Report of Bat survey

Garnet House,
Stonyhurst College,
Hurst Green,
Lancashire,
BB7 9PT

Provided for:

CA Planning
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Summary

This report has been produced on behalf of CA Planning as part of a planning proposal for a development at Garnet House, in the grounds of Stonyhurst College in Hurst Green, Lancashire.

Surveys carried out in 2014 and 2017 comprised daytime building inspections, use of remote detectors and a data logger, as well as emergence surveys. A data search was also undertaken.

A total of 4 species of bat were recorded during surveys; Common pipistrelle *Pipistrellus pipistrellus* (flying over and roosting), soprano pipistrelle *Pipistrellus pygmaeus* (flying over only), noctule *Nyctalus noctula* (flying over only) and Brandt's bat *Myotis brandtii* (DNA evidence of roosting only – from droppings).

No bats were observed roosting inside Garnet House; however old and more recent bat droppings were found scattered and clustered throughout the roof void of Garnet House during all surveys.

A small number of bats (maximum four on any one occasion) were recorded emerging from Garnet House during surveys.

The proposed development involves the conversion of the building from a single residential property into separate units. The proposed work has the potential to disturb and harm at least four common pipistrelle and two Brandt's bats, and will also destroy two bat roosts (roof coverings and roof void); these activities will require a licence to be undertaken lawfully. The proposed works, bat numbers and the number of bat roosts meet the criteria for a Low Impact Class Licence.

No bird nests or signs of nesting or roosting activity, including barn owls, were found associated with Garnet House.

Report contents

Appendices

1 Introduction

1.1 This report has been produced on behalf of CA Planning as part of a planning proposal for a development at Garnet House, within the grounds of Stonyhurst College in Hurst Green, Lancashire.

1.2 Ecology Services UK Limited was commissioned to carry out bat surveys in September 2014 and in April, May and June 2017.

1.3 It is understood that the proposed works involve the conversion of the building from a single residential property into separate units.

1.4 The information contained within this report comprises:

- The methodology employed to survey for bats at the proposed development site
- A brief description of the survey area
- The results from the bat surveys
- An assessment of the importance of the survey area for bats
- Conclusions drawn from the results of the surveys
- Advice and recommendations for further action in relation to bats at the proposed development site

1.5 The surveys, assessment of potential and advice in this report comply with national best practice guidance as outlined in:

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

1.6 Personnel

Pat Waring planned all surveys, supervised all personnel and wrote the bat survey report.

Pat is a licensed bat worker (Class 2 licence), a Registered Consultant of the Bat Low Impact Class Licence, a Chartered Environmentalist and a full member of the Chartered Institute of Ecology and Environmental Management, with a Bachelor of Science degree in Biology.

Pat has been working as an ecological consultant for over nineteen years, most recently as Director of Ecology Services UK Limited. This work includes provision of expert advice, guidance and training to bodies such as Statutory Nature Conservation Organisations, Local Planning Authorities and Lancashire, Yorkshire and North Wales Police Authorities, as well as the delivery of professional training courses about bats at a national level.

Pat has recognised and extensive experience and knowledge of ecological survey, monitoring, condition assessment and impact assessment techniques. He has extensive knowledge of bat ecology relating to buildings and trees including the requirements and condition necessary for bats roosting. He also has recognised skills relating to bat surveys and assessment.

Pat has extensive experience of designing mitigation, compensation and enhancement for a range of bat species. He provides professional training at a national level in mitigation design, compliance audits for mitigation and in measuring success of mitigation schemes. He has acted as the sole Project Ecologist for over 30 licensed mitigation schemes for bats in England and Wales.

Pat meets the requirements for knowledge, skills and practical experience as outlined in the CIEEM technical guidance (Chartered Institute for Ecology and Environmental Management (2013) *Competencies for Species Survey: Bats*. CIEEM, Winchester, Hants).

Pat was accompanied by Janette Gazzard during all surveys. Janette, who is a full member of the Chartered Institute of Ecology and Environmental Management, is a professional Ecologist with extensive experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

Pat Waring and Janette Gazzard were accompanied by the following surveyors during each emergence survey:

Surveyor name	Qualification and competencies
Adam King	Trainee Ecologist with experience of emergence survey techniques, including use of bat detectors.
Matthew McLellan	Trainee Ecologist with experience of emergence survey techniques, including use of bat detectors.
Nicole Lever	Trainee Ecologist with experience of emergence survey techniques, including use of bat detectors.

Table 1 – bat survey personnel

The survey work was carried out under a Natural England Class 2 licence.

1.7 Advisory note

The information in this document represents the professional opinion of Ecology Services UK Ltd and does not constitute professional legal advice. You may wish to seek professional legal interpretation of the wildlife legislation associated with this area of work.

Ecology Services UK Ltd states that the information, opinion and advice which have been prepared are true, and have been prepared and provided in accordance with the CIEEM Code of Professional Conduct. Ecology Services UK Ltd confirms that the opinions expressed are our true and professional bona fide opinions.

2 Objectives, methodology and rationale

2.1 General background

The brief for this work was to survey a single building (Garnet House) subject to a development proposal. Following an initial daytime survey in 2014, further surveys were undertaken in 2014 and then again in 2017.

Objectives – building surveys

a) To identify any potential bat roosting habitat.

b) To identify whether bats were present in Garnet House at the time of survey

c) To identify whether bats had used Garnet House prior to survey

d) To provide an assessment of the likely importance of Garnet House for bats and bat conservation

e) To provide advice and recommendations accordingly

Objectives – emergence surveys

a) To identify whether bats were emerging from Garnet House at the time of survey and, if so, to identify bat numbers and species

b) To provide an assessment of the likely importance of Garnet House for bats and bat conservation

Information gathering involved two phases; a desk-based study and field-based surveys.

