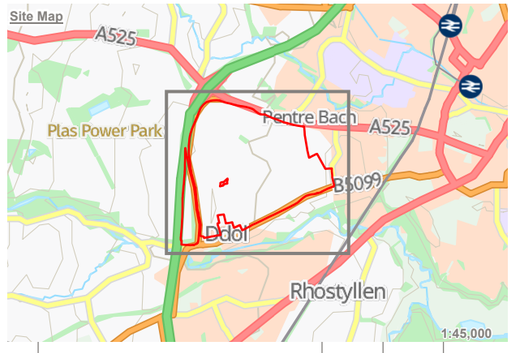
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- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Myotis species
- Noctule
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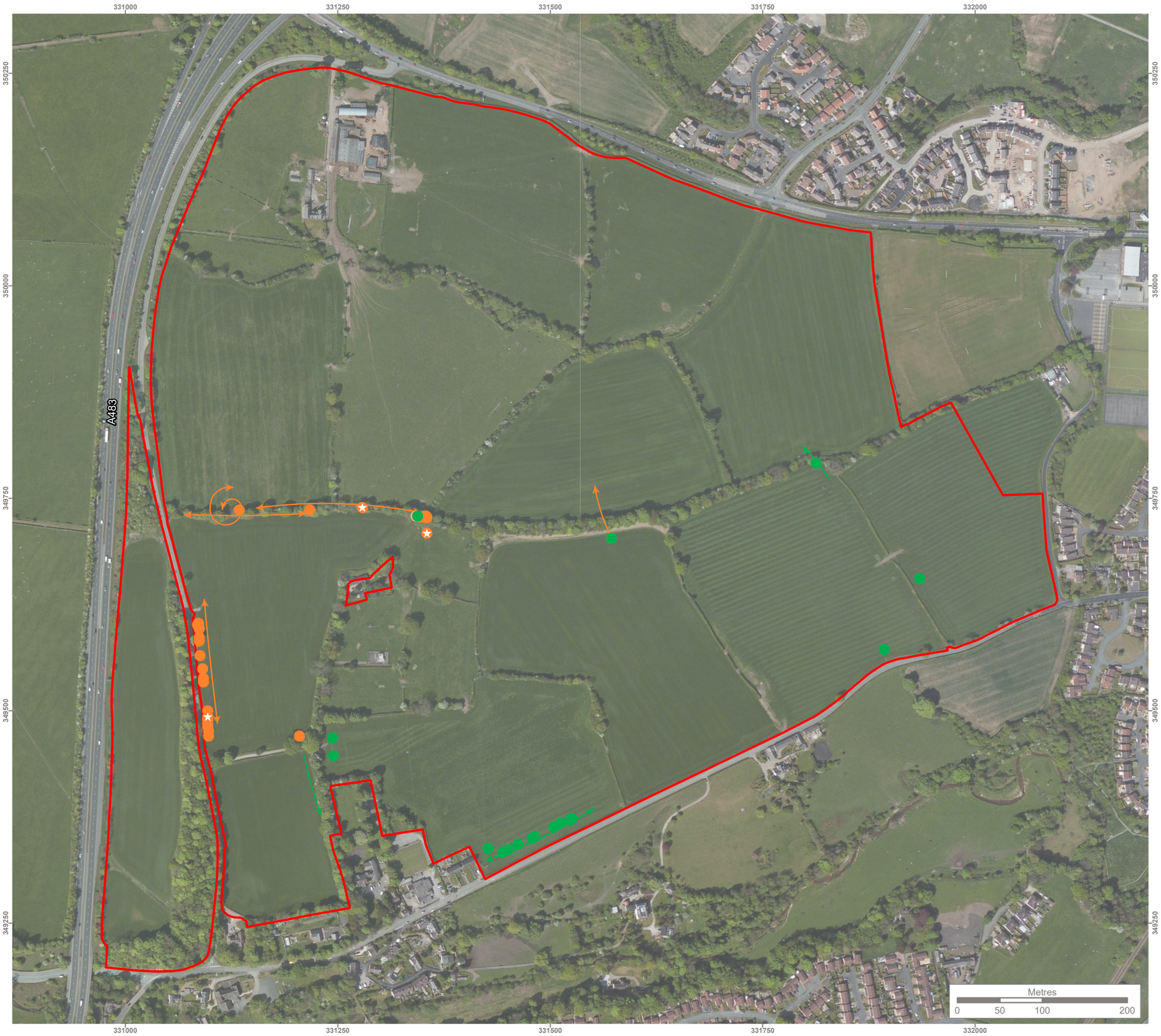
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Title
Bat Transect Survey Results
Visit 4 - North Transect 8th July 2021

