Appendix 5.2

Bat Survey Report

C.GEN Killingholme Limited

NORTH KILLINGHOLME POWER PROJECT

Bat Survey Report

BAT
MAY 2020

PUBLIC

C.GEN Killingholme Limited

NORTH KILLINGHOLME POWER PROJECT

Bat Survey Report

PUBLIC

PROJECT NO. 70055743

OUR REF. NO. BAT

DATE: MAY 2020

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Final			
Date				
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Signature				
Project number	70055743			
Report number	BAT			
File reference	North Killingholme DCO Amendments_Bat Survey Report			

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EXECUTIVE SUMMARY

WSP UK Limited (hereafter referred to as 'WSP') was commissioned by C.GEN Killingholme Limited (hereafter referred to as C.GEN) to undertake a bat surveys on land in North Killingholme, North Lincolnshire (National Grid Reference: TA 16141 20137); hereafter referred to as 'the Site' (see Figure 1). The purpose of the surveys was to update the ecological baseline of the Site to support an amendment to the Development Consent Order (DCO) of the North Killingholme Power Project, granted in 2014. The project proposals included the construction and operation of a new 470 megawatt electrical (MWe) thermal generating station and associated development (hereafter referred to as the Proposed Scheme). The amendment includes a non-material change application to extend the lifetime of the DCO. In order to ensure the consent remains fit for purpose, other minor modifications to the Order are proposed. However, no changes are sought to the technology used, modes of operation or the Order Limits.

To support the 2013 application, a series of bat surveys were undertaken on the Site in 2011. Overall, low levels of activity were recorded from four bat species: common pipistrelle, soprano pipistrelle, noctule and a Myotis sp. Greater levels of common pipistrelle and noctule were recorded at specific locations across the Site, particularly the western and northern boundary. During a Preliminary Ecological Appraisal (PEA) undertaken in May 2019 to support the amendment to the DCO, suitable habitat for supporting commuting, foraging and roosting bats was identified on the Site. Suitable habitat included scattered and dense scrub, scrub interfaces, waterbodies and buildings. The Site was assessed as having low roosting suitability for bats due to its industrial nature.

An external building inspection was undertaken on 18 buildings across the Site in 2019, with seven buildings having suitability for roosting bats. Emergence and dawn re-entry surveys were conducted on each building to determine presence/likely absence during the active season in 2019. In addition, three manual transect survey visits were carried out to ascertain bat activity levels across the Site. These were carried out in August and September 2019 and April 2020. An automated static detector survey was also carried out alongside the transects, with a static detector deployed in a single location for a total of five nights per survey month.

Six species of bat were recorded during the 2019 bat surveys: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle noctule, brown long-eared bat. Overall, the surveys recorded relatively low levels of bat activity across the Site. Greater levels of common pipistrelle and noctule were recorded at specific points within the Site, notably the northern boundary. A small summer roost of common pipistrelle was also identified within B5.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1. WSP UK Limited (hereafter referred to as 'WSP') was commissioned by C.GEN Killingholme Limited (hereafter referred to as C.GEN) to update ecological baseline data in relation to a proposed amendment to the Development Consent Order (DCO) granted for the North Killingholme Power Project in 2014. The project proposals include the construction and operation of a new 470 megawatt electrical (MWe) thermal generating station and associated development (hereafter referred to as the Proposed Scheme).

1.1.2. The proposed amendments to the DCO includes a non-material change application to extend the lifetime of the DCO, initially granted in 2014. The Order Limits, proposed plant and generation equipment, remains the same as described in the Environmental Statement (referred to as the Principal Project Area). The Principal Project Area is centred at National Grid Reference: TA 157 198); and hereafter referred to as the 'Site' (displayed on **Figure 1**).

1.2 ECOLOGICAL BACKGROUND

1.2.1. The Site has been subject to a number of protected species surveys and assessment work, as part of the ES for the North Killingholme Power Project (C.GEN, 2013). Parsons Brinckerhoff (PB) conducted the surveys to support the ES undertaking bat surveys in 2011 (Parsons Brinckerhoff, 2011). Activity was recorded from four bat species: common pipistrelle, soprano pipistrelle, noctule and a *Myotis* sp intermittently across the Site. Common pipistrelle and noctule were recorded more frequently than other species and were particularly found commuting along the western and northern boundaries.

1.2.2. In 2019, WSP carried out a Preliminary Ecological Appraisal (PEA) of the Site (WSP, 2019). The survey covered the entire Site including boundary features. In addition, where accessible, a 20m area around the Site was also surveyed from vantage points and aerial mapping to gather an overview of surrounding habitats. Suitable habitats for bats were confirmed to still be present within the Site and WSP were subsequently commissioned by C.GEN to undertake targeted bat surveys.

1.3 DESK STUDY

1.3.1. As part of the PEA, a desk study was undertaken for the Site (WSP, 2019). In total, 72 records of bat were identified within 5km of the Site during the last ten years. These records comprised five species: brown long-eared bat *Plecotus auritus*, noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and Natterer's bat *Myotis nattereri*. No records for bat roosts within the Site were returned.

1.3.2. The closest record of foraging/commuting bats was of noctule, soprano pipistrelle, common pipistrelle and a *Myotis* sp., all recorded 270m south of the Site at Chase Hill Wood.

1.3.3. A field observation of roosting noctules was also returned from Chase Hill Wood in 2013.

1.4 BRIEF AND OBJECTIVES

1.4.1. C.GEN commissioned WSP to complete bat surveys of the Site in 2019 and 2020. The brief was to:

- Complete a bat activity survey, comprising repeated manual transect surveys and the deployment of an automated bat detector, to identify the species of bat active on Site and provide an indication of relative activity levels;
- Complete emergence and/or dawn re-entry surveys of built structures with suitability to support bat roosts to establish the presence or likely absence of bat roosts on Site; and
- Evaluate use by and the value of the Site for bats and compare with results from previous surveys carried out in 2011 by PB.

1.4.2. The results of these surveys are included within this report.

2 METHODS

2.1 OVERVIEW

2.1.1. The Site was assessed as having habitats of Low suitability for foraging and commuting bats, following criteria set out in the Bat Conservation Trust guidelines (Collins, 2016). Structures were also identified throughout the Site that could support roosting bats.

2.1.2. In accordance with recommendations stated in the PEA, further surveys to ascertain presence/likely absence of roosting bats within the Site and to measure the level of activity of foraging and/or commuting bats were to be carried out. These surveys included; activity surveys (deployment of static detectors and manual activity transects) and dusk emergence/pre-dawn re-entry surveys. The methodologies employed are outlined below.

2.2 BAT ACTIVITY SURVEY

MANUAL TRANSECT SURVEY

2.2.1. Three manual transect surveys were undertaken within the Site in August and September 2019 and April 2020 in order to capture summer, autumn and spring activity (survey effort appropriate for Low suitability habitat (Collins, 2016)).

2.2.2. Each month a single pre-defined transect was walked by two surveyors at dusk to record levels of bat activity. The direction and starting point of the transect was varied between seasons to avoid temporal bias in the results. The transect surveys were carried out in accordance with current good practice guidance (Collins, 2016).

