



Berwick Bank

Technical Appendix 7.3 – Bats

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1. Introduction

1.1 Overview

ITP Energised was appointed by SSE Renewables to undertake bat surveys within the onshore component of the proposed Berwick Bank offshore windfarm development at Torness, southeast of Dunbar, East Lothian (hereafter referred to as the 'Site'). The site has central Ordnance Grid Reference: NT 74632 73282. The Study Area incorporated the Site and a 50 m buffer as shown in the location plan (Figure 7.3.1).

The work initially involved a Preliminary Roost Assessment (PRA) of trees, buildings and structures. Further to this, active season surveys were carried out for all trees, buildings and structures with potential roost features that lay within the footprint of proposed cable routes and a 30 m buffer (based on the potential design options at the time of the survey) were completed.

This report describes the methods used to gather and record information for the Site and summarises the findings of the study.

1.2 Site Description

The Site is approximately 599.6 hectares (ha) in size and extends from north-west of Skateraw Harbour to Bilsdean in the south. The A1 trunk road and the East Coast Main Line (ECML) railway pass through the Site from the north-west to the south-east. The Site largely comprises agricultural land with a mixture of arable and grazed fields. Braidwood Burn and Ogle Burn run through the western reaches of the Site, Thornton Burn and Branxton Burn runs through the centre of the Site, Dry Burn runs through the north of the Site and Bilsdean Burn runs through the south of the Site. These watercourses are commonly associated with corridors of scrub and mixed woodland habitat. The Site also encompasses a number of small hamlets and farm steadings. Larger settlements include Crowhill, Branxton and Lawfield to the south of the A1 and Skateraw and Thorntonloch to the north. The Site includes an area of coastline at the landfall location to the north of Torness Point.

2. Legislation

2.1 Legislation

2.1.1 Bats

All bat species within the UK are fully protected under the Conservation (Natural Habitat &c.) Regulations 1994 (as amended). Under this legislation, it is an offence to deliberately and/or recklessly:

- Capture, injure or kill a wild bat;
- Harass a wild bat or group of bats;
- Disturb a wild bat in a roost (any structure or place it uses for shelter or protection);
- Disturb a wild bat while it is rearing or otherwise caring for its young (this would be a 'maternity' roost);
- Obstruct access to a bat roost or to otherwise deny the animal use of the roost;
- Disturb such a wild bat in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of that species; and to
- Disturb a wild bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:



- Damage or destroy a breeding site or resting place of such an animal (whether or not deliberately or recklessly); and to
- Keep, transport, sell or exchange, or offer for sale or exchange any wild bat (or any part or derivative of one) obtained after 10 June 1994.

2.2 Good Practice Ecological Guidance

Cognisance has been taken of the following best practice guidelines and survey method publications in relation to bats:

- Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016);
- Bat Mitigation Guidelines (Mitchell-Jones, 2004);
- Bat Workers' Manual (Mitchell-Jones and McLeish, 2004);
- Bat Roosts in Trees - A Guide to Identification and Assessment for Tree-Care and Ecology Professionals (BTHK, 2018); and
- Competencies for Species Survey: Bats (CIEEM, 2013)

3. Methods

3.1 Desk Study

A review of desk study data was completed to gather baseline information on bats. The following resource was consulted:

- ITP Energised (2022) Berwick Bank EIA, Ecology Chapter, Technical Appendix 7.1, Preliminary Ecological Appraisal.

3.2 Preliminary Roost Assessment

A Preliminary Roost Assessment (PRA) of the Site was conducted on the 7th, 8th and 9th June 2021 by ecologist and licensed batworker Stuart Abernethy (NatureScot Bat Licence No. 165055). Following a revision to the application boundary a survey of additional structures to the south-west of Skateraw was undertaken on 4th February 2022 by Jenny Diack, Senior Ecologist (NatureScot Licence 150746) and Helen Lamont, Ecologist. Trees, buildings and structures within the Study Area were assessed to identify potential roost features (PRFs), search for evidence of roosting bats and provide an overall assessment of roost suitability to inform further survey requirements using the BCT guidelines (Collins, 2016).

The ground-level inspection of trees, structures and buildings involved searching for the presence of features which could be of value to roosting bats, such as splits, cracks, rot holes, coverings of mature ivy, peeling bark (within trees) and raised slates, gaps under soffits or barge boards, crevices in stone or brick work (within buildings). Additionally, physical evidence of presence was also searched for (e.g. bat corpses, droppings, feeding remains, scratch marks, and urine and grease staining). The potential for the trees, structures or buildings to support roosting bats was ranked in accordance with the criteria set out in the BCT guidelines.