2.2 Desk-based study

The following were consulted as part of the desk-based study:

Source	Data	Rationale
Biological Records Centre at Lancashire Environmental Records Network (2014).	All biological records, including bats, held by the Records Centre.	LERN is the main data centre for general records in Lancashire. Not all bat records are submitted to and held by this source.
East Lancashire Bat Group (2014 and 2017).	Records of bats, including roosts and other data.	ELBC members generate substantial numbers of bat records for the East Lancashire area.
Ribble Valley Borough website - planning applications within 5km of the proposed development site (2014 and 2017)	Ecological survey reports submitted as part of planning applications	Some ecological survey reports include data about protected species, including bats. Often this data is not submitted to data holders such as LERN.
MAGIC website – EPS schemes within 5km of the proposed development site (2014 and 2017)	Details of the last 10 years of European Protected Species mitigation schemes	EPS mitigation schemes for bats deal with impacts on bat roosts. This type of data enables the predicted impacts on the Garnet House roost to be put into context.
Ecology Services Uk Ltd surveys	Ecology surveys undertaken within 5km of proposed development site	Some of this data does has not yet been submitted to the local record centre of East Lancashire Bat Group

Table 2 – sources for desk-based study

2.3 Methodology for surveys

The surveys, assessment of potential and advice in this report comply with national best practice guidance as outlined in:

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

2.3.1 Daytime inspection surveys

Building surveys

Daytime inspections were carried out as follows:

2014
10th September
18th September
14th October

2017
27th April
6th June

- Internal and external parts of Garnet House were subjected to examination for signs of bats, including droppings, urine staining, grease marks, feeding remains and areas clear of cobwebs. A search was also made for live and dead bats.

- An endoscope was used to investigate areas out of reach for hand searching, such as narrow gaps and other confined spaces.

- Previously identified potential access/egress points and roosting features for bats were examined in detail where accessible.

- A 1000 lumens Led Lenser X21 torch and close-focussing Pentax Papilio 8.5x21 binoculars were used as aids to visibility.

- Observations were made from ground level and surrounding vantage points, as well as from telescopic 3.8 metre ladders

- Notes were made of potential disturbance factors for bats

- Large pieces of cardboard (survey sheets) were deployed across the roof void floor in Garnet House in 2014 and 2017; this was done to enable fresh droppings to be caught and observed easily. The survey sheets were checked on all subsequent site visits

- Bat droppings were collected in October 2014 from inside the roof void of Garnet House, for use in DNA analysis.

- TinyTag dataloggers were deployed in the roof void of Garnet House from 18th September to 14th October 2014 and from 27th April to 7th June 2017. The dataloggers were used to provide data to inform the bat surveys and any mitigation that might be required. Temperature and humidity data was logged throughout the survey period.

2.3.2 Anabat survey

Two unmanned Anabat bat detectors were continuously deployed inside the roof void of Garnet House from 18th September to 14th October 2014.

A single Anabat bat detector was continuously deployed inside the roof void of Garnet House from 27th April to 7th June 2017.

The roof void Anabats were set to function every night from at least 30 minutes before sunset to at least 30 minutes after sunrise the following morning (the time period when bats, if present, were expected to be active).

2.3.3 Emergence surveys

Emergence surveys of Garnet House were carried out as follows:

2014
18th September
24th September
28th September

2017
5th May
21st May
3rd June

- At the start and end of each survey, a range of environmental readings, including temperature, humidity and wind speed, were taken using a Kestrel 4000 Weather Meter. The weather meter was set to log data continuously throughout each of the surveys.

- Each survey started 30 minutes prior to sunset and continued until at least 60 minutes after sunset. This timing was chosen as it was judged to provide the best opportunity for observing emergence in myotis and pipistrelle bats (the species judged most likely to be using the building for roosting, during daytime surveys).

Bat detectors used externally during emergence surveys were as follows:

Date	Detector models	Detector functions
18th September 2014	BatBox Griffin x2 EM3 Petersson D240x Batlogger M	Time expansion Time expansion Time expansion Time expansion
24th September 2014	BatBox Griffin x2 BatBox 3 Batlogger M	Time expansion Heterodyne Time expansion
28th September 2014	BatBox Griffin x2 Petersson D240x x2	Time expansion Time expansion
5th May 2017	BatBox Griffin x2 BatBox Duet Batscanner	Time expansion Frequency division Heterodyne
21st May 2017	BatBox Griffin x2 BatBox Duet Batscanner	Time expansion Frequency division Heterodyne
3rd June 2017	BatBox Griffin x2 BatBox Duet Batscanner	Time expansion Frequency division Heterodyne

Table 3 – bat detectors used during emergence surveys

- Bat echolocation was recorded onto internal memory cards of the Griffin detectors.

- All surveyors were equipped with a hand-held bat detector.

- Surveyors were positioned so that all elevations of the building could be observed by at least one person.

- During emergence surveys, observers stood close to locations that were judged most likely to act as access points for bats, as determined during the building surveys and previous emergence surveys.

- Sony HDR-XR 520VE and Canon XF100 camcorders (set on 0 lux Nightshot), each with two IRlight6 infra-red illuminators, were focussed on external sections of the building throughout the emergence surveys to assist with observations. All activity was recorded onto the internal hard drives of the camcorders for further analysis.

2.3.4 Bat identification

The identification of bat species was confirmed by a combination of droppings analysis, location and type of roost features, direct observation (e.g. the behaviour of bats when seen flying and examination of dead bats), use of bat detectors and analysis of bat recordings using computer software (BatExplorer, Batsound v3.31 and AnalookW).

Analysis of bat recordings involved a series of measurements, including inter pulse interval, pulse duration, characteristic slope and frequency of maximum energy; all of these were compared to a number of known references in order to arrive at an identification of each bat species.

A DNA analysis of a sample of bat droppings was commissioned from the Department of Chemical & Life Science, Waterford Institute of Technology, in September 2014.