Drawing Number				Page 1 of 2
G8745.026.1				
Drawn	**Checked**	**Approved**	**Scale**	**Date**
SP	MH	LR	1:4,500 @ A3	09/12/2022



KEY

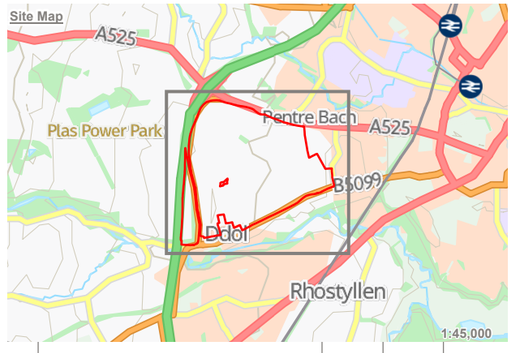
- Site boundary
- Common pipistrelle
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Noctule
- Bat flightline (colour denotes bat species)

Note:
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Site Map



Rev	Description	Drawn	Approved	Date

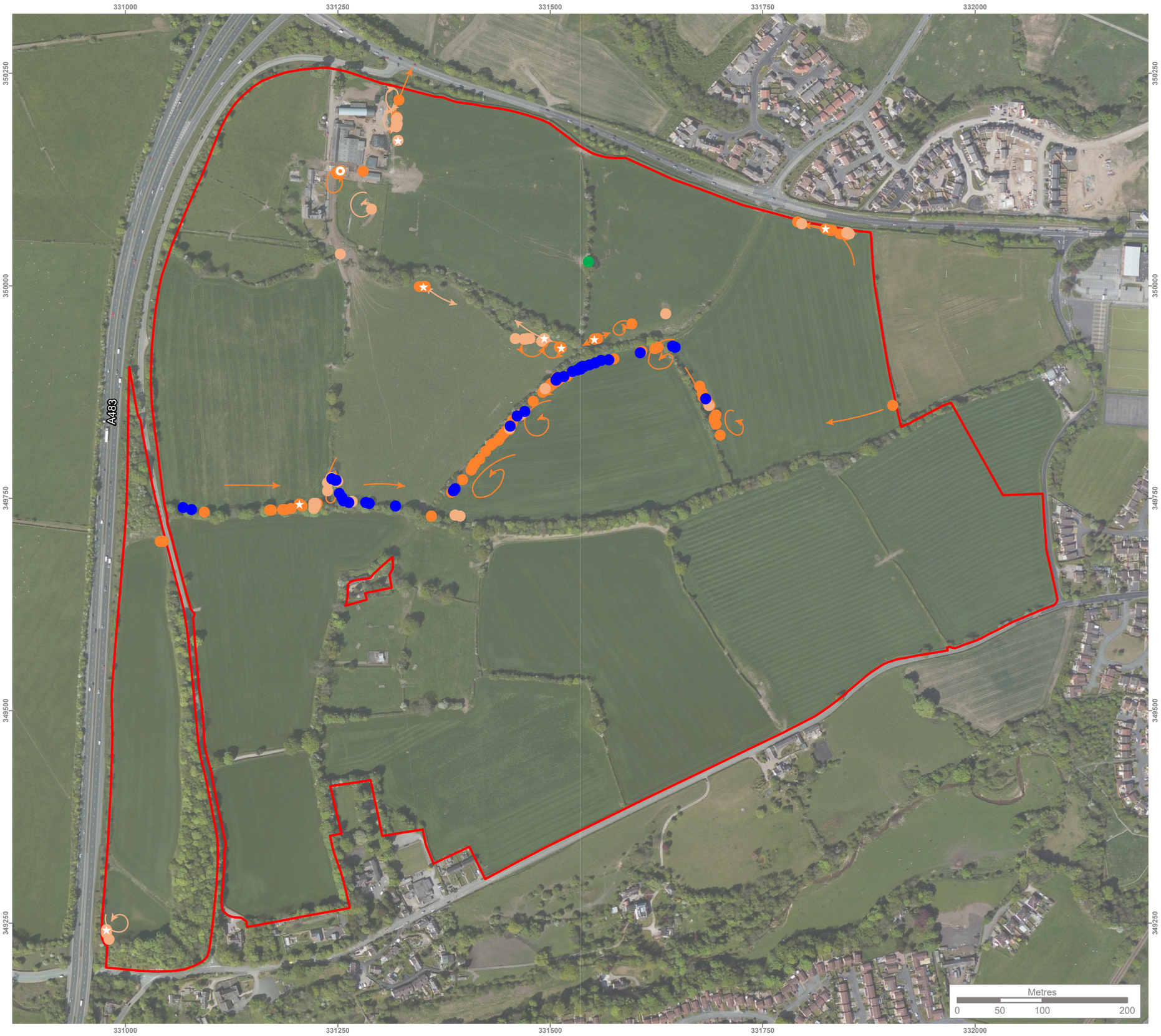
TEP THE ENVIRONMENT PARTNERSHIP

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Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 4 - South Transect 8th July 2021

Drawing Number				Page 2 of 2
G8745.026.2				