Roosting bats

Guidelines for assessing the potential suitability of the structure, building or tree to support roosting bats, based on the presence of suitable roost features, are given below:

- Negligible – Negligible roost features identified, not suitable for roosting bats.
- Low – A structure with one or more potential roost features that could be used by individual bats opportunistically. However, these potential roost features do not provide enough space, shelter,



protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by large numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). Could also be a tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.

- Moderate – A structure or tree with one or more potential roost features that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
- High – A structure or tree with one or more potential roost features that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Foraging/commuting bats

Guidelines for assessing the potential suitability of the Proposed Development Site for use by commuting and foraging bats, based on the presence of habitat features, are given below:

- Negligible – Negligible habitat features on Site likely to be used by commuting or foraging bats
- Low
 - Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by another habitat.
 - Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in parkland situation) or a patch of scrub.
- Moderate
 - Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.
 - Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
- High
 - Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.
 - High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.

Winter Hibernation Assessment

During the survey all trees, buildings and structures were also assessed as to their suitability to support hibernating bats.

3.3 Active Season Bat Surveys

3.3.1 Overview

During the surveys, surveyors watched for bats exiting potential roost features and recorded activity using bat recording equipment (see 3.3.4. below) for later analysis. The number of survey visits was based on the assessment of roost suitability with Low roost suitability structures surveyed over one visit and Moderate roost suitability trees/structures surveyed over two visits. Survey dates and locations are described within Section 4.4.1.



3.3.2 Dusk Emergence

The dusk survey commenced 15 minutes prior to sunset and continued for a minimum of 90 minutes after sunset. If late emerging species, such as brown long-eared or *Myotis* bats, were recorded during the survey, or had been recorded during a previous survey visit, surveys would continue until 120 minutes after sunset. However, this was not the case.

3.3.3 Dawn Re-entry

The dawn survey commenced 90 minutes prior to sunrise and finished 15 minutes after sunrise. During the survey, surveyors watched for bats entering potential roost features within the trees and structures. If early returning species, such as brown long-eared or *Myotis* bats, had been recorded during the first dusk survey visit, the survey would have commenced 120 minutes prior to sunrise. However, as mentioned above this was not the case.

3.3.4 Analysis

All bat activity was recorded using Batbox Duet FD recorders and Wav. recording devices. Batbox Duet recordings were analysed using BatSound software for identification of bat calls to species level where necessary.

3.4 Survey Limitations

Bats do not always leave visible signs on the outside of roosting locations and, if present, these signs can often be removed through adverse weather conditions. Therefore, the absence of bat evidence does not necessarily equate to the absence of roosting bats. However, as features with potential suitability for roosting bats should be subsequently investigated in more detail, this is not considered a significant limitation.

Sound Analysis

Analysis of survey recordings (sonograms) was aimed at correlating bat echolocation calls to species, as far as possible, although there are limitations related to the identification of bat species solely from sonograms; these include:

- Some species, most notably *Myotis* species, have similar calls that cannot always be reliably separated;
- The quality of the recording is related to the proximity of the sound source to the detector and the presence of any obstructions. As such, faint and/or distorted calls may not be recorded in sufficient detail to allow identification;
- All bats can vary their calls substantially according to their environment and the purpose of the call, and therefore some calls may be atypical, thus making identification unreliable;
- As the peak frequencies of common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*) can overlap, calls with peak frequencies of 50-51Khz were not identified to species level and were noted as pipistrelle bat (*Pipistrellus* spp.); and
- During one of the dawn surveys at Tree 19 on 27th July, a water pump was continuously running in close proximity to the tree. The resulting noise and interference meant that it was not possible to record bat activity for analysis. Visual observations of bat activity were considered sufficient to establish if bats were using potential roost features but species active in the vicinity of the tree could not be confirmed.



4. Results

4.1 Desk Study

Data received from TWIC (2021) shows that common pipistrelle, soprano pipistrelle, *Myotis* bat species, Daubenton's bat (*Myotis daubentonii*), whiskered/Brandt's bat (*Myotis mystacinus/Myotis brandtii*), Natterer's bat (*Myotis nattereri*), noctule bat (*Nyctalus noctula*) and brown long-eared bat (*Plecotus auritus*) have been recorded within 5 km of the Site in the last 10 years. Table 1 below summarises the results of the bat data search.