2.2.3. Eight locations along the transect route, covering different habitat types, were chosen by surveyors to carry out stationary recording and observation for 5-minute periods. These locations (Point Counts (PC)) were repeated across all visits and meant that collected data was comparable. During each visit, the same pre-defined transect and PCs were walked to record levels of bat activity. Each manual transect survey started 15 minutes before sunset[1] and continued for approximately 120 minutes afterwards. The manual transects surveys were started 15 minutes before sunset to capture data on bats that could be emerging earlier.

2.2.4. During each transect the surveyors noted the bat species heard and seen, including the time, location, and, where possible behaviour type and direction of flight. Surveyors were equipped with bat detectors Elekon Batlogger[2] (EB) to listen to and record bat activity. Calls registered by the bat detectors were recorded for later analysis using specialist computer software, details are provided in **Section 2.5** below.

[1] The third manual transect visit (April 2020) began fifteen minutes after sunset due to equipment malfunction.

[2] For the third transect visit (April 2020), the Government lockdown guidelines relating to Covid-19 prevented WSP surveyors from being able to access an equipment store to collect an Elekon Batlogger. An Echo Meter Touch Pro 2 was used instead.

2.2.5. The transect route walked during the manual transect surveys is provided in **Figure 2**. Dates, times and weather conditions of each of the transect survey visits are provided in **Table A-1**, **Appendix A**.

AUTOMATED DETECTOR SURVEY

2.2.6. In combination with the walked transect surveys, additional bat activity data was gathered using an automated bat detector. An automated (static) bat detector (Song Meter (SM) 4) was deployed in August 2019[3], September 2019 and April 2020 for a minimum of five nights per month in accordance with current good practice guidance (Collins, 2016).

2.2.7. The automated detector was deployed at a location that represented the diversity of habitats present within the Site. The static detector was installed immediately adjacent to a standing water ditch with an adjacent line of dense scrub, demarcating the north-western boundary of the Site and acting as a linear feature for bats to commute along.

2.2.8. The automated detector was set to commence recording 30 minutes before sunset and cease recording 30 minutes after sunrise. The location of the automated detector is shown on **Figure 2**. Dates, times and weather conditions during automated detector surveys are shown in **Table A-2**, **Appendix A**.

2.2.9. Calls registered by the static bat detector were recorded for later analysis using specialist computer software, details are provided in **Section 2.5** below.

2.3 BAT DUSK EMERGENCE / PRE-DAWN RE-ENTRY SURVEY

2.3.1. During the PEA, seven structures within the Site were assessed as having suitability to support roosting bats. One structure (B5) was identified as having Moderate roosting suitability and six structures (B1, B4, B6, B7, B8, B9) were identified as having Low roosting suitability (in accordance with Collins, 2016). All other structures on site had Negligible roosting suitability and were therefore not subject to further survey. See **Table A-3**, **Appendix A** for descriptions of potential roosting features (PRF) associated with each structure and its suitability to support roosting bats.

2.3.2. All seven structures were subject to further surveys to watch and listen for bats emerging from or re-entering a roost. The level of survey effort employed was proportional to the level of roosting suitability and/or the presence of a confirmed roost, in accordance with good practice guidelines (Collins, 2016). The number of visits and the type of survey is detailed in **Table A-4** in **Appendix A and summarised below in Table 2-1**. Surveyor locations were utilised to fully cover the PRF on the surveyed building. The surveyor locations are shown in **Figure 3A**, **3B** and **3C**.

[3] The static bat detector was installed during the August survey visit and left in place to record September data.

Table 2-1 - Dates of emergence and re-entry surveys

	No. Surveyor Positions	Survey Type and Date
B1	2	Dusk emergence (07/08/2019)
B4	1	Dusk emergence (05/09/2019)
B5	4	Dusk emergence (06/08/2019)
	4	Dusk emergence (27/08/2019)
	3	Dawn re-entry/roost characterisation (19/09/2019)
B6	3	Dusk emergence (07/08/2019)
B7	2	Dusk emergence (06/08/2019)
B8	1	Dusk emergence (27/08/2019)
B9	1	Dusk emergence (07/08/2019)

2.3.3. The dusk emergence surveys began 15 minutes before sunset and continued until 120 minutes after sunset. The dawn re-entry surveys began 120 minutes before sunrise and finished 15 minutes after sunrise.

2.3.4. The surveyors used EB bat detectors to listen to and record echolocation calls of bats observed throughout each survey. An infra-red (IR) camera was used as a surveyor position on surveys of B5 and B7 to record footage of bat activity. Following the survey, data collected by the IR camera was analysed to identify bat access/egress into the target structure.

2.3.5. During each survey, surveyors mapped the flight-lines used by any bats observed and noted any features used by the bats to exit/enter the buildings. Incidental records of bat activity in the vicinity of the surveyor locations were also collected.

2.4 DATA ANALYSIS

BAT CALL IDENTIFICATION

2.4.1. The recordings of bat echolocation calls collected during manual transect surveys were analysed using specialist computer software BatExplorer (Version 2.0.3.0) and Kaleidoscope (third survey only). Calls collected during automated static detector surveys were analysed using Kaleidoscope. The analysis enables confirmation of species or species group based on call parameters, and the relative activity of different species of bats by counting the minimum number of bats recorded within

discrete sound files. Once triggered by ultrasound, the SM4 and EB bat detectors record sound files with a duration of 15 seconds, which may contain a number of individual bat calls (or passes), or discrete groups of ultrasound 'pulses'. The assessment of relative bat activity between species is based on the relative abundance of recorded calls of each species within each survey period (i.e. each walked transect survey or period of static monitoring per month) and across the combined study period.

2.4.2. It should be recognised that a series of separate sound files may represent a series of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g. bats making repeated foraging passes within the range of a detector).

2.4.3. Where possible, bat calls were identified to species level. However, species of the genus *Myotis* are grouped together and collectively referenced to as *Myotis* species (sp.) because in most cases their call characteristics are similar in structure and have overlapping call parameters, making species identification problematic (Russ, 2013).

2.4.4. Similarly, *Pipistrellus* sp., *Nyctalus* sp. and *Plecotus* sp. were also used to describe calls where it was not possible to distinguish species within the respective genus. For *Pipistrellus* sp., the following criteria based on measurements of peak frequency were used to classify calls:

- Common pipistrelle ≥ 42 and <49KHz;
- Soprano pipistrelle ≥ 51KHz;
- Nathusius pipistrelle *Pipistrellus nathusii* <39KHz;
- Common/soprano pipistrelle ≥49 and <51KHz; and
- Common/Nathusius pipistrelle ≥39 and <42KHz.

2.4.5. In addition, the following categories were used for calls which cannot be identified with confidence due to the overlap in call characteristics between species or species groups:

- *Myotis/Plecotus* sp.;
- *Nyctalus* sp. (either Leisler's bat *Nyctalus leisleri* or noctule);
- Serotine *Eptesicus serotinus*/Leisler's; and
- Serotine/*Plecotus* sp.

2.4.6. The call identification references used for analysis are set out below in **Table 2-2**. Individual species included under each genus are only those which have been recorded from the Site (i.e. not all species which fall under that genus). It is noted that *Myotis* sp. calls are not identified to species level.