Drawn	**Checked**	**Approved**	**Scale**	**Date**
SP	MH	LR	1:4,500 @ A3	09/12/2022



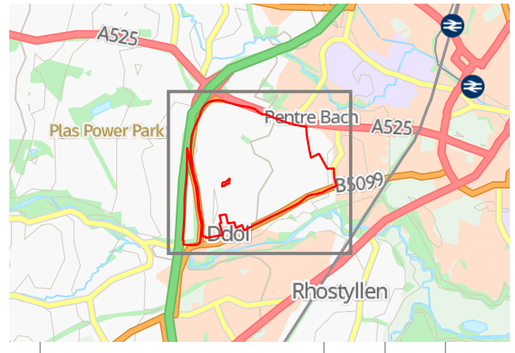
KEY

- Site boundary
- Common pipistrelle
- Common pipistrelle social call
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Soprano pipistrelle social call
- Soprano pipistrelle feeding buzz
- Myotis species
- Noctule
- Bat flightline (colour denotes bat species)

Note:
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Rev	Description	Drawn	Approved	Date

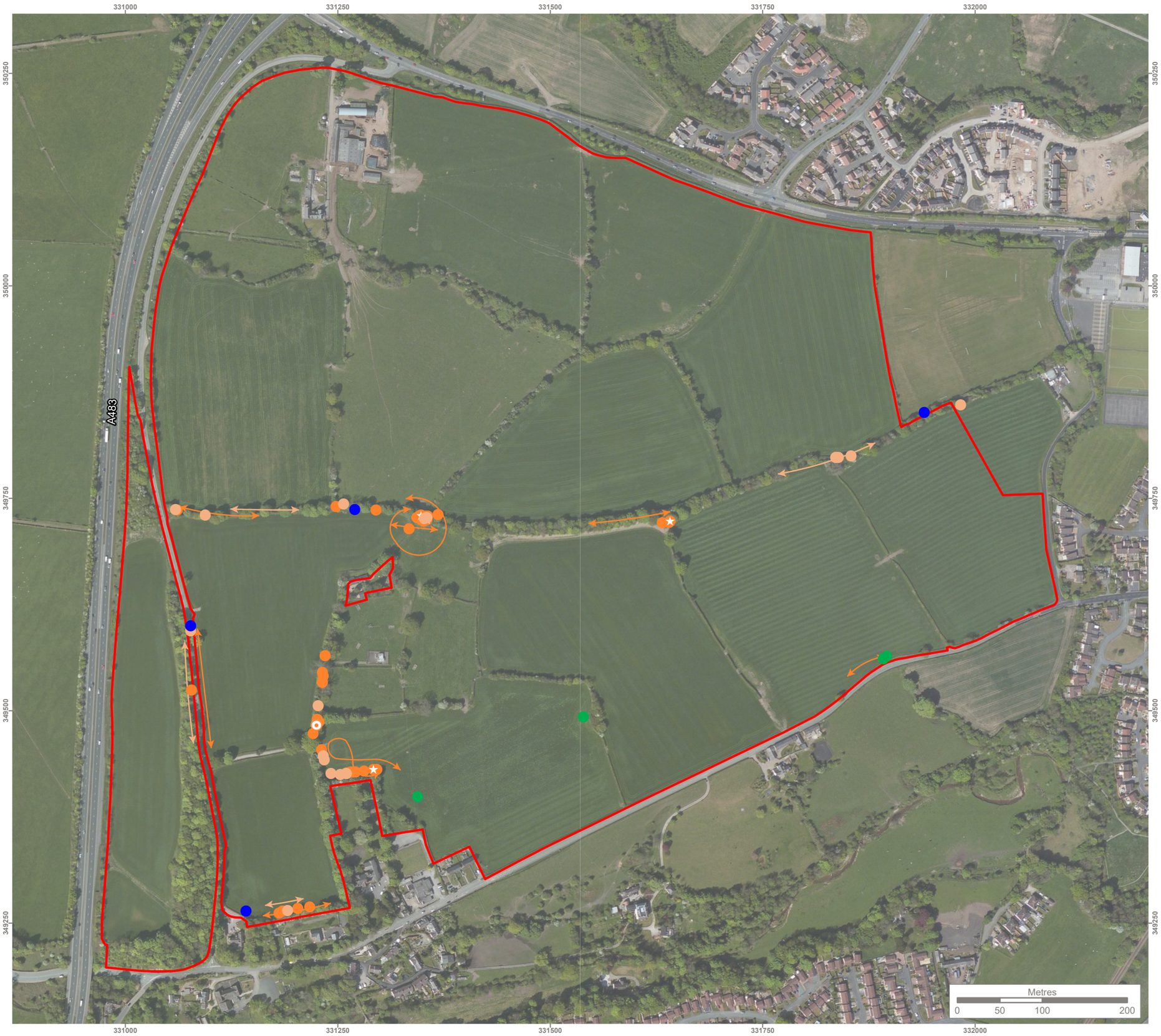
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Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 5 - North Transect 18th August 2021