2.3.5 Summary table of bat surveys

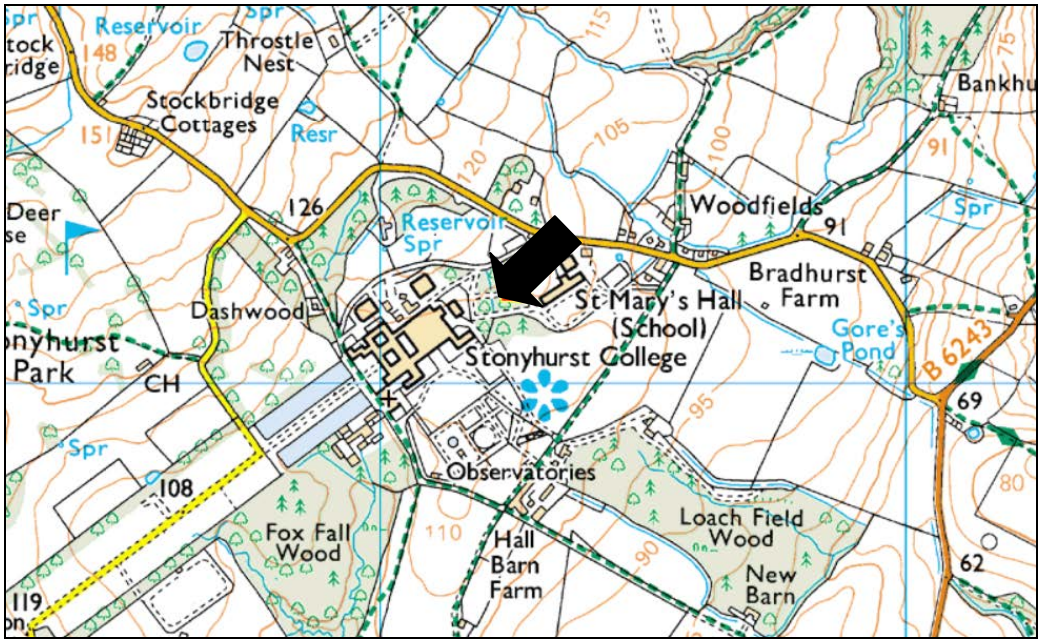
Survey type	Timing of survey during 2014
Daytime	10/9/14, 18/9/14, 14/10/14 27/4/17, 6/6/17
Emergence	18/9/14, 24/9/14, 28/9/14 5/5/17, 21/5/17, 3/6/17
Anabat	18/9/14 to 14/10/14 27/4/17 to 7/6/17
Datalogger	18/9/14 to 14/10/14 27/4/17 to 7/6/17

Table 4 – summary of bat surveys

3 Site description

3.1 The site subject to survey

The proposed development site location (SD 6922 3915) and context are shown below.



Map 1 - 1:25 000 map of site and context - location shown by arrow to centre of map

Image 1 - Aerial view of proposed development site (marked with white arrow)

Image 2 – Wider aerial view of proposed development site (marked with white arrow) showing context

The proposed development site comprises a single building known as Garnet House.

Garnet House

Garnet House is an occupied and heated dwelling house with block walls and a dual-pitch, slated roof. The roof coverings are in a generally good condition, with only very few missing and slipped slates noted during the surveys. The roof ridge does, however, have a lead cover which is raised in places. There is no visible access for bats or birds from the outer part of the ridge into the roof void.

Within the single extensive roof void of Garnet House, the roof is supported on a metal framework and timber rafters. The roof void design resembles a traditional cut and pitch style, but has some localised clutter as a result of the water tank and its supporting framework.

The roof is underdrawn with traditional bitumastic hessian felt throughout.

The external walls of Garnet House are in a good condition, with no gaps. All doors and windows were intact throughout the surveys.

There are potential access features for birds and bats at both gable ends of Garnet House, associated with areas of wooden cladding and roof overhangs. In addition, there is potential for bats to access areas beneath the lead ridge covering. Potential sheltering (i.e. roosting) sites for bats occur throughout the upper part of the roof coverings and throughout the roof void.

Internal and external areas where bat signs were likely to accumulate showed no signs of disturbance at the start of or throughout surveys in 2014 or 2017. This suggests that if signs of bats had been left inside or outside of Garnet House, they would have remained undisturbed up to and during the surveys.

Overall, Garnet House provides a range of potential roost features, mainly associated with the roof void, as well as a range of temperature and humidity regimes and gradients.

3.2 The proposed development site surroundings

The proposed development site lies wholly within the grounds of Stonyhurst College, and the immediate surroundings are dominated by mixed plantation woodland, amenity grassland (sports pitches), hard standing and college buildings.

The mixed plantation woodland canopy is dominated by beech *Fagus sylvatica*, sycamore *Acer pseudoplatanus*, oak *Quercus sp* and European larch *Larix decidua*. Additional canopy species include ash *Fraxinus excelsior*, lime *Tilia x europea*, scots pine *Pinus sylvestris*, yew *Taxus baccata*, cherry *Prunus sp*, holly *Ilex aquifolium*, hornbeam *Carpinus betulus* and horse chestnut *Aesculus hippocastanum*.

The immediate surroundings offer a significant resource suitable for use by commuting and foraging bats.

The wider surroundings are dominated by areas of open farm fields, with frequent hedgerows and large blocks of broadleaved and mixed woodland. Other noteworthy features include occasional farm buildings, ponds, formal water bodies and the River Hodder and River Ribble. The wider surroundings therefore offer significant resources suitable for use by commuting, foraging and possibly roosting bats.

The location and spillage extent of artificial lighting varies in the immediate and wider surroundings of the survey site; however, this factor is not regarded as a potential constraint to bat activity and movement within the proposed development site or its surroundings.

3.3 Assessment and evaluation of Garnet House for bats

The left hand side of the table below lists the attributes generally regarded as essential for understanding and measuring the continued ecological functionality of a structure for bats (for example, as outlined in Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn).The Bat Conservation Trust, London.). The right hand side of the table comprises the assessment of condition of each attribute at Garnet House.