Table 2-2 - Species Identification Analysis Categories and References

Genus	Common name	Scientific name	Call identification analysis reference
Pipistrellus sp.	Unconfirmed pipistrelle sp.	*Pipistrellus* sp.	PIPsp.
	Common pipistrelle	*Pipistrellus pipistrellus*	PIPPIP
	Soprano pipistrelle	*Pipistrellus Pygmaeus*	PIPPYG
	Nathusius' pipistrelle	*Pipistrellus nathusii*	PIPNAT

Genus	Common name	Scientific name	Call identification analysis reference
Myotis sp.	Unconfirmed mouse-eared sp.	*Myotis* sp.	MYOsp.
	Daubenton's bat	*Myotis daubentonii*	MyoDaub
Plecotus sp.	Unconfirmed long-eared sp.	*Plecotus* sp.	PLEsp.
	Brown long-eared bat	*Plecotus auritus*	PLEAUR
Nyctalus sp.	Unconfirmed noctule sp.	*Nyctalus* sp.	NYCsp.
	Noctule	*Nyctalus noctula*	NYCNOC
Unconfirmed sp.	Unconfirmed bat sp.	-	Unconfirmed sp.

MANUAL TRANSECT SURVEY

2.4.7. In conjunction with the surveyors' notes made during each manual transect survey, the recorded sound files were analysed to identify/confirm the species of bats and their level of activity.

2.4.8. Bat Activity Index Values (BAIV) have been calculated to compare activity in different parts of the Site or at different times. The BAIV do not represent the number of bats present; but provide a comparable indicator of the general activity level.

2.4.9. For manual transect surveys, the BAIV for each species was calculated for each transect visit. Overall transect data is represented as bat passes per hour; this BAIV is calculated by dividing the total number of bat passes during the transect by the number of hours spent surveying each transect. PC data is represented as bat passes per visit; this BAIV is calculated by dividing bat passes at the PC by the number of visits to each PC location.

AUTOMATED DETECTOR SURVEYS

2.4.10. All files were analysed using the built-in auto-identification capability of the Kaleidoscope software. All .wav files from the automated detectors were cut into 15 second files.

2.4.11. During the auto-identification process an analysis parameter was applied to filter out 'Noise' files. The settings used during the filter process are detailed in **Table 2-3**, below.

Table 2-3 - Kaleidoscope Pro 5.1.3 Auto Identification Parameters

Signal of interest	
Kilohertz	5 – 150
Milliseconds	2 – 500
Minimum number of calls	2

2.4.12. All files labelled as Noise during the auto-identification process were excluded from subsequent data counts.

2.4.13. All remaining sound files were classified to species level by the auto-identification system. Files were attributed with a specific species identification or classified as 'NoID' where the call parameters could not be identified by the software. Following the auto-identification process, all calls (except common pipistrelle and soprano pipistrelle with a match ratio over 0.89) were manually checked to verify the auto-identification and to identify calls classified as 'NoID' where possible.

2.4.14. The use of two parameters, the 'match ratio' and the 'confidence interval', generated through the auto-identification analysis process, enabled the streamlined analysis of common pipistrelle and soprano pipistrelle calls.

2.4.15. The match ratio (ranging between 0.01-1) for individual sound files provides an assessment of the number of calls ascribed to the primary auto-identified species. All recordings auto-identified as common pipistrelle or soprano pipistrelle with a match ratio of 0.89 or below were manually checked to confirm/identify the bat species. Only 10% of common pipistrelle and soprano pipistrelle calls above a 0.9 ratio were manually checked; a match ratio above this value provided a high level of probability that a single bat species was present within the recording thus it was not considered necessary to manually review all calls with a match ratio over 0.9.

2.4.16. The confidence interval is an indicative value ranging from.01-1; a higher number represents a more confident identification of the primary auto-identified species. Common pipistrelle and soprano pipistrelle calls were ranked according to their confidence interval. A process of checking the auto-identified calls with the lowest confidence interval was undertaken; this process was continued until 50 calls were auto-identified correctly. This process was completed to adequately ensure that common and soprano pipistrelle bat calls were correctly identified.

2.4.17. Analysed bat calls were reviewed by a second ecologist with sufficient experience of bat call identification to deliver quality assurance of the initial analysis. The following review protocols were used to provide quality assurance:

- Second review of 10% of manually identified common pipistrelle and soprano pipistrelle calls; and
- Second review of 10% of manually identified other species calls.

2.4.18. Data logs are generated by the automated detectors which detail the recording history for the periods they were deployed. These logs were assessed to confirm the duration for which the detectors were deployed.

2.4.19. For automated detector surveys, the BAIV of each species was calculated for each month that the detector was deployed. The automated detector data is represented as bat passes per night for each month. This BAIV was calculated by dividing the number of bat passes recorded during each survey visit by the total number of nights the automated detector was deployed during that survey period.

2.5 DATES OF SURVEY AND PERSONNEL

2.5.1. All bat surveys were led by suitably experienced ecologists.

2.5.2. The dates, times and weather conditions for manual/automatic activity and emergence/re-entry surveys are included in **Appendix A**.

2.6 NOTES AND LIMITATIONS

2.6.1. Ecological survey data is typically valid for two years unless otherwise specified; for example, if conditions are likely to change more quickly due to ecological processes or anticipated changes in management.

2.6.2. The third manual transect survey in April 2020 began fifteen minutes after sunset (rather than 15 minutes before) due to equipment malfunction, which was a deviation from the survey methodology used for the August and September visits. However, the survey duration was comparable to the previous two surveys and point count data has been standardised within the results of this document. As such, the data collected, and the conclusions drawn are considered valid.

2.6.3. Different brands of bat detector require specific types of software to analyse recorded calls. As a result of following Government Covid-19 guidelines, access to previously used equipment stored within an office was not possible. Therefore, a different brand of bat detector was used for the third manual activity transect. This meant that a different type of computer software was used to analyse the recorded calls for the third manual transect visit. However, the echolocation calls displayed in the two pieces of software used are similar in appearance, with both software types providing similar identification tools to analyse echolocation calls. As a result, this divergence is not thought to have significantly affected the results of the analysed bat calls.

2.6.4. During the first manual transect survey, surveyors were instructed by Site security to travel by vehicle between PC 2 and PC 3, due to the presence of heavy-duty port vehicles moving large shipping containers in the area. One surveyor drove the vehicle at a slow speed to imitate a speed comparable to walking, whilst the second surveyor deployed the bat detector out of the vehicle window facing upwards. As the same methodology was completed during all three manual transect survey visits and only a small proportion of the transect route was located between PC 2 and PC 3, the data are considered comparable and therefore valid.

2.6.5. It should be noted that bat surveys undertaken using bat detectors are inherently biased as bats with louder calls (such as the *Nyctalus* and pipistrelle species) can be recorded at a greater distance and with greater confidence than species which use quiet calls, such as *Plecotus* species. This could affect the results of all surveys undertaken as it may under-represent the quieter calling species such as *Plecotus* and certain *Myotis* species. However, every effort has been made to record observed behaviour for all bats encountered (echolocating or not) during manual transect surveys. Bat calls have also been carefully analysed to ensure that all bat species are identified (including multiple species within one sound file). This limitation has been considered when interpreting the results.

3 RESULTS

3.1 MANUAL TRANSECT SURVEYS

3.1.1. Eight bat species/species groups were recorded within the Site during the manual transect surveys. The confirmed species/species groups were:

- Common pipistrelle;
- Soprano pipistrelle
- Nathusius' pipistrelle;
- *Pipistrellus* sp.;
- Noctule;
- Daubenton's bat;
- *Myotis* sp.; and
- Brown long-eared bat.