Drawing Number				Page 1 of 2
G8745.027.1				
Drawn	**Checked**	**Approved**	**Scale**	**Date**
SP	MH	LR	1:4,500 @ A3	09/12/2022



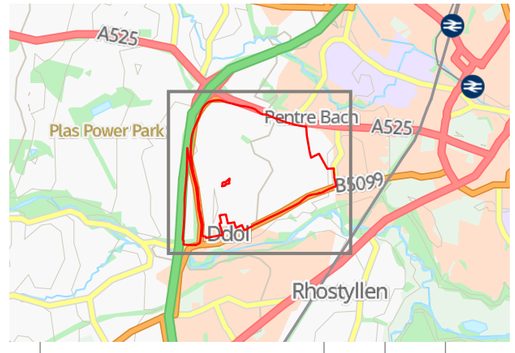
KEY

- Site boundary
- Common pipistrelle
- Common pipistrelle social call
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Myotis species
- Noctule
- Bat flightline (colour denotes bat species)

Note:
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Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 5 - South Transect 18th August 2021

Drawing Number				
G8745.027.2				Page 2 of 2
Drawn	Checked	Approved	Scale	Date
SP	MH	LR	1:4,500 @ A3	09/12/2022



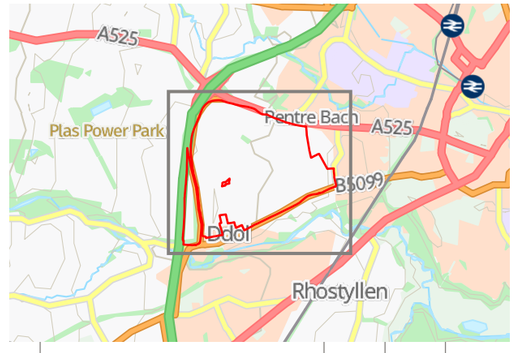
KEY

- Site boundary
- Common pipistrelle
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Myotis species
- Bat flightline (colour denotes bat species)

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Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 6 - North Transect 9th September 2021

Drawing Number				
G8745.028.1				Page 1 of 2
Drawn	**Checked**	**Approved**	**Scale**	**Date**
SP	MH	LR	1:4,500 @ A3	09/12/2022