Table 1. Bat species recorded within 5 km of the Site in the last 10 years

Species	Record Summary
<i>Myotis</i> spp.	Five records within the last 10 years with the most recent in 2016 and closest record lies 1.6 km SE of Site
Daubenton's bat	Two records within the last 10 years with the most recent in 2016 and closest record lies 2.5 km S of Site
Whiskered/Brandt's bat	Four records within the last 10 years with the most recent in 2016 and closest record lies 2.5 km S of Site
Natterer's bat	Four records within the last 10 years with the most recent in 2016 and the closest record lies 1.3 km SE of Site
Noctule bat	Four records within the last 10 years with the most recent in 2016 and the closest record lies 3.6 km S of Site
Common pipistrelle	Six records within the last 10 years with the most recent in 2016 and the closest record lies 1.2 km SE of Site
Soprano pipistrelle	Six records within the last 10 years with the most recent in 2016 and the closest record lies 1.2 km SE of Site
Brown long-eared bat	One record within the last 10 years lies 1.3 km SE of Site

4.2 Habitat Assessment

The Site is well connected to habitats in the wider environment via the green and blue network of woodland strips and watercourses. Habitats within the Site provide a mosaic of suitable bat foraging, commuting, and roosting habitat, particularly along the wooded burn corridors of Thornton Burn, Dry Burn and Bilsdean Burn that lead into smaller tributaries and waterbodies including the Ogle Burn, Thurston Mains Burn, and Kames Well pond. Watercourses and waterbodies are likely to be utilised by species such as Daubenton's bat, which specialise in foraging within riparian habitats.

The main areas of woodland that provide suitable commuting and foraging habitat for bats are located along the Thornton Burn, at the south edge of the Site boundary, and areas of woodland in the south east of the Site. The woodland sections within the Site provide sheltered foraging and commuting routes for bats and, as part of the green network, provide landscape features for bats to move between habitats of good value across the Site.

Arable land makes up the majority habitat of the Site and along the proposed cable route options (based on the design options at the time of the survey). Associated areas of hedgerow and scrub along field margins provide good foraging habitat and commuting routes for bats.

Scattered semi-mature and mature trees within the Site have features such as holes, cracks, crevices which provide numerous roosting opportunities for bats.

Overall, the habitats are assessed as **High** suitability for all bat species.



4.3 Preliminary Roost Assessment


All Target Notes and Photographs described within this section are contained within Annex A. Target Note descriptions for trees with potential roost features (PRF) within the Study Area are detailed in Table A1 and structures detailed in Table A2 with locations shown in Figure 7.32.

4.3.1 Trees

Within the Study Area, 19 trees were identified with features suitable for use by roosting bats as described within Table A1, Annex A and shown on Drawing 7.32. Following consultation with NatureScot it was decided that where potential roost features lay within the footprint, or within 15 m of the Proposed Development (based on the design options at the time of the survey), further survey should be completed to confirm presence or absence of roosting bats. Two of the trees, TN16 and TN17, fell within the cable route or within the 15 m of proposed works (based on the design options at the time of the field surveys) and are described in Table 2 below. Both trees are categorised as having **Moderate** suitability for use as a summer roost and **Negligible** suitability for use as a winter roost. Further survey of these trees was undertaken in 2021 to confirm presence or absence of roosting bats.

Table 2. Trees with Potential Roost Features within cable route option and 15 m buffer


Target Note	Grid Reference (X/Y)	Species	Description	Summer Roosting Potential	Hibernation Potential
16	NT 73646 75399	<i>Fraxinus excelsior</i>	 <p>Split down trunk from broken limb of ash measuring 50cm in height, suitable for use by individual bats. Located in good bat habitat of broadleaved woodland.</p>	Moderate	Negligible
17	NT 73923 74072	<i>Fraxinus excelsior</i>		Moderate	Negligible

Target Note	Grid Reference (X/Y)	Species	Description	Summer Roosting Potential	Hibernation Potential
			 <p data-bbox="595 1377 1161 1507">Large ash located on south side of Thornton burn with features that could be used by individual bats including branch cracks and lifted bark in good bat habitat.</p>		

4.3.2 Structures

Within the Site, six structures were identified with features suitable for use by roosting bats as described within Table A2, Annex A and shown on Figure 7.3.2. Of these structures, one ECML overbridge (TN24) lies within 15 m of proposed road widening works for an access road south of the A1 trunk road and is categorised as having Low bat roosting potential for use during the summer and winter as described in Table 3.