3.1.2. A summary of the activity levels recorded during the transect surveys is provided below. Bat activity (represented as bat passes per hour) recorded during the transect surveys each month are summarised in **Table 3-1** and shown in chart form in **Appendix B**. Bat passes per visit for each PC are presented in **Table 3-2**, and in graph form in **Appendix B**.

Table 3-1 - BAIV of each species for the manual transect surveys (bat passes per hour) per month

Month	PIPPIP	PIPPYG	PIPNAT	PIP.sp	NYCNOC	MYO.sp	PLEAUR	Total bat activity
August 2019	99	8	0	1	2	28	0	138
September 2019	52	11	1	1	13	24	1	103
April 2020	97	8	0	1	0	3	1	110
% of total calls	70.66	7.69	0.29	0.85	4.27	15.67	0.57	

Table 3-2 - BAIV of each species (bat passes per hour) per PC

Point Count (PC)	PIPPIP	PIPPYG	PIP.sp	NYCNOC	MYO.sp	PLEAUR	Total activity per PC
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	34.67	3.00	0.33	0.00	6.33	0.00	44.33
5	4.00	0.00	0.00	0.67	1.33	0.00	6.00
6	2.67	0.33	0.00	0.00	0.00	0.33	3.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.33	1.00	0.00	0.00	0.00	0.00	1.33

Pipistrelle Species (PIPPIP, PIPPYG, PNAT)

3.1.3. Common pipistrelle was recorded at four of the eight PCs; PC 4, 5, 6 and 8; and was the most frequently recorded species, representing 70.66% of total bat passes recorded during the activity transects. Common pipistrelle was recorded with the highest amount of bat passes per hour at PC4 (BAIV of 34.67). This is likely due to the commuting and foraging opportunities available within the habitat near PC4, comprising tree lines, scrub and a waterbody. These habitats also provide connectivity to the wider landscape outside the site.

3.1.4. Soprano pipistrelle made up 7.69% of all bat passes recorded during the activity transects and were recorded at three PCs; PC 4, 6 and 8. The highest level of soprano pipistrelle activity was also recorded at PC 4.

3.1.5. Nathusius' pipistrelle and *Pipistrellus* sp. were less frequently heard, together making up less than 2% of total bat passes recorded during the activity transects. *Pipistrellus* sp. was recorded at a single PC, PC4, whilst Nathusius' pipistrelle was not recorded at any PC (recorded between PC 6 and PC7).

Noctule (NYCNOC)

3.1.6. Noctule was only recorded at one of the eight PCs, PC 5, and was recorded at comparatively low levels of activity (BAIV of 0.67) compared to other species recording during the survey. However, noctule made up a total of 4.27% of all bat passes recorded during the activity transects. PC5 is along a linear fence line with scrub lines to the north and south.

***Myotis* Species (MYO.SP, MyoDaub)**

3.1.7. *Myotis* bats were recorded at two PCs; PC 4 and 5; with a greater level of activity recorded at PC 4. *Myotis* bats made up 15.67 of all bat passes recorded during the bat activity transects, the second highest species/species group (following common pipistrelle).

Brown Long-eared (PLEAUR)

3.1.8. Brown long-eared bats made up less than 1% of the total bat passes and were absent from the manual transect survey in August. This species was recorded at one PC, PC6. Brown long-eared bat calls are quieter than most other bat species and may therefore be under-represented.

3.2 AUTOMATED DETECTOR SURVEYS

3.2.1. A total of seven bat species/species groups were recorded during the automated detector component of the activity survey. The species/species groups were as follows:

- *Myotis* sp.;
- Noctule;
- *Nyctalus* sp.;
- Common pipistrelle;
- Soprano pipistrelle;
- *Pipistrellus* sp.; and
- Nathusius' pipistrelle.

3.2.2. The bat data recorded during the static monitoring periods each month are summarised in **Tables 3-3** and **3-4** further below.

3.2.3. Noctule was the most frequently recorded species, representing 57.8% of all bat records collected during the automated detector surveys (278 individual sound files). *Nyctalus* sp. made up 6.03% of all bat records collected.

3.2.4. Pipistrelle species (common, soprano and Nathusius') represented 35.55% of all bat records collected, with common pipistrelle alone comprising 26.4% of all records. *Myotis* sp. were recorded at, comparatively, much lower levels; 0.62% of all bat records collected.

3.2.5. August recorded the greatest level of bat activity (BAIV of 49.0) during the automated static detector surveys.

3.2.6. A chart showing the percentage bat species composition is displayed in **Appendix B**.

Table 3-3 - BAIV across all months during automated detector surveys

	MYO.sp	NYCNOC	NYC sp.	PIPIP	PIPPYG	PIPsp.	PIPNAT	Grand Total
Count of Species	3	278	29	127	37	6	1	481
BAIV (bat passes per night)	0.20	18.53	1.93	8.47	2.47	0.40	0.07	32.07
% of total species composition	0.62	57.80	6.03	26.40	7.69	1.25	0.21	100.0

Table 3-4 - BAIV per month during automated detector surveys

	MYO.sp	NYNC	Nyc sp.	PIPIP	PIPPYG	PIPSP	PIPNAT	Grand Total
August 2019	0.40	31.40	4.00	9.60	3.20	0.40	0.00	49.00
September 2019	0.00	19.60	1.60	3.60	2.40	0.80	0.00	28.00
April 2020	0.20	4.60	0.20	12.20	1.80	0.00	0.20	19.20

3.3 BAT DUSK EMERGENCE/DAWN RE-ENTRY SURVEY

3.3.1. Of the seven structures subject to dusk emergence/dawn re-entry surveys, roosting behaviour was recorded in relation to B5 only. A single emergence was recorded during the first emergence survey of a common pipistrelle. The emergence was recorded on the western façade from a gap between brickwork near the soffit. On the second emergence survey, two common pipistrelle bats were observed leaving B5 at roughly the same aspect of the structure as observed during the first emergence survey. This was confirmed after reviewing IR camera footage recorded during the survey. The IR footage confirmed that a third emergence occurred, although the species could not be identified. However, given the size of the roost and confirmation of use by common pipistrelles, it

is likely to be a *Pipistrellus* sp. In summary, two common pipistrelle bats and an unconfirmed species of bat (likely to be a *Pipistrellus* sp.) emerged from B5.

3.3.2. A comparatively low level of bat activity was observed and recorded for all other buildings surveyed. Of the foraging and commuting activity recorded, common and soprano pipistrelle and noctule made up the majority of the bat activity. *Myotis* sp. were recorded less frequently.

3.3.3. Survey dates and number of survey positions are included in **Appendix A** and shown on **Figures 4a** to **4c**.

3.4 ASSESSMENT AGAINST PREVIOUS FINDINGS

3.4.1. The habitats within the Site have not undergone a significant change since the 2011 bat surveys.

3.4.2. The findings of the 2019/2020 bat surveys are broadly comparable to the previous survey results obtained in 2011. The PEA undertaken in 2019 assessed the Site as having low suitability for supporting commuting and foraging bats given the industrial nature of the Site and scattered and limited extents of vegetation. Similarly, the Site was assessed as having limited opportunities for bats during previous surveys in 2010[4]. However, both assessments identified specific parcels of habitat (in the west of the Site) as being valuable to commuting and foraging bats.