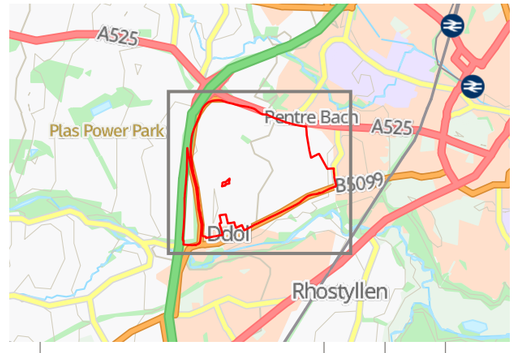
KEY

- Site boundary
- Common pipistrelle
- Soprano pipistrelle
- Myotis species

Note:
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Rev	Description	Drawn	Approved	Date

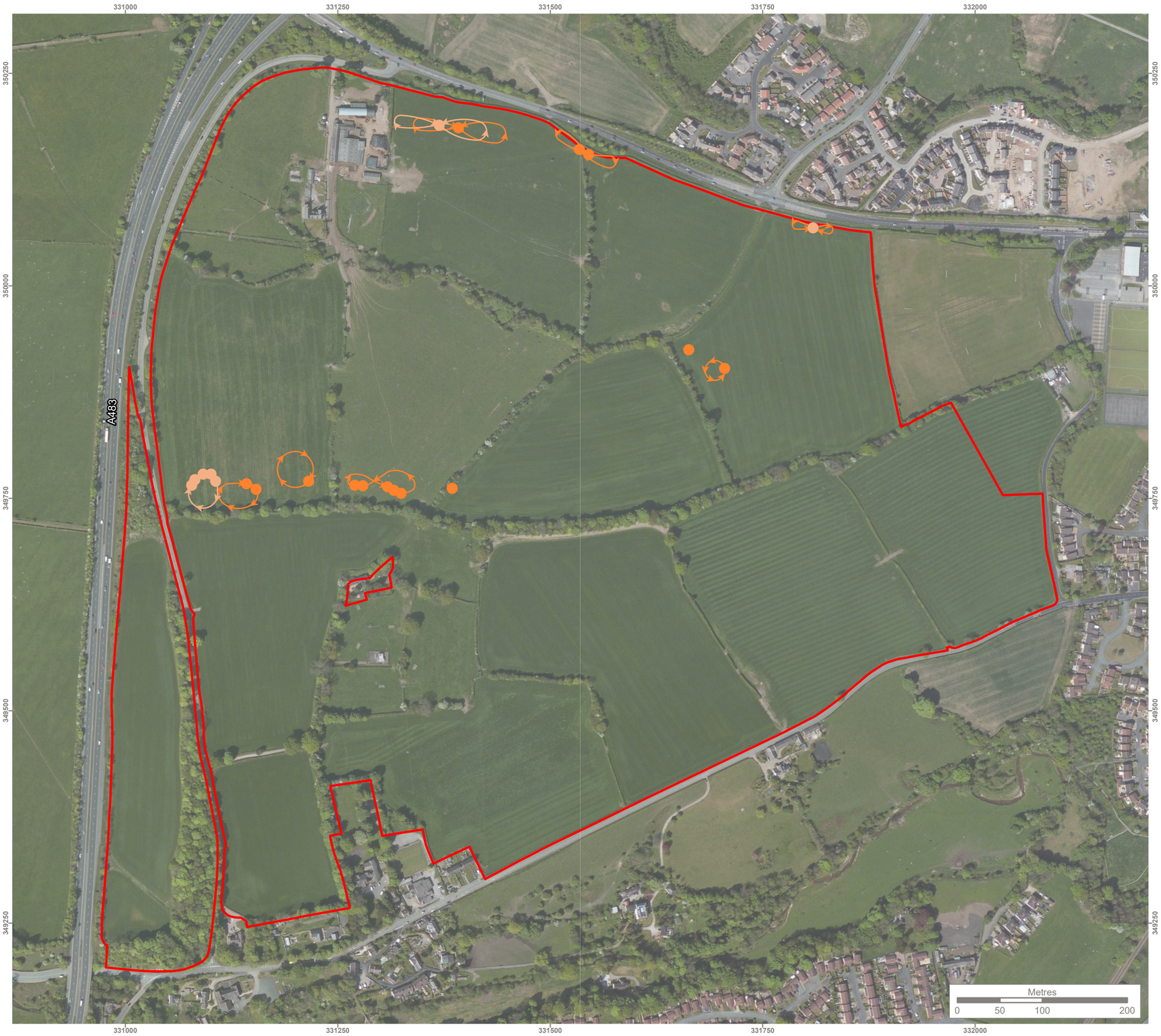
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Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 6 - South Transect 9th September 2021