Key attribute	Condition at Garnet House
Permanence	Garnet House is a permanent structure in a state of good repair. The building structure and the surrounding features which will influence use by bats (e.g. woodland) have been continuously available for many years.
Accessibility	Garnet House is very accessible as regards bat species which can use crawl-in access features. All current likely access features are associated with the roof structures, particularly at the ridge and gable ends.
Lack of disturbance	Garnet House in an occupied building, but the potential bat access and roosting features are subject to either only very occasional disturbance (roof void) or no disturbance (roof coverings, including ridge).
Lighting	There is only very limited artificial lighting immediately outside Garnet House; however although there is some light spillage onto potential bat access features from the college buildings to the west; this is not currently a limiting factor to bat roosting, emergence and re-entry to roosts. There is artificial lighting in the roof void, which is used very occasionally; however, bats can shelter in a range of dark, unlit places even when lighting is in use.
Temperature	Garnet House is subject to artificial heating throughout the year; this affects the roof void roost feature. The roof is partly shaded, but still subject to a high degree of insolation. Based on the data from the datalogger, the likely roosting features will be subject to wide fluctuations of temperature throughout the year.
Space	Bats have unrestricted access throughout the roof void of the building. The roof structures are of a traditional cut and pitch design, so the roof void is mostly uncluttered and bat flight is mostly unhindered.
Substrate	Bats have access to a variety of substrates for roosting and perching, including wood, brick and bitumastic hessian.
Surroundings	The surroundings are dominated by a mature mixed plantation, parkland with mature trees, historic buildings and waterbodies with a high degree of connectivity between them, and no severance features.

Table 5 – key attributes of Garnet House

4 Results of surveys

The weather during the evening surveys was as follows.

Date (2014)	Temperature ^{0}C (start/end)	Humidity % (start/end)	Cloud cover % (start/end)	Rain	Wind mph (start/end)
18/9/14	18.5/16.7	81.2/87.8	10/10	None	0.0/0.0
24/9/14	12.9/12.2	65.7/68.1	10/10	None	5.8/4.3
28/9/14	17.5/14.5	72.6/88.2	90/90	None	0.0/0.0
5/5/17	9.9/8.8	52.8/59.0	0/0	None	3.0/2.2
21/5/17	17.9/14.4	58.3/64.6	20/0	None	1.6/0.7
3/6/17	13.3/14.0	68.2/67.5	20/40	None	4.0/0.8

Table 6 – weather during surveys

Graphs of datalogger results are included in the appendices. The datalogger recorded the following results:

Between 18th September and 14th October 2014:

Logger location	Highest temp	Lowest temp	Highest humidity	Lowest humidity
Roof void	34.5^{0}C	8.5^{0}C	95.5%	25.5%

Table 7 – datalogger results

Between 27th April and 7th June 2017:

Logger location	Highest temp	Lowest temp	Highest humidity	Lowest humidity
Roof void	37.0^{0}C	11.0^{0}C	94.0%	27.5%

Table 8 – datalogger results

There was a high degree of temperature and relative humidity fluctuation within each 24 hour period

Interpretation

- Environmental conditions, as regards temperature and humidity, were suitable for bat occupation and for undertaking surveys throughout the 2014 and 2017 survey periods.

4.1 Results and interpretation of desk-based studies

Bat roost data for the area of 2km around Stonyhurst College, provided by the Lancashire Environmental Record Network, was as follows:

Bat species	Number of roosts	Roost type and number of bats	Date range
Common pipistrelle	1	Unknown	1986
Soprano pipistrelle	1	Unknown	2011
Natterer's bat	1	Unknown	2000

Table 9 – data search results

East Lancashire Bat Group confirmed the presence of a soprano pipistrelle maternity roost within the main building complex at Stonyhurst – approximately 135 metres from Garnet House and 190 metres from the oak tree roost.

No additional data about bat roosts was found during the review of planning applications in Ribble Borough.

No bat licence schemes were found in the search area during the review of data on the Magic website.

The review of Ecology Services UK Ltd data showed that the following bat roosts were present at the Old Mill buildings in 2016 and 2015 during surveys:

- A maternity roost of Natterer's bats
- A maternity roost of brown long eared bats
- A night roost of brown long eared bats
- A day roost of common pipistrelles
- A day roost of soprano pipistrelles

Interpretation

- The bat roost at Garnet House accounts for 100% of all Brandt's roosts known from the search area

- The bat roost at Garnet House accounts for 30% of all common pipistrelle roosts known from the search area

4.2 Results and interpretation of field-based surveys

4.2.1 Daytime surveys

Building surveys

No live or dead bats were found during the daytime building surveys.

Extensive, scattered and clustered signs of bats, in the form of droppings, were found all throughout the roof void of Garnet House. Significant clustered accumulations of droppings were found below the ridge beam in the roof void of Garnet House, particularly at north and south ends of the ridge. The droppings were a mixture of old and more recent material, including evidence from both 2013-2014 and 2016-2017.

No new bat droppings were found on top of survey sheets deployed in 2014.

More than 200 bat droppings were found on the survey sheets deployed between 2014 and 2017.

No new bat droppings were found on top of survey sheets deployed in 2017.

Garnet House roof void dimensions are as follows:

Height = 2.9m
Width = 3.2m
Length = 12.1m

Interpretation

- The lack of visible bats is not unusual, particularly given the timing of the surveys, the crevice-dwelling habitat of many bat species and the availability of dark sheltering places.

- The extent of bat droppings indicates that bats have been both flying and perching throughout the roof void of Garnet House over a number of years.

- The survey sheet evidence suggests that there was no bat activity inside the roof void during the period of survey sheet deployment in 2014 and 2017.

- The survey sheet evidence suggests that there was some bat activity, including bat roosting, during the period of survey sheet deployment **between** 2014 and 2017.

- The roof void dimensions make this feature suitable for use by a range of bat species.

4.2.2 Anabat survey

Roof void – Anabat at north gable interior of Garnet House = 2014

No bat activity was recorded at any time during deployment.

Roof void – Anabat at south gable interior of Garnet House = 2014

No bat activity was recorded at any time during deployment.

Roof void – Anabat at north gable interior of Garnet House = 2017

No bat activity was recorded at any time during deployment.

Interpretation – Garnet House

- The Anabats have provided no evidence that bats were roosting inside the building during the deployment period.

4.2.3 Emergence surveys

Date	Bat species and location of emergence
18th Sept 2014	Two myotis bats (judged to be Brandt's bats) emerged from the south gable of Garnet House, between barge board and wood cladding
24th Sept 2014	No emergence observed
28th Sept 2014	No emergence observed
5th May 2017	No emergence observed
21st May 2017	One common pipistrelle emerged from the south roof apex
3rd June 2017	Four common pipistrelles emerged in total from the south roof apex and west pitch.