3.4.3. The parcels of habitats in the west of the Site (referred to as Site 1B in surveys undertaken by PB[5]) were considered to be of high value and supported the most valuable habitat for commuting bats. These habitats were assessed as a probable key commuting corridor for a moderate to large roost of noctule and pipistrelle (likely located within the wider landscape) based on the results of bat activity surveys. Foraging opportunities were assessed as being limited within the Site, providing low suitability for foraging bats. Common pipistrelle and noctule were the most abundant bat species recorded during the bat surveys in 2011, with soprano pipistrelle and *Myotis* sp. recorded less frequently. In 2011, Site 1B was found to support 'moderate to high' numbers (~50) of noctules and common pipistrelle along the northern and western boundaries, indicating that these were of importance to commuting bats. Comparatively low numbers of bats were recorded elsewhere within Site 1B during 2011. Two new species of bat were recorded during the activity surveys in 2019 and 2020, these were brown long-eared and Nathusius' pipistrelle. Very little activity was recorded from these species, with a single Nathusius' pipistrelle call being recorded in April and two brown-long eared calls being recorded, one in September and April.

3.4.4. The bat surveys undertaken in 2019 and 2020 recorded generally low levels of bat activity across the Site. Comparatively moderate levels of activity of common pipistrelle were recorded at specific locations, particularly along the northern boundary of the Site. Comparatively moderate levels of noctule activity were also recorded during the activity surveys, predominantly during the automated detector survey near the scrub and waterbody in the north of the Site. There were low levels of *Myotis* and soprano pipistrelle activity during both 2011 and 2019/2020 surveys. The results of the

[4] Parsons Brinckerhoff (2010) Extended Phase 1 Habitat Assessment of Killingholme Site, Lincolnshire. C.GEN.

[5] Parsons Brinckerhoff (2011) Phase 2 Bat Report: North Killingholme Power Project. C.GEN.

2019 and 2020 survey suggest that the strip of scrub lining the fence along the western boundary and the mosaic of scrub, tree line and waterbody in the north of the Site are important locations for commuting, with foraging opportunities located predominantly around the waterbody and its scrub fringe. A similar assessment was made in the 2011 bat report undertaken by PB, indicating that bats were primarily using the western and northern boundaries.

3.4.5. The emergence/re-entry surveys in 2019 recorded a summer roost of small numbers (<5) of common pipistrelle in B5 (see Figure 4c). In accordance with good practice guidance this roost is considered of 'Low' conservation importance[6]. No bat roosts were identified within B5 during the 2011 bat surveys. Although a roost was not identified in 2011, a number of feeding stations were recorded within two of the buildings (B1 and B2) on Site, indicating that buildings on Site were being used by bats. Furthermore, the ES states that, although no bat roosts were recorded, the Site had the potential to support roosting bats in the future. Requirement 32 of the DCO[7] requires a strategy for pre-demolition bat surveys to be agreed with Natural England.

[6] Collins J. (ed.) (2016). Bat Surveys for Professional Ecologists, Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.

[7] SI 2014 No. 2434 Infrastructure Planning: The North Killingholme (Generating Station) Order 2014

4 IMPLICATIONS FOR DEVELOPMENT

4.1 OVERVIEW

4.1.1. Bats were recorded roosting, commuting and foraging within the Site. The proposals therefore have the potential to cause an impact on roosting, commuting and foraging bats, as was identified in the ES that accompanied the 2013 application. The activity levels recorded during the 2011 surveys are of a similar level to that recorded in 2019/2020 with noctules and common pipistrelles utilising western and northern scrub boundaries and representing the most commonly recorded species. Given the similarity in activity levels and species, impacts and appropriate mitigation measures remains the same as per the measures set out in the ES, and captured under Requirement 32 of the consented DCO.

4.1.2. Although roosting bats were not recorded during 2011, measures to prevent disturbance to bats that could be using buildings as resting places were summarised in the ES. This included the recommendation that demolition be undertaken under a precautionary method statement supervised by a licensed bat worker. The need for pre-demolition/construction update surveys was also identified. Mitigation measures would remain largely the same as outlined in the ES. The results of the 2019 building surveys have confirmed that a development licence will be required from Natural England to enable the demolition of B5 (confirmed common pipistrelle bat roost). Mitigation would include the provision of a replacement roost (such as a bat box) erected in proximity to the demolished building.

4.1.3. The legislation and planning policy specific to bats is summarised below.

4.2 LEGAL COMPLIANCE

4.2.1. Bats and their roosts are afforded a high level of protection under The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations'), the legislation means that it is an offence to:

- Deliberately capture, injure or kill a wild bat;
- Deliberately disturb wild bats; 'disturbance of animals includes in particular any disturbance which is likely:
  (a) to impair their ability —
    (i) to survive, to breed or reproduce, or to rear or nurture their young; or
    (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
  (b) to affect significantly the local distribution or abundance of the species to which they belong.' and
- Damage or destroy a breeding site or resting place used by this species.

4.2.2. Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of animals when using places of shelter, and obstruction of access to places of shelter.

4.3 PLANNING POLICY COMPLIANCE

4.3.1. At the national level, the National Planning Policy Framework (NPPF, 2019) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including bats; the Office of the Deputy Prime Minister (ODPM) circular 06/2005 also provides

supplementary guidance, including confirmation that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.

4.3.2. In the case of NSIP developments such as the North Killingholme Power Project, the National Policy Statement for Energy (EN-1) takes precedence over the NPPF. This identifies that (paragraph 5.3.18) *'…The applicant should include appropriate mitigation measures… in particular the applicant should demonstrate that: … during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised...'.*

4.3.3. The NPPF states in Section 15, paragraph 174 that '*plans should:*

- *Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- *Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity'.*

4.3.4. Natterer's bat *Myotis nattererii*, whiskered bat *Myotis mystacinus*, Brandt's bat *Myotis brandtii*, noctule bat, Leisler's bat *Nycatlus leislerii*, common and soprano pipistrelle, barbastelle bat *Barbastella barbastellus* and brown-long eared bat are also listed as species on the Lincolnshire BAP.

5 CONCLUSIONS

5.1.1. The suitability of the site for foraging and commuting bats remains similar to that recorded during surveys to inform the ES.

5.1.2. A number of buildings remained present on Site. Seven of these structures were assessed as providing suitable roosting habitat for bats. Of the seven buildings, one (B5) supported a summer roost of a small number (<5) of common pipistrelle in 2019. No other bat roosts were recorded on Site.

5.1.3. Less than 500 bat passes were recorded across the Site in total during the manual transect surveys. Similarly, less than 500 bat passes were recorded in total during the automated static detector surveys. Common pipistrelle and noctule bats were the most frequently recorded species, with activity concentrated at specific locations, along the western and northern boundaries. Comparatively low levels of activity were recorded from *Myotis* sp. and soprano pipistrelle. Activity surveys indicate that the western boundary and the mosaic of habitats in the north of the Site; which include scrub, tree lines and a waterbody; are important areas for commuting and foraging.

5.1.4. Bat activity has not changed significantly since the bat surveys undertaken in 2011, with common pipistrelle and noctule being recorded most frequently in 2011 and 2019/2020, and in similar locations. Although a roost has been identified and characterised during the 2019 surveys, this is not seen as a significant change to the baseline. This is because the Site was assessed in 2011 as being suitable to support roosts in the future (as stated in the ES).