Drawing Number				Page 2 of 2
G8745.028.2				
Drawn	**Checked**	**Approved**	**Scale**	**Date**
SP	MH	LR	1:4,500 @ A3	09/12/2022



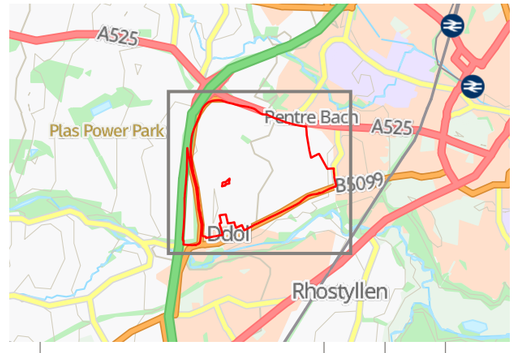
KEY

- Site boundary
- Common pipistrelle
- Soprano pipistrelle
- Bat flightline (colour denotes bat species)

Note:
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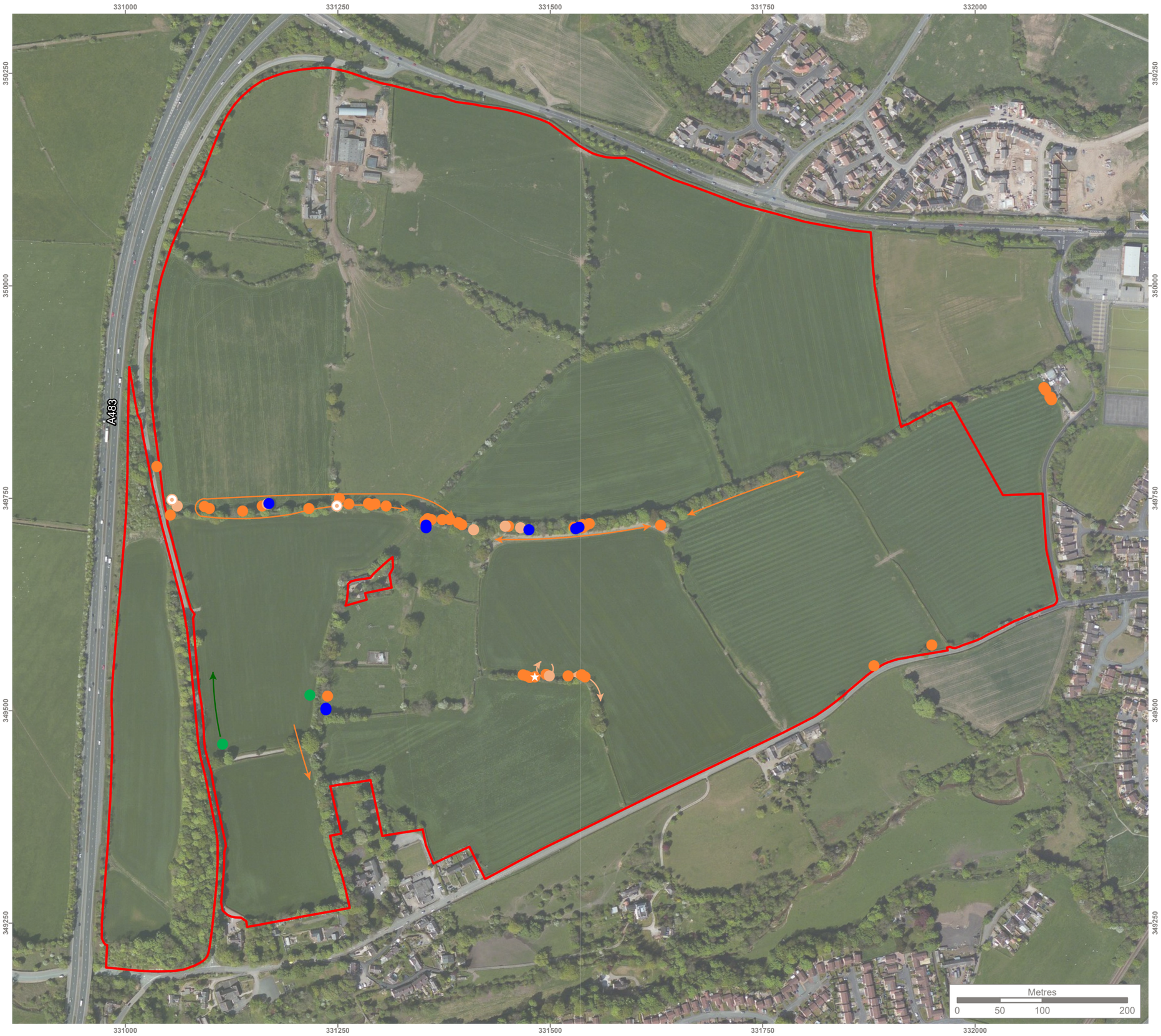
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Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 7 - North Transect 7th October 2022