Table 10 – results of emergence surveys

Interpretation

- The findings confirm that bats were using the building as a roost during both 2014 and 2017 survey periods.

- It is not possible to draw any definite conclusions about the type of bat roosts from the number of bats emerging. However, the results provide no evidence that a maternity roost is or has been present.

- All bats seen emerging in 2014 and 2017 are very likely to have been roosting in the roof or cladding structures (i.e. not inside the roof void). This would help to explain why no bats were recorded by the roof void Anabats in either survey period, and why no bat droppings were found on the roof void survey sheets in 2014 or 2017.

4.2.4 Bat identification

A total of 4 species of bat were recorded during surveys; Common pipistrelle *Pipistrellus pipistrellus* (flying over and roosting), soprano pipistrelle *Pipistrellus pygmaeus* (flying over only), noctule *Nyctalus noctula* (flying over only) and Brandt's bat *Myotis brandtii* (DNA evidence of roosting only – from droppings).

Sonograms are presented in the appendices.

The results of the DNA analysis showed that bat droppings sampled were attributable to Brandt's bats (a type of myotis bat).

Interpretation

- Common pipistrelle, soprano pipistrelle, myotis and noctule bats are found frequently throughout Lancashire.

- The distribution of Brandt's bats is poorly understood in Lancashire; the species is known from very few locations in Lancashire and current evidence suggests that it may have a restricted distribution in the county.

4.3 Other species

No nesting birds or bird nests were found during the bat surveys of Garnet House.

5 Limitations of survey

Surveys took place on several occasions in April 2014 (daytime survey), May 2017, June 2017and September 2014 (evening surveys). It is recognised that limiting the survey period to visits in these months does not take account of bat activity on the proposed development site through the whole of the active season (April to October) or at other times of the year.

5.1 Daytime surveys

5.1.1 Some bat species are typically crevice dwellers. Droppings and other field signs of the presence of such species are often not visible, as they accumulate in hidden areas which may not be found during routine, non-invasive surveys. This is a frequent limitation when surveying buildings.

5.1.2 As with most buildings, the roof coverings could not be examined in detail due to limits on access and concerns about the safety of surveyors. However, all of the roof coverings were visible from ground level and the whole of the roof underside was visible from within the roof void; this enabled an assessment to be made in relation to potential for roosting areas for bats.

5.2 Anabat surveys

5.2.1 The recording system employed by Anabats can only respond to signals with sufficient intensity; signal intensity can be determined by both the bat species and the distance of a bat from the Anabat detector. As a result, some bat activity within the roof void may not have been recorded.

5.3 Emergence surveys

5.3.1 The echolocation used by some bats is very quiet and difficult to detect; species such as brown long eared bat may have been present without registering on the bat detectors used during the emergence surveys.

5.4 Datalogger

5.4.1 The dataloggers were stationed inside a roof void and the data gathered does not, therefore, relate to likely external roost features such as roof coverings.

6 Conclusions

6.1 Data search

6.1.1 The data sources do not hold any records of bat roosts at Garnet House.

6.2 Daytime surveys

6.2.1 Garnet House is a bat roost; it has supported roosting bats in 2014 and 2017 and the evidence suggests that it has also supported roosting bats between these two years.

6.2.2 The external roof structures and the roof void at Garnet House support suitable environmental conditions for use by roosting bats throughout their active season.

6.3 Anabat surveys

6.3.1 The survey results do not provide any evidence that bats were active during the deployment period in Garnet House in 2014 or 2017.

6.4 Emergence surveys

6.4.1 The evidence confirms that two species of bat roosted in Garnet House during the survey periods.

6.4.2 The space between barge board and wood cladding on the south gable is an emergence point for bats.

6.4.3 The south ridge apex is an emergence point for bats.

6.4.4 The lack of artificial light spillage onto all known and potential emergence points means that this is not currently a limiting factor to bat emergence and re-entry.

6.5 Use by roosting bats

6.5.1 There is no suggestion, based on the evidence from surveys, that Garnet House is used as a maternity roost.

6.5.2 Garnet House has supported a roost of at least four common pipistrelle bats in spring and two Brandt's bats in late summer. The building may also support a roost during the rest of the active season.

6.5.3 Garnet House provides suitable conditions for bats to roost throughout the year.

6.6 Datalogger

6.6.1 The roof void of Garnet House is subject to significant shifts in temperature and humidity on a daily basis; however, these are within the tolerance range of all bat species known to occur in the local area.

6.7 Landscape and lighting

6.7.1 The proposed development site and its immediate surroundings support a number of habitats and physical features known to be of high value to bats, including mature trees and broadleaved woodland.

6.7.2 Artificial lighting is not a limiting factor to bat activity at the proposed development site at the current time.

6.8 Licensing and mitigation

6.8.1 As the proposed development (building conversion) will involve the destruction of a bat roost (i.e. loss of roof void) and a risk of disturbance or damage to at least six roosting bats in Garnet House, a licence will be required for works to be undertaken lawfully.

6.8.2 Certain aspects of mitigation will be a minimum requirement of the licence. To fulfil the licence conditions, mitigation will need to include careful management of works associated with bat roosting features, including supervision of contractors by a licensed ecologist.

6.9 Birds

6.9.1 There is no evidence to suggest that Garnet House is used, or has ever been used, by nesting birds.

7 Advice and recommendations

7.1 Actions, advice and rationale

Action required	Advice and rationale
As offences under legislation will be triggered by the proposed works (particularly the Conservation of Habitats and Species Regulations 2010, as amended), it will be necessary to **carry out the proposed activities under a licence**. The planned works meet the criteria for a **low impact class licence**. The licence will need to be in place prior to demolition for works to proceed lawfully.	All bat species are afforded full protection under UK and European legislation, including the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and the Conservation of Habitats and Species Regulations 2010 (as amended). Together and in brief, this legislation makes it illegal to: • Intentionally or deliberately take, kill or injure a bat • Damage, destroy or obstruct access to bat roosts • Deliberately disturb bats. Prosecution could result in imprisonment, unlimited fines and confiscation of vehicles and equipment used. A bat roost is defined in the legislation as "any structure or place which a bat uses for shelter or protection". Roosts are protected whether or not bats are present.
As offences under legislation will be triggered by these actions (particularly the Conservation of Habitats and Species Regulations 2010, as amended), it will be necessary to **carry out the activities under a licence**. The planned works meet the criteria for a **low impact class licence**. The licence will need to be in place prior to demolition for works to proceed lawfully.	At least four common pipistrelle bats and two Brandt's bats have roosted at Garnet House. As a bat roost, the building is both subject to strict legal protection at all times; this protection includes; disturbance and demolition, as well as covering of the roost access points or other changes to the roost environment. The proposed works will involve the removal and therefore the destruction of two roost features, as well as risks to at least six roosting bats. Proposed works will affect the continued ecological functionality of roost features and the favourable conservation status of bats