Table 3. Structures with Potential Roost Features within cable route option and 15 m buffer

Target Note	Grid Reference (X/Y)	Description	Summer Roosting Potential	Hibernation Potential
24	NT 76082 72909	 <p data-bbox="475 1709 1038 1968">Rail overbridge that could not be accessed due to train line. Stone wingwalls, abutments and parapets. Overall stonework was in good condition with no suitable roost features evident, however as lineside access was not possible to fully inspect, a precautionary approach was adopted, and the bridge was assessed as having Low bat roost potential.</p>	Low	Low



4.4 Active Season Surveys

The results of the active season surveys are summarised below. Full survey results are included within Annex B.

4.4.1 Survey Dates and Conditions

Table 4 below summarises survey dates and conditions for the active season survey visits and survey forms are provided in Annex B.

Table 4. Summary of Active Season Survey Visits

Location	Date	Survey Type	Temperature Start °C	Temperature End °C	Rain	Wind	Cloud Cover
Tree 16	23/07/2021	Dawn	16	14	0	1	2
	09/08/2021	Dusk	17	16	0	1	4
Tree 17	27/07/2021	Dawn	15	14	0	1	6
	10/08/2021	Dawn	15	14	0	1	2
Bridge TN24	24/08/2021	Dusk	17	16	0	1	6

4.4.2 Tree 16

4.4.2.1 Survey visit 1 – Dawn Re-entry, 23.07.2021

No bats were seen returning to the tree during the survey. One soprano pipistrelle and one common pipistrelle were recorded foraging along the edge of treeline at 04:17.

4.4.2.2 Survey visit 2 – Dusk Emergence, 09.08.2021

No bats were seen leaving the tree during the survey. One bat was heard continuously foraging at the edge of the treeline, over the arable fields to the east of the surveyor location at 22:00.

4.4.3 Tree 17

4.4.3.1 Survey Visit 1 – Dawn Re-entry, 27.07.2021

No bats were seen returning to the tree during the survey. Bats heard on detector at 04:05 and 04:31 but no recordings due to background noise from water pump running close to survey location.

4.4.3.2 Survey Visit 2 - Dawn Re-entry, 10.08.2021

No bats were seen returning to the tree during the survey. *Pipistrellus* sp. were recorded foraging along the watercourse, passing four times at 04:05 and seven times at 04:19 and one *Myotis* bat was recorded commuting across the surveyor location at 04:33.

4.4.4 Bridge TN24

4.4.4.1 Survey Visit 1 – Dusk Emergence, 24.08.2021

No bats were seen emerging from the structure during the survey. One bat was recorded foraging in the field south of the bridge at 21:07 by the surveyor at the north side of the bridge and one bat was observed commuting across the Site at 21:19 by the surveyor at the south side of the bridge.



5. Discussion

5.1 Habitats

The habitats within the Site and wider study area include mature woodland, hedgerows and watercourses that provide bats with excellent sheltered foraging and commuting routes through the landscape as well as roosting opportunities within mature trees. The footprint of works largely lies within areas of arable and improved grassland fields which are lower value for bats. At the northern end of the proposed route it crosses a small area of mixed plantation woodland and a new cable bridge is to be installed across the Braid Burn at the southern end of the route. These works will require vegetation removal including tree felling but the width of the works corridor is such that it is unlikely to result in the severance of commuting or foraging routes during the construction or operational phase.

5.2 Trees

5.2.1 Trees 16 and 17

During activity surveys low numbers of pipistrelle bats were active foraging and commuting in the vicinity of the trees with one *Myotis* bat pass also recorded near Tree 16. No roosting behaviour was observed at either tree. Following a revision to the design both trees now lie outwith 30 m of the proposed works and require no further consideration.

5.3 Structures

5.3.1 Bridge TN24

The active season survey found no evidence that bats are roosting within the railway overbridge at TN24. Bat activity during the survey was low with one pipistrelle bat active foraging in the arable field to the south of the structure location. No further survey or consideration of this structure is required.

5.4 Potential roost features (Trees and Structures)

Table 5 below outlines the recommended minimum protection zone when considering the potential for works to result in the disturbance of roosting bats due to associated levels of noise, vibration, and dust (adapted from Shawyer, 2011¹). The final design has been produced with consideration of potential roost features to avoid wherever possible. At present all potential roost features now lie outwith 30 m of the Proposed Works as shown on Figure 7.3.2 and no further survey of these trees or structures is required. However, if there is a change to the planned works and a suitable minimum protection area cannot be maintained then further survey will be necessary and a Suitably Qualified Ecologist (SQE) must be consulted.