5.1.5. Furthermore, feeding stations were identified in buildings B7 and B4 (identified as B1 and B2 by PB) during the 2011 surveys (PB, 2011), indicating that bats were already using buildings as feeding/resting places (access was permitted inside these buildings during the 2019/2020 surveys). No new information has been identified within the 2019/2020 assessment that has not already been identified or predicted previously. As a result, the findings from the 2019/2020 assessment are consistent with the findings presented in the ES.

REFERENCES

PROJECT REFERENCES

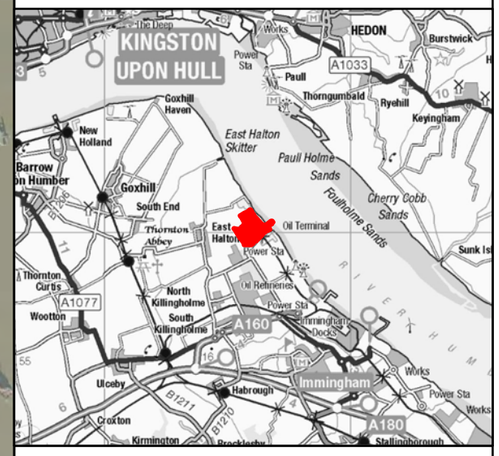
- Parsons Brinckerhoff (2010) *Extended Phase 1 Habitat Assessment of Killingholme Site, Lincolnshire. C.GEN.*
- Parsons Brinckerhoff (2011). *Phase 2 Bat Report. North Killingholme Power Project*.
- C.GEN (2013). *North Killingholme Power Project. Environmental Statement. Volume 1.*
- WSP UK (2019). *North Killingholme Power Project - DCO Amendments - Preliminary Ecological Appraisal*. WSP.

TECHNICAL REFERENCES

- Collins J. (ed.) (2016). *Bat Surveys for Professional Ecologists, Good Practice Guidelines (3rd Edition)*. The Bat Conservation Trust, London.
- Ministry of Housing, Communities and Local Government (2019). *The National Planning Policy Framework.*, London.
- HMSO (Her Majesty's Stationary Office) (1981). *Wildlife and Countryside Act (as amended by the Countryside and Rights of Way Act 2000)*. HMSO, London.
- HMSO (2006). *Natural Environment and Rural Communities Act*. HMSO, London.
- HMSO (2010). *The Conservation of Habitats and Species Regulations 2017 (the Habitat Regulations).* HMSO, London.
- ODPM (2005). *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System*.
- Russ, J. (2013). *British Bat Calls a Guide to Species Identification*. Pelagic Publishing.

Key

Principal Project Area



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Project: NORTH KILLINGHOLME POWER PROJECT

Title: SITE LOCATION

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Checked: LR
Approved: PD

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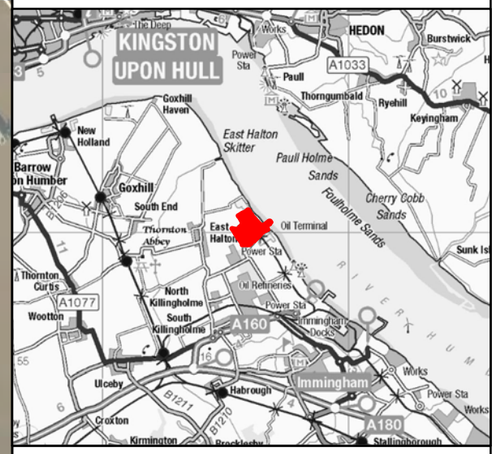
Key

Principal Project Area

Bat Transect

Listening Point

Static Detector



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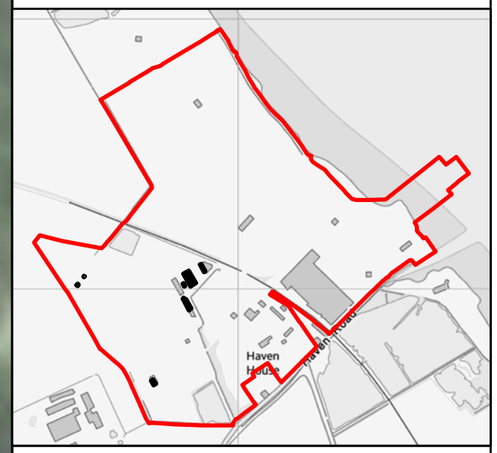
- Building Dawn
- Surveyor Position
- IR Camera



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- Building Dawn
- Surveyor Position
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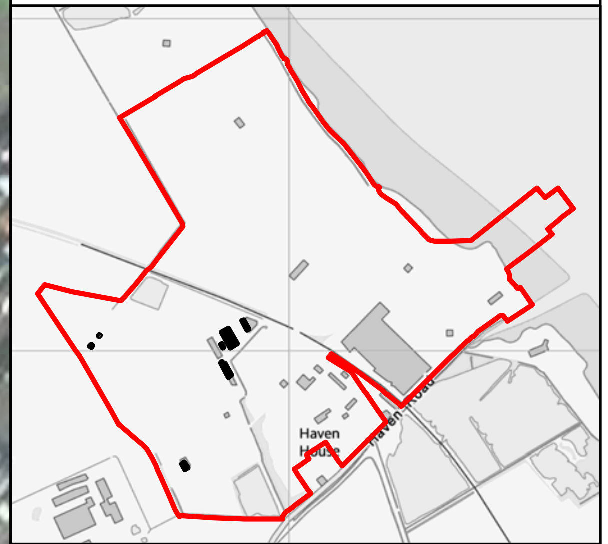

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Client:

C.GEN

Project:

NORTH KILLINGHOLME POWER PROJECT

Title

SITE LOCATION

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Key

- Principal Project Area
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- Building Dawn
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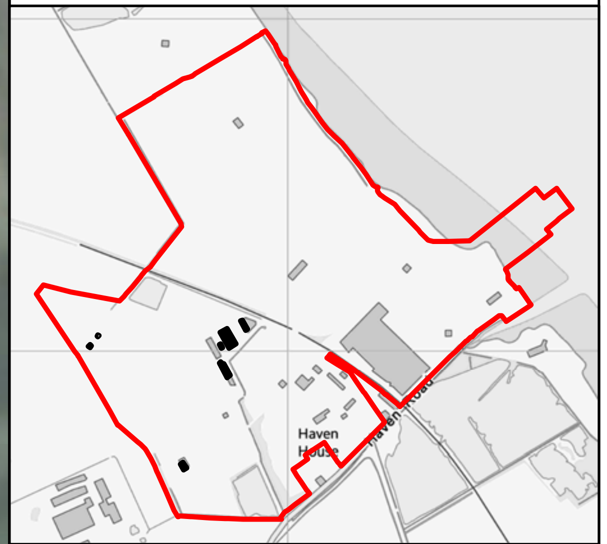

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Client:

C.GEN

Project:

NORTH KILLINGHOLME
POWER PROJECT

Title

SITE LOCATION

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Key

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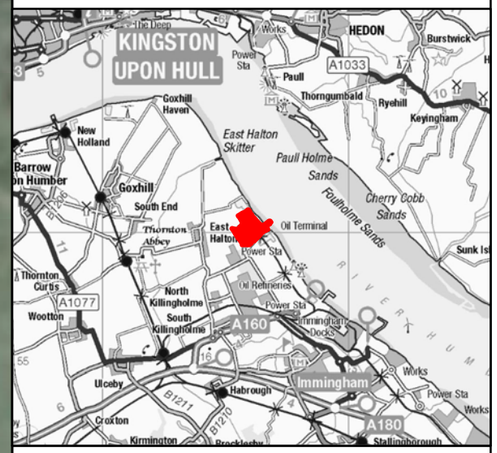
- Buildings
- Building Dawn
- Surveyor Position
- IR Camera
- N.Noctula
- N.Noctula (multiple)



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Title: ACTIVITY SURVEY RESULTS

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Key
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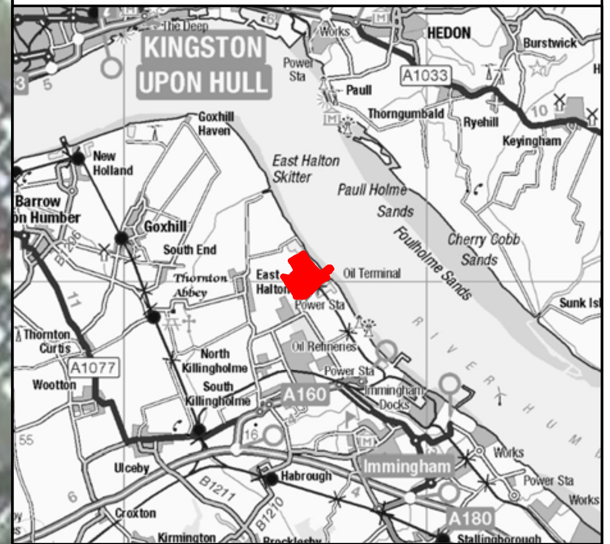
- Buildings
- Building Dawn
- Surveyor Position
- IR Camera
- P.pipistrelle
- Unknown Bat



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Project: NORTH KILLINGHOLME POWER PROJECT

Title: ACTIVITY SURVEY RESULTS

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Key

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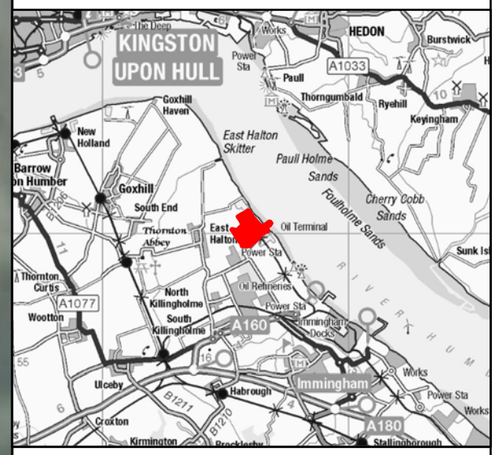
- Buildings
- Building Dawn
- Surveyor Position
- IR Camera



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Project: NORTH KILLINGHOLME POWER PROJECT

Title: ACTIVITY SURVEY RESULTS

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Appendix A

FIELD SURVEY RESULTS, DATES AND METADATA

Table A-1 - Date of Manual Activity Survey Visits

Date	Survey Type	Surveyors	Sunset/Sunrise Time	Start Time	End Time	Temp. (°C) Start - End	Wind (beaufort) Start - End
29/08/2019	Dusk	GG/SS	19:59	19:44	22:34	20/17	3/3
17/09/2019	Dusk	GG/SS	19:12	18:57	21:23	14/12	3/3
07/04/2020	Dusk	CG/SS	19:43	19:59	22:41	12/10	2/1

Table A-2 – Date, time and temperature during automated detector surveys

Month	Date	Sunrise	Sunset	Maximum Temp (°C)	Minimum Temp (°C)
August 2019	27/08/2019	Deployed	20:03	25.75	20.75
	28/08/2019	06:02	20:01	20.75	15.25
	29/08/2019	06:03	19:58	12.2	21
	30/08/2019	06:05	19:56	22.25	16.75
	31/08/2019	06:07	19:53	18.25	15.75
	01/09/2019	06:09	-	17	10.25
September 2019	01/09/2019	-	19:51	17	10.25
	02/09/2019	06:10	19:49	16.5	10.75
	03/09/2019	06:12	19:46	21	15.25
	04/09/2019	06:14	19:44	19	14.75
	05/09/2019	06:16	19:41	17	10.25
	06/09/2019	06:17	Collected	17.25	13.5
April 2020	07/04/2020	Deployed	19:48	18	1
	08/04/2020	06:16	19:49	21	9
	09/04/2020	06:13	19:51	10	7
	10/04/2020	06:11	19:53	21	7

Month	Date	Sunrise	Sunset	Maximum Temp (°C)	Minimum Temp (°C)
	11/04/2020	06:09	19:55	24	9
	12/04/2020	06:06	Collected	18	7

Table A-3 - Bat Structures and Level of Roosting Suitability as defined in PEA

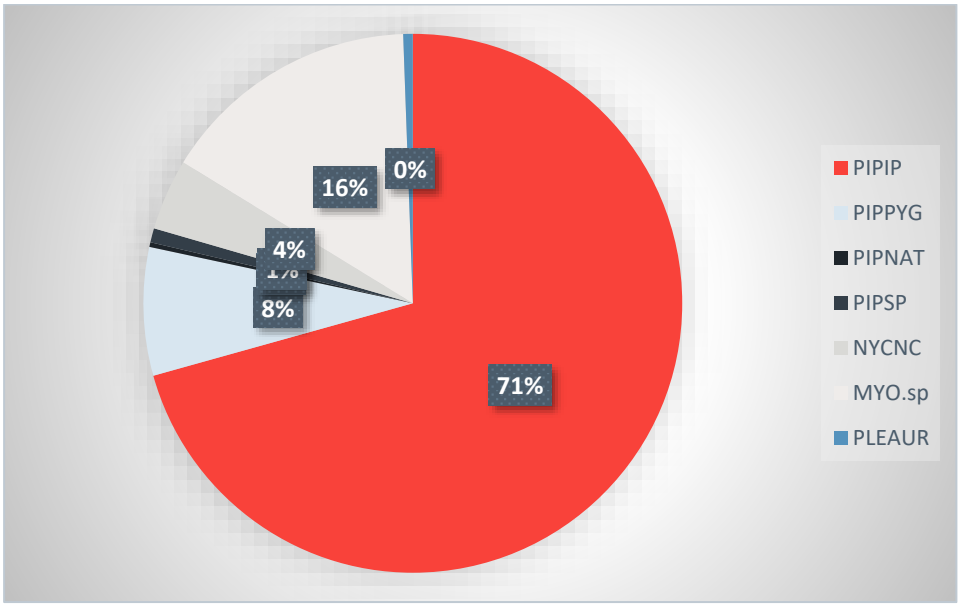
Bat Target Note Number	Bat Target Note Description	Bat Roost Suitability
Building 1	Rectangular redbrick flat roof structure. PRF 1 – Timber framed window shutter with gaps between. PRF 2 – Some gaps in masonry between brick work on southern elevation – shallow cavities PRF 3 – Missing brick 7 cm x 4 cm gap in south east corner at approx. 6 m height	Low
Building 4	Small red brick single storey substation with flat roof. PRF 1- slight gap in missing masonry between brickwork – 1 cm wide extending in horizontally	Low
Building 5	Redbrick rectangular single storey structure with flat roof. PRF 1 - Concrete plinths separate internal rooms with concrete lintel – gap between each lintel (Photograph 7). PRF 2 – gap in brickwork above blue door PRF 3 – Large gap in central section where roofs join together on lintel and plinth – extends back into structure PRF 4 – Several gaps where concrete is missing – tight crevices 1cm x 4/5cm	Moderate
Building 6	Single storey red brick structure – slight duo pitched roof with corrugated material (potentially asbestos). Building is separated into several rooms mostly open on one elevation. Lots of swallow nests within rooms of building. Small shallow	Low