Action required	Advice and rationale
Undertake the following **mitigation measures** under licence: • Engage an appropriately experienced and licensed Ecologist to oversee all bat-related aspects of the process • A single bat box must be installed on a tree within 50 metres of Garnet House prior to any disturbance to the building. The bat box must be maintained for a period of at least 5 years. If within the 5 year period bats use the bat box, then it will be regarded as a bat roost and must be retained until it is no longer usable by bats as a result of natural processes. • All contractors to attend a toolbox talk • All contractors to adhere to working practices as outlined in the toolbox talk and accompanying method statement • All disturbing and damaging activities (as regards bats and their roosts) to be carried out carefully by hand • All disturbing and damaging activities (as regards bats and their roosts) to be carried out under the close supervision of a licenced and suitably experienced ecologist • All disturbing and damaging activities (as regards bats and their roosts) to be carried out over as short a timescale as possible	All measures listed are required as part of the Bat Low Impact Licence.

7.2 Other species

Action advised/recommended	Rationale
No action is advised	There are no known or likely issues as regards protected species other than bats

8 Bibliography

Chartered Institute for Ecology and Environmental Management (2013) *Competencies for Species Survey: Bats.* CIEEM, Winchester, Hants.

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

Ecology Services UK Ltd (2016) *Report of Bat Survey – Stonyhurst Old Mill.* Stonyhurst College

Mitchell-Jones, A. J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.

Mitchell-Jones, A. J. & McLeish, A. P. (1999). *The Bat Workers' Manual (2nd Ed.).* JNCC, Peterborough. ISBN 1-86107-462-X. [3rd edition in 2004].

Bat Survey
-
Garnet House, Stonyhurst College, Hurst Green, Lancashire
-
Appendices

App 1 – Map of Garnet House, showing bat roost and emergence points

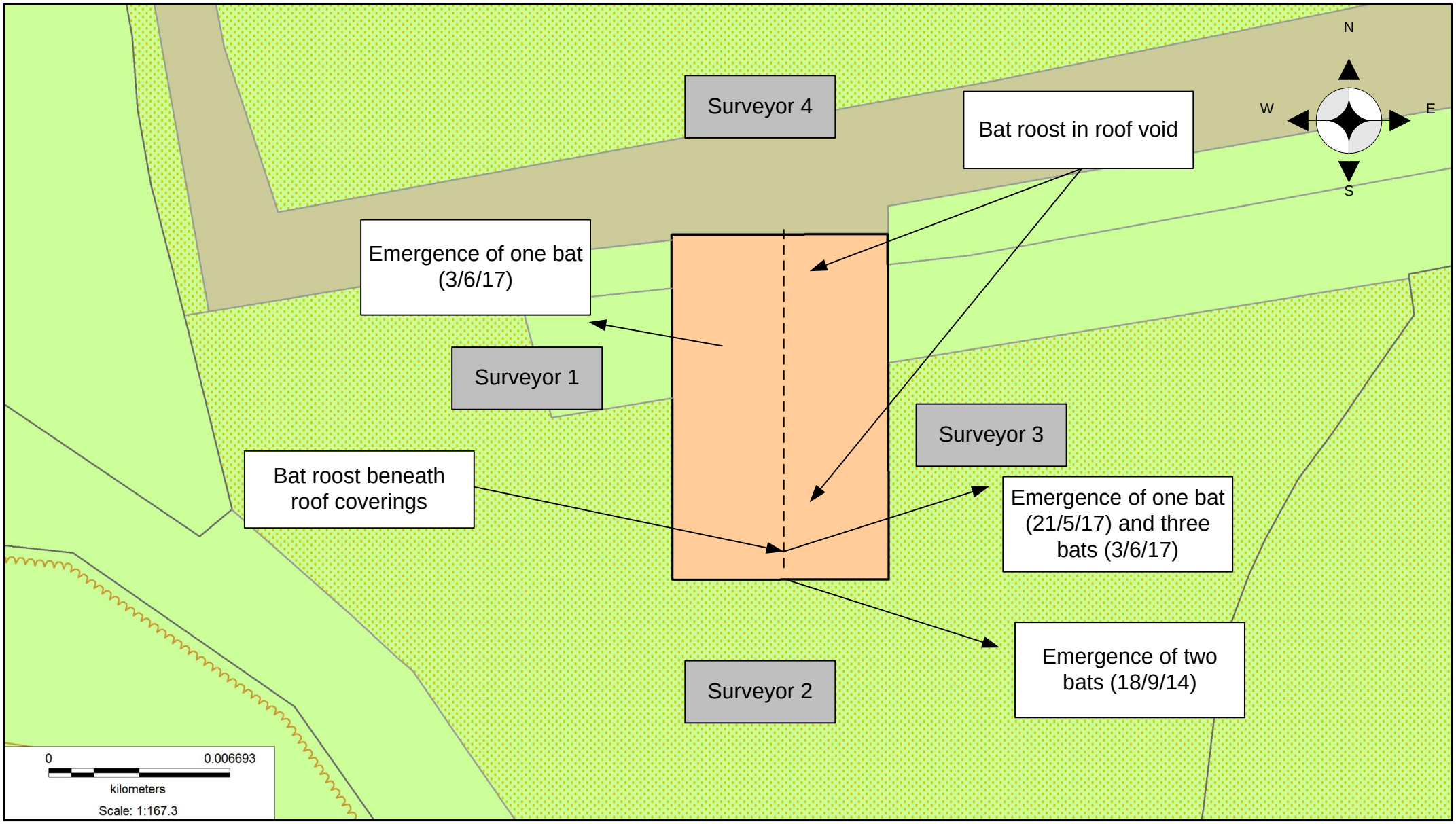
App 2 – Bat activity survey forms – emergence surveys