Drawing Number				
G8745.029.1				Page 1 of 2
Drawn	**Checked**	**Approved**	**Scale**	**Date**
SP	MH	LR	1:4,500 @ A3	09/12/2022



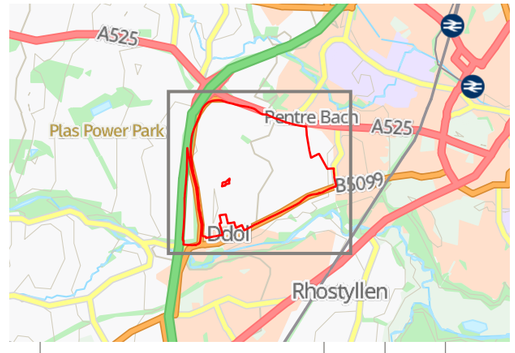
KEY

- Site boundary
- Common pipistrelle
- Common pipistrelle feeding buzz
- Soprano pipistrelle
- Soprano pipistrelle social call
- Myotis species
- Noctule
- Bat flightline (colour denotes bat species)

Note:
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Rev	Description	Drawn	Approved	Date

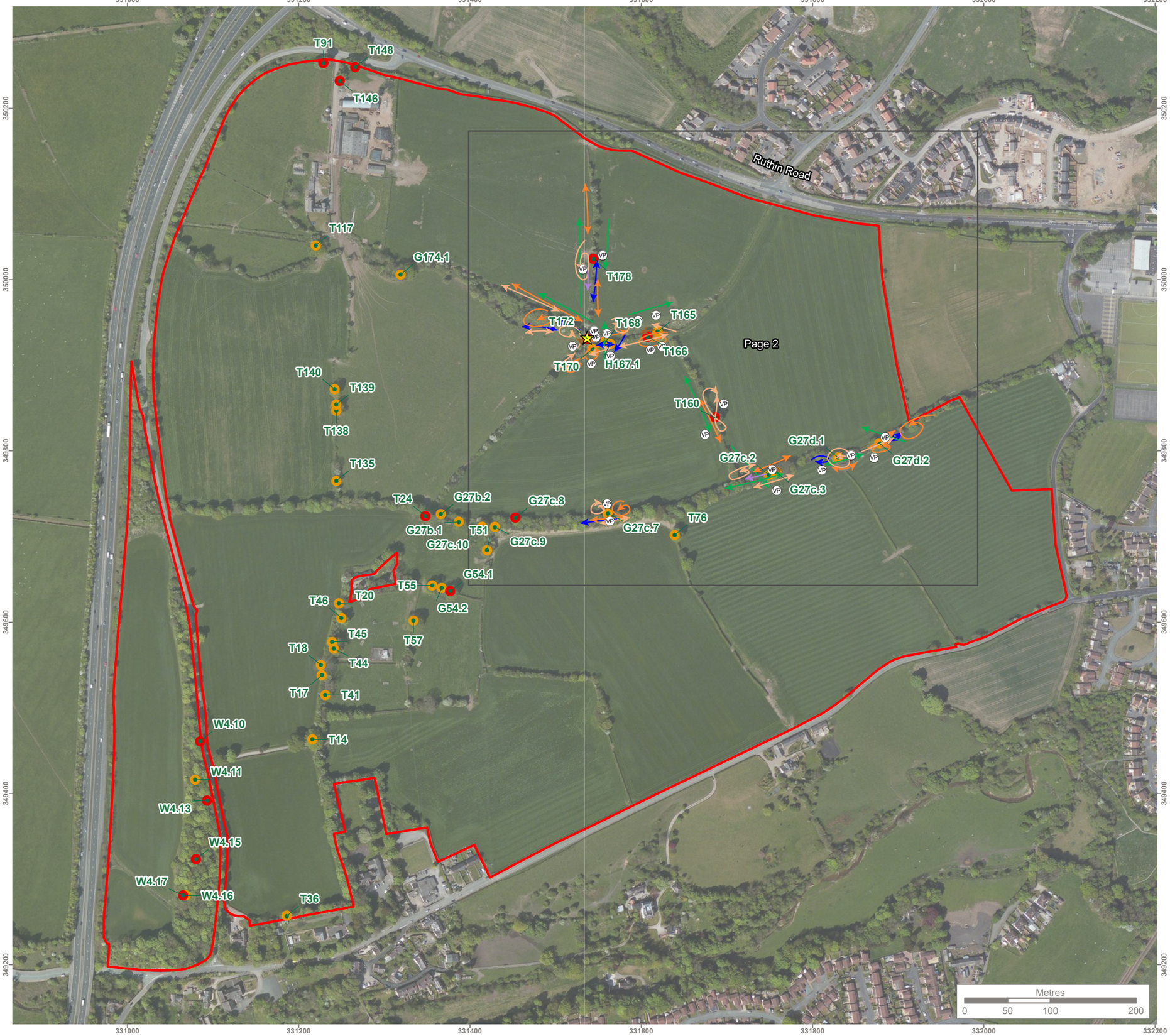
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Project
Ruthin Road, Wrexham