Bat Target Note Number	Bat Target Note Description	Bat Roost Suitability
	gaps between top of brick walls and between sheets.	
Building 7	Disused two-storey building constructed of red brick with metal sheet cladding placed around top floor. Flat roofed building, with small single storey extension on northern side. PRF 1 - Some windows were open or missing but internal side boarded up or with mesh covering. PRF 2 – Gap above metal shutter door on south side – full access into inside of building but appears to be limited roosting locations within structure	Low
Building 8	Single storey red brick structure (substation building) with concrete flat roof – approx. 6 m x 5m. PRF 1 – Wooden door with missing section in top corner providing potential access point into structure PRF 2 –Missing brick on south elevation – low down (20 cm off ground) leading inside structure	Low
Building 9	Derelict single storey red brick structure in fenced off area. Small building – approx. 3 m x 5 m. No roof present so completely open. PRF 1 - gap between brickwork above doorway – approx. 5 cm x 1.5 cm which likely extends in 5 cm	Low

Appendix B

CHARTS AND GRAPHS

Chart 1 - Percentage of total bat passes per species for the entire manual transect survey period



Graph 1 - BAIV per species per PC over the entire manual transect survey period

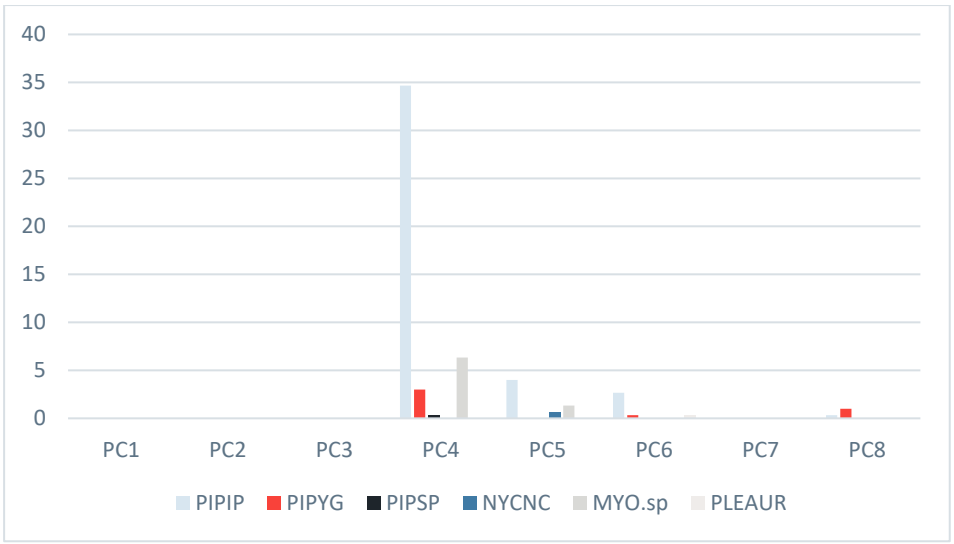
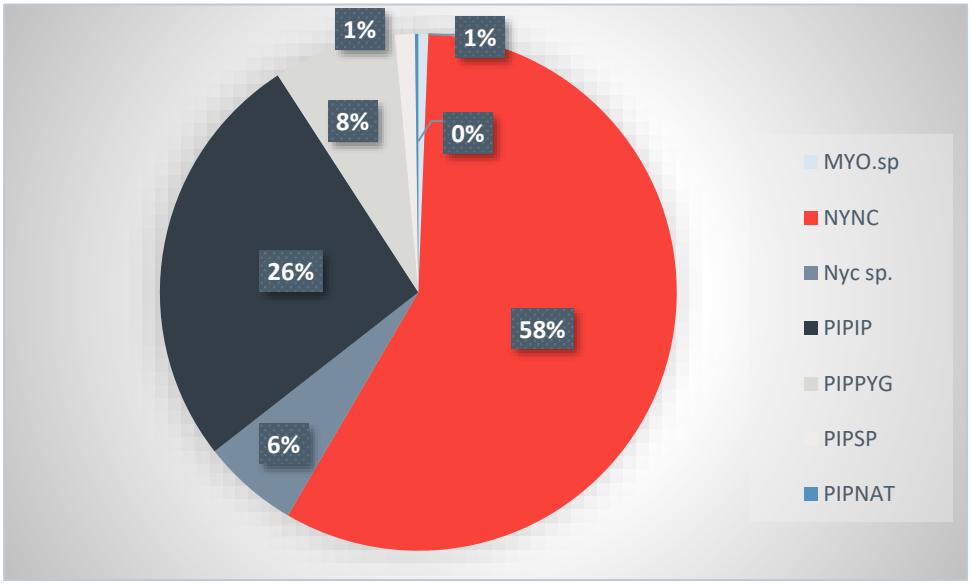
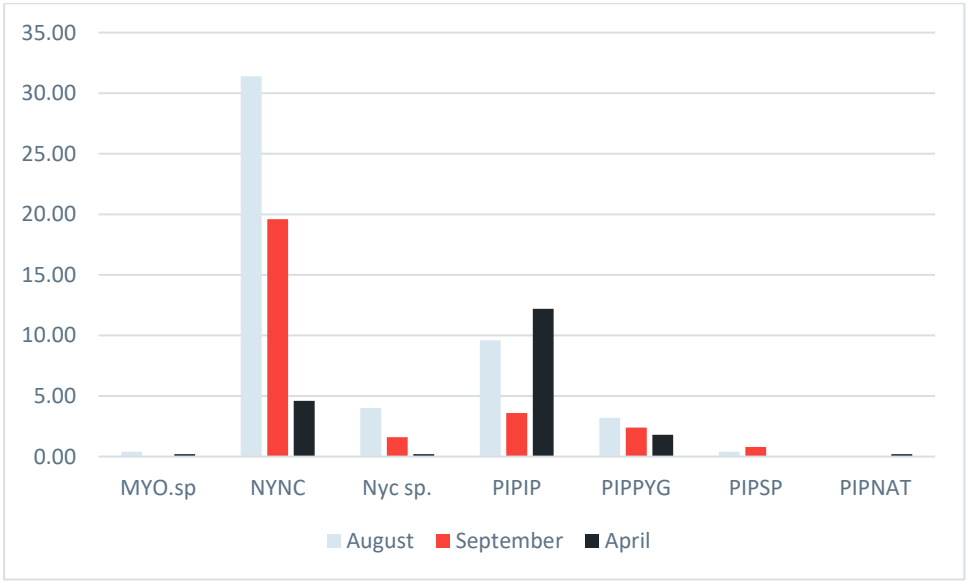


Chart 2 – Percentage of bat passes per species for the entire automated detector survey period



Graph 2 - BAIV per species for each month of automated detector survey



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