App 3 - Datalogger results

App 4 - Sonograms

App 5 – Results of DNA analysis

App 6 - Photographs of survey area



Map of Bat Roost and Emergence Points - Garnet House at Stonyhurst College.
Map produced 15th June 2017

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Garnet House, Stonyhurst College, Hurst Green, Lancashire BB7 9PZ
Survey Date(s)	18th September 2014
Timing of survey	1910 - 2025
Notes	Emergence survey of building – surveyors positioned at all four elevations of the building Sunset at 1919hrs Total bats emerging = two unidentified bats from south elevation

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	1930	Flying around woodland to north of building	Unknown	Detector + recording
Soprano pipistrelle	1933	Flying around woodland to north of building	Unknown	Detector + recording
Soprano pipistrelle	1935 - 1942	Flying around woodland to north of building	Unknown	Detector + recording
Unidentified	1939	Emerging silently from between barge board and wood cladding – south gable	East towards woodland	Sight only
Common pipistrelle	1940 – end of survey	Flying around woodland to north of building	Unknown	Detector + recording
Noctule	2010	Commuting past building	Unknown	Detector + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Garnet House, Stonyhurst College, Hurst Green, Lancashire BB7 9PZ
Survey Date(s)	24th September 2014
Timing of survey	1850 - 2010
Notes	Emergence survey of building – surveyors positioned at all four elevations of the building Sunset at 1904hrs Total bats emerging = none

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	1921	Flying above south gable	Unknown	Detector
Soprano pipistrelle	1922	Flying above south gable	Unknown	Detector
Common pipistrelle	1924	Flying above south gable	Unknown	Detector
Common and soprano pipistrelle	1924 – end of survey	Flying around building	Unknown	Detector + recording
Noctule	1949	Commuting above the building	Unknown	Detector
Myotis species	2003	Commuting past building	Unknown	Detector + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Garnet House, Stonyhurst College, Hurst Green, Lancashire BB7 9PZ
Survey Date(s)	28th September 2014
Timing of survey	1845 - 1955
Notes	Emergence survey of building – surveyors positioned at all four elevations of the building Sunset at 1854hrs Total bats emerging = none

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	1900	Flying around western side of building	Unknown	Detector + sight + recording
Common pipistrelle	1904	Flying around western side of building	Unknown	Detector + sight + recording
Common and soprano pipistrelle	1905 - 1950	Flying around building (occasional throughout)	Unknown	Detector + recording
Noctule	1955	Commuting past building	Unknown	Detector + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Garnet House, Stonyhurst College, Hurst Green, Lancashire BB7 9PZ
Survey Date(s)	5th May 2017
Timing of survey	2015 - 2200
Notes	Emergence survey of building – surveyors positioned at all four elevations of the building Sunset at 2048hrs Total bats emerging = none

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	2050 – end of survey	Flying around woodland to north of building	Unknown	Detector + recording
Soprano pipistrelle	2055 – end of survey	Flying around south garden of Garnet House	Circling	Detector + sight + recording

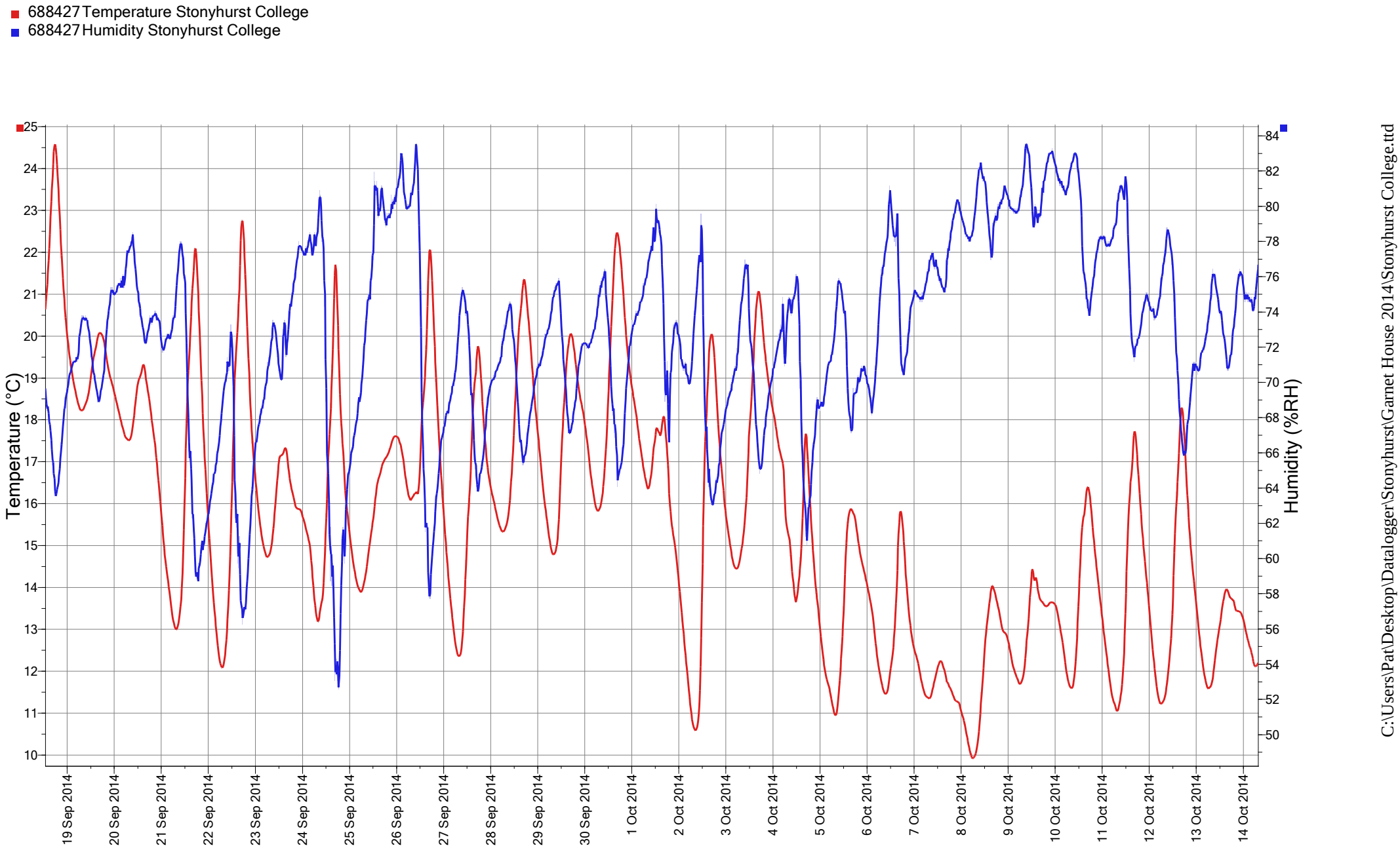
BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Garnet House, Stonyhurst College, Hurst Green, Lancashire BB7 9PZ
Survey Date(s)	21st May 2017
Timing of survey	2045 - 2215
Notes	Emergence survey of building – surveyors positioned at all four elevations of the building Sunset at 2115hrs Total bats emerging = one