Title
Bat Transect Survey Results
Visit 7 - South Transect 7th October 2022

Drawing Number				
G8745.029.2				Page 2 of 2
Drawn	Checked	Approved	Scale	Date
SP	MH	LR	1:4,500 @ A3	09/12/2022



KEY

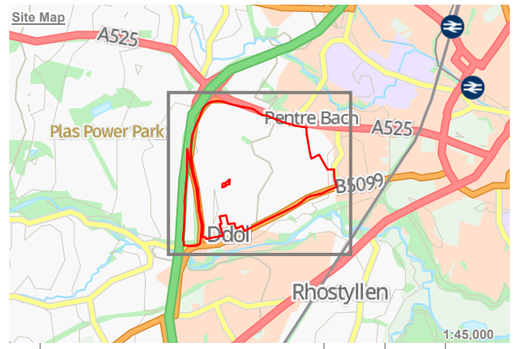
- Site boundary
- Page and page number
- VP View point location

Nocturnal Surveys Observations

- Soprano pipistrelle day roost
- Myotis species
- Noctule
- Common pipistrelle
- Soprano pipistrelle
- Brown long eared bat
- Lesser horseshoe

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Project
Ruthin Road, Wrexham

Title
Bat Nocturnal Emergence Re-entry Survey General Observations and Results Plan

Drawing Number
G8745.030.1

Drawn	Checked	Approved	Scale	Date
SP	MH	LR	1:4,500 @ A3	09/12/2022



KEY

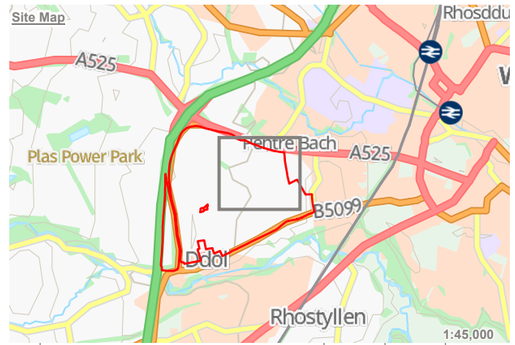
- Site boundary
- VP — View point location

Nocturnal Surveys Observations

- Soprano pipistrelle day roost
- Myotis species
- Noctule
- Common pipistrelle
- Soprano pipistrelle
- Brown long eared bat
- Lesser horseshoe

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Project
Ruthin Road, Wrexham

Title
Bat Nocturnal Emergence Re-entry Survey General Observations and Results Plan

Drawing Number
G8745.030.2

Drawn	Checked	Approved	Scale	Date
SP	MH	LR	1:2,000 @ A3	09/12/2022

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