Table 5. Recommended protection zones for different levels of disturbance (Shawyer, 2011)

Predicted Level of Disturbance	Example Site Activities	Minimum Protection Zone
Low	<ul style="list-style-type: none">➤ Pedestrian movement➤ Storage of materials➤ Artificial lighting (not directed towards potential roost feature)	10 m

¹ Note this reference relates to barn owl (*Tyto alba*) mitigation; however, the reasoning behind the size of disturbance buffers is considered applicable to bats also, and similar bat disturbance buffers have been accepted by NatureScot on other schemes.



Predicted Level of Disturbance	Example Site Activities	Minimum Protection Zone
Moderate	➤ General building and landscaping works – laying of concrete, bricks, roofing etc. Using mechanised plant	15 m
High	➤ Heavy construction works – ground levelling, pile driving, use of compacting roller etc. using heavy plant	30 m

5.5 Birds

It is noted that habitats within the Site also provide numerous nesting opportunities for birds. If works are undertaken in the nesting season from March to August, inclusive, these activities could result in the loss of one or more active nests, which would constitute an offence under the Wildlife and Countryside Act (WCA) 1981 (as amended).

To ensure compliance with the WCA 1981 (as amended), works should be completed outside of the nesting season. If this is not possible, a SQE should search works areas for evidence of nesting birds within 48 hours of works commencing. Should a nest be recorded, a suitable protection zone must be put in place until the young have successfully fledged the nest.

5.6 Use of Appropriate Lighting

Artificial lighting can often impact the foraging and commuting behaviour of nocturnal mammals, notably bats. Consequently, it is advised that if task lighting is required during works, then it should be directed to where it is needed and light spillage (whether direct and/or in-direct) should be avoided, particularly within the vicinity of the confirmed roost locations and woodland edge habitat (BCT/ILP, 2018). Further guidance is available from the EUROBATS Secretariat (Voigt *et al.*, 2018). The design of permanent lighting within the development should also take the above into account to avoid potential long-term impacts on roosting, foraging and commuting behaviour of bats within the Site.

5.7 Repeat Surveys

The survey data in the present report are considered valid for 12 months. As works will not commence before September 2022, it is recommended that an update survey is undertaken, as per the methods section of this report, to ensure there has been no significant change to the baseline outlined within this report.

6. Compliance with Legislation

Fulfilment of the recommendations outlined above will ensure compliance with the relevant nature conservation legislation outlined in Section 2.1.



7. References

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Figures

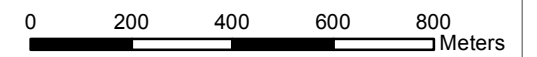
Figure 7.3.1 – Location Plan





Key:

- Site Boundary
 - 50m buffer (bats)
- Infrastructure**
- Permanent
 - Temporary



Scale 1:15,000 @ A3



Berwick Bank
Technical Appendix 7.3 - Bat Survey

**Figure 7.3.1
Location Plan**

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Date: 04/11/2022	Drawn by: JD	Checked by: RK	Version: v1
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Figure 7.3.2 - PRA Results



Key:

- Site Boundary
- 50m buffer (bats)

Structures and Buildings

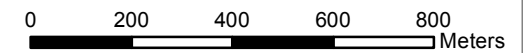
- High
- Moderate
- Low
- Negligible

Trees

- ▲ High
- ▲ Moderate
- ▲ Low
- 30m disturbance buffer trees

Infrastructure

- Permanent
- Temporary



Scale 1:15,000 @ A3



Berwick Bank
Technical Appendix 7.3 - Bat Survey



Figure 7.3.2
PRA Results



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Annexes



Annex A – Target Notes

Table A1. Trees with Potential Roost Features



Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
1	NT 73770 73284	High	Low	 <p>Sessile oak with observable broken limbs and cracks along branches approximately 30 m above ground level. Features could provide roosting potential for multiple bats and surrounding habitat is considered to have High suitability for use by bats. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>
2	NT 73884 73281	Moderate	Negligible	



Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				Ash tree with visible crack in trunk approximately 4m above ground level that could be utilised by multiple bats. Surrounding habitat is considered to have Moderate suitability for bats. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.
3	NT 73807 73306	Low	Negligible	 <p>Ash with ivy cover and holes in trunk that may provide roosting opportunities for individual bats. Tree is approximately 10 m in height. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats. Surrounding habitat is considered to have Moderate suitability for use by bats.</p>
4	NT 73724 73304	Moderate	Negligible	 <p>Ash with two large branch breaks and splintered wood with potential for use by multiple bats.</p>




Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				Habitat in close proximity considered to be Moderate suitability for use by bats. Feature height from ground c.10m. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.
5	NT 74368 72362	Moderate	Low	 <p>Ash with two holes in trunk that could be utilised by individual bats. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>
6	NT 74135 72383	High	Moderate	 <p>Sessile oak with 2 m long crack in main stem that could be used by multiple bats over summer and winter. Habitat is also considered to be High suitability for use by bats. If tree to be impacted recommend climb and inspect survey to fully assess</p>




Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				features for evidence of and/or potential for, roosting bats.
7	NT 72246 74719	Low	Negligible	 <p>Large sycamore with broken trunk that has small cracks running down main stem that could be utilised by individual bats. Area considered to be low potential for bats due to the poor connectivity of copse to wider landscape. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>
8	NT 73925 72351	Low	Negligible	 <p>Sessile oak with broken limb showing cracks that could be accessed by individual bats. Feature located c.5 m above ground level. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>



Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
9	NT 73930 72773	Low	Negligible	 <p>Sycamore with large amount of raised bark that could be utilised by individual bats. Habitat considered Moderate suitability for use by bats. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>
10	NT 74292 72750	Mod	Low	 <p>Pedunculate oak with broken limbs with cracks that could be utilised by individual bats. Surrounding habitat considered to have Moderate suitability for use by bats. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>




Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
11	NT 74725 73273	Low	Negligible	 <p>Ash with large tear-out exposing hole in main stem that could be utilised by multiple bats, approximately 5 m above ground level. Surrounding habitat considered to have Moderate suitability for bat use including a small burn. If tree to be impacted recommend climb and inspect survey to fully assess features for evidence of and/or potential for, roosting bats.</p>
12	NT 74725 73273	Moderate	Low	 <p>Ash with large gaping cavities up trunk that could be accessed by multiple bats. Features observed to be c.8 m from ground. Further active season surveys recommended if tree to be impacted.</p>

Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
13	NT 72246 74719	High	Low	 <p>Kent bat boxes affixed to north side of semi-mature ash. Difficult to reach with ladder so would need climbed if they are to be inspected.</p>
14	NT 73702 75426	High	Low	 <p>Kent bat boxes x2 attached to juvenile ash. Tree tag 0619. Can be reached by ladder to inspect.</p>
15	NT 73674 75413	High	Low	 <p>Kent bat box and bird box. Easy to reach with ladder to inspect.</p>

Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
16	NT 73646 75399	Moderate	Negligible	  <p data-bbox="802 1355 1366 1507">Split down trunk from broken limb of ash measuring 50 cm in height, suitable for use by individual bats. Located in good bat habitat of broadleaved woodland. Active season surveys and/or inspect using ladder to access.</p>
17	NT 73923 74072	Moderate	Negligible	








Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				 <p data-bbox="802 1350 1366 1503">Large ash located on south side of Thornton burn with features that could be used by individual bats including branch cracks and lifted bark in good bat habitat. Recommend active season surveys and/or climb and inspect.</p>



Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
18	NT 74228 72431	Moderate	Negligible	  <p data-bbox="802 1348 1366 1440">Large ash with woodpecker damage and lifted bark in good habitat for bats. Can be checked by tree climbers.</p>
19	NT 73473 73178	High	Low	




Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				Sessile oak with large fracture 2m long down trunk and multiple broken branches in good bay foraging habitat. Can be checked by tree climbers




Table A2. Structures with Potential Roost Features

Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
20	NT 74370 74152	Moderate	Moderate	  <p>Railway underbridge passing over Thornton Burn that has visible gaps in brickwork and cracks in barrel that can be accessed by multiple bats. Potential for use as both a summer and winter roost site.</p>

Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
21	NT 73855 75399	High	High	  <p>Old lime kilns with high bat roost potential due to gaps in brickwork on sides and roof of kiln with deep crevices providing access to multiple bats.</p>
22	NT 73780 75398	Low	Low	 <p>Public toilets with slate roof tiles. The building is considered to have Moderate bat roost potential for use as a summer roost, with multiple gaps under tiles that could be utilised by low numbers of bats (1-2 bats). No internal survey completed of loft space but no evidence of bat roosting activity found on walls or from crevices under the fascia of roof.</p>

Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
23	NT 75287 73519	Moderate	Low	 <p>Railway bridge with high bat roosting potential due to gaps in concrete and brickwork</p>
24	NT 76082 72909	Low	Low	

Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				  <p>Rail overbridge that could not be accessed because of the live train line. Stone wingwalls, abutments and parapets. Overall stonework was in good condition with no suitable roost features evident, however as lineside access was not possible to fully inspect, a precautionary approach was adopted and the bridge is assessed as having Low bat roost potential.</p>
25	NT 75835 73114	Moderate	Low	

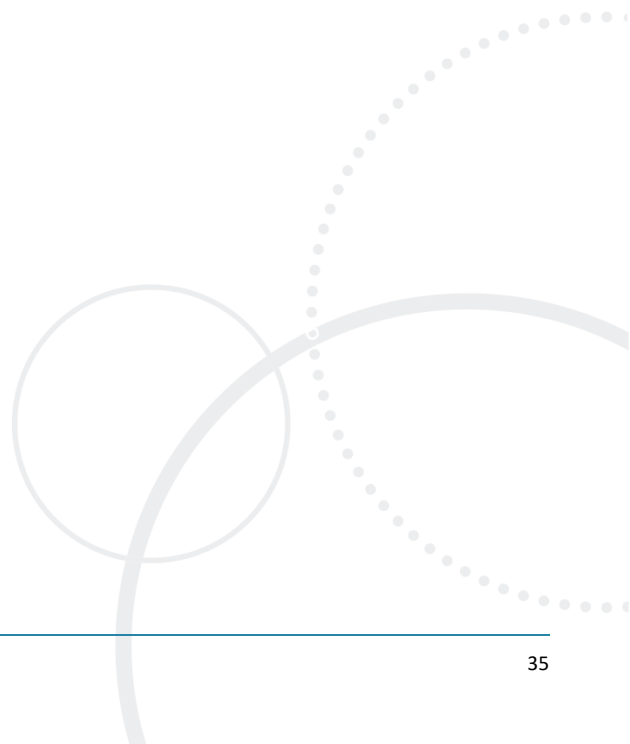
Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				 <p data-bbox="758 757 1369 817">Small rail bridge with features including gaps between concrete overhead and gaps in connecting brickwork.</p>
26	NT 72637 75449	Moderate	Low	 <p data-bbox="758 1294 1369 1384">ECML railway bridge over the Dry Burn. A number of gaps in stonework, particularly on northwest and northeast wingwalls. Moderate bat roost suitability.</p>
27	NT 72664 75429	Negligible	Negligible	



Target Note	Grid Reference (X/Y)	Summer Roost Potential	Winter Roost Potential	Description
				ECML railway bridge (ECM8/098) over farm track. Stone construction. Pointing in good condition with no potential roost features identified.



Annex B – Survey Forms



Type of Survey:	Dawn - Re-entry	Sunrise time:	05:01			
Survey Location:	Tree 16 - Berwick Bank	Grid Reference:	NT 73646 75399			
Date:	23/07/2021					
Surveyors						
Equipment	Weather	Temp (0C)	Rain	Wind (Beaufort)	Cloud (eighths)	
Stuart Abernethy (SA)	Tascam + Batbox	Start of survey:	16	0	1	2
		End of survey:	14	0	1	4
Surveyor						
Time	Species	Number of bats	Number of passes	Activity (e.g. foraging, commuting, roosting)	Notes	
Start of survey	03:30					
Track 444	04:17 Soprano pipistrelle	1		1 Foraging	Bat can be heard continuously foraging along edge of treeline and in trees	
Track 445	04:17 Common pipistrelle	1		1 Foraging	Bat heard foraging along edge of woodland	
End of survey	05:15					
Total survey time (minutes)	105		Total number of passes	2		
Survey Summary						
<p>Surveyor 1: One common pipistrelle and one soprano pipistrelle were recorded foraging along the edge of the treeline c.30m south of the target tree. No bats were observed returning to the identified feature on the tree</p>						