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	2105 – end of survey	Flying around woodland to north of building	Unknown	Detector + recording
Common pipistrelle	2110	Emerged from south apex of roof	East towards woodland	Detector + sight + recording
Common pipistrelle	2125 – end of survey	Flying around woodland to north of building	Unknown	Detector + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Garnet House, Stonyhurst College, Hurst Green, Lancashire BB7 9PZ
Survey Date(s)	6th June 2017
Timing of survey	2100 - 2240
Notes	Emergence survey of building – surveyors positioned at all four elevations of the building Sunset at 2136hrs Total bats emerging = four

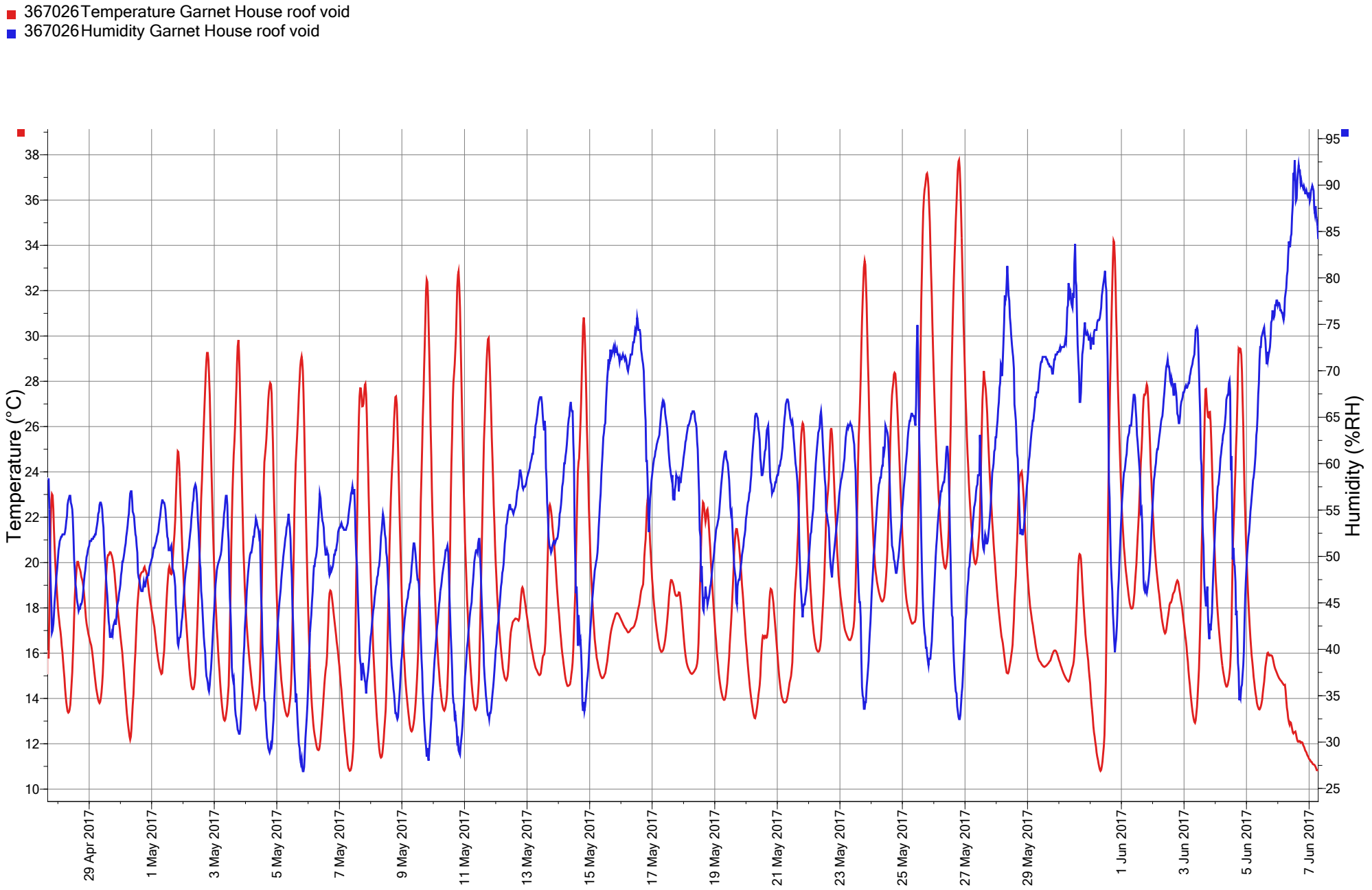
Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	2120 – end of survey	Flying around woodland to north of building	Unknown	Detector + recording
Common pipistrelle x 3	2130	Emerged from south apex of roof and from ridge	East towards woodland	Detector + sight + recording
Common pipistrelle	2145 – end of survey	Flying around woodland to north of building	Unknown	Detector + recording

Stonyhurst College