Type of Survey:	Dusk - emergence	Sunset time:	21:00			
Survey Location:	Tree 16 - Berwick Bank	Grid Reference:	NT 73646 75399			
Date:	09/08/2021					
Surveyors	Equipment	Weather	Temp (0C)	Rain	Wind (Beaufort)	Cloud (eighths)
Stuart Abernethy	Batbox + Tascam	Start of survey:	17	0 (heavy during the day)	1	4
		End of survey:	16	0	1	4
Surveyor	Time	Species	Number of bats	Number of passes	Activity (e.g. foraging, commuting, roosting)	Notes
Start of survey	20:30					
Track 461	22:00		1	1	commuting	bat heard at the edge of treeline, no clear recording
Track 461			1	1	commuting	bat heard over the arable fields to the east of the surveyor location
Track 461			1	2	foraging	bat heard along the edge of the treeline and return flight
End of survey	22:30					
Total survey time (minutes)	120		Total number of passes	4		
Survey Summary						
<p>Surveyor 1: No bats observed leaving the split tree feature at the time of survey. Bats could be heard outside of the woodland at the edge habitat and over the arable fields but none were recorded foraging within the woodland.</p>						

Type of Survey:	Sunrise - emergence	Sunrise time:	05:08			
Survey Location:	Berwick Bank - Tree 17	Grid Reference:	NT 73923 74072			
Date:	27/07/2021					
Surveyors	Equipment	Weather	Temp (0C)	Rain	Wind (Beaufort)	Cloud (eighths)
Stuart Abernethy (SA)	Tascam + Batbox	Start of survey:	15	0	1	6
		End of survey:	14	0	1	2
Surveyor SA	Time	Species	Number of bats	Number of passes	Activity (e.g. foraging, commuting, roosting)	Notes
Start of survey	03:37					Water pump generator running <10m from surveyor
Track 452	04:05	unknown	1	1	commuting	bat pass heard on Batbox of commuting call along the watercourse - no clear recording of sonogram due to background noise
Track 453	04:31	unknown	1	1	commuting	bat pass heard on Batbox of commuting call along the watercourse - no clear recording of sonogram due to background noise
Track 454	05:00					water pump switches off
End of survey						
Total survey time (minutes)	106		Total number of passes	2		
Survey Summary						
<p>Surveyor 1: Infrequent passes were heard on batbox but due to the noise from the water generator the recordings were poor quality. No bats were seen returning to the tree features being observed at the time of survey</p>						

Type of Survey:	Dawn - Re-entry	Sunrise time:	05:30			
Survey Location:	Tree 17 - Berwick Bank	Grid Reference:	NT 73923 74072			
Date:	10/08/2021					
Surveyors						
Equipment	Weather	Temp (0C)	Rain	Wind (Beaufort)	Cloud (eighths)	
Stuart Abernethy	Tascam + Batbox	Start of survey:	15	0	1	2
		End of survey:	14	0	1	2
Surveyor						
Time	Species	Number of bats	Number of passes	Activity (e.g. foraging, commuting, roosting)	Notes	
Start of survey	04:00					
Track 462	04:05 Pipistrellus spp	2		4 Foraging	Bats foraging west to east along burn channel	
Track 462	04:19 Pipistrellus spp	1		7 Foraging	bat foraging along watercourse on the same flight line multiple times	
Track 462	04:33 Myotis spp.	1		1 Commuting	One bat making commuting buzz as it passes over surveyor from west to east along burn	
End of survey	05:45					
Total survey time (minutes)	105	Total number of passes	12			
Survey Summary						
<p>Surveyor 1: Bats were recorded commuting along the burn corridor and sonograms of pipistrellus and myotis bats were recorded using the area for foraging. No bats were observed returning to the features on the tree at the time of survey.</p>						

Type of Survey:	Dusk emergence	Sunset time:	20:34			
Survey Location:	Railway overbridge - TN24	Grid Reference:	NT 76082 72909			
Date:	24/08/2021					
Surveyors	Equipment	Weather	Temp (0C)	Rain	Wind (Beaufort)	Cloud (eighths)
Stuart Abernethy (SA)	Tascam + Batbox	Start of survey:	17	0	1	6
Natalie Hooton (NH)	Tascam + Batbox	End of survey:	16	0	1	6
Surveyor	Time	Species	Number of bats	Number of passes	Activity (e.g. foraging, commuting, roosting)	Notes
Start of survey	20:15					
	21:07		1	4	foraging	Bat observed and recorded foraging in field south of the target structure
	21:17		1	2	foraging	same bat foraging in field south of target structure
	21:19		1		commuting	one bat pass
End of survey	22:00					
Total survey time (minutes)	105		Total number of passes	6		
Survey Summary						
<p>Surveyor 1 (SA): One bat was observed and recorded foraging in the arable fields to the south of the target structure. No bats were observed leaving the bridge under observation</p> <p>Surveyors 2 (NH): one bat was observed commuting across the arable fields to the south of surveyor</p>						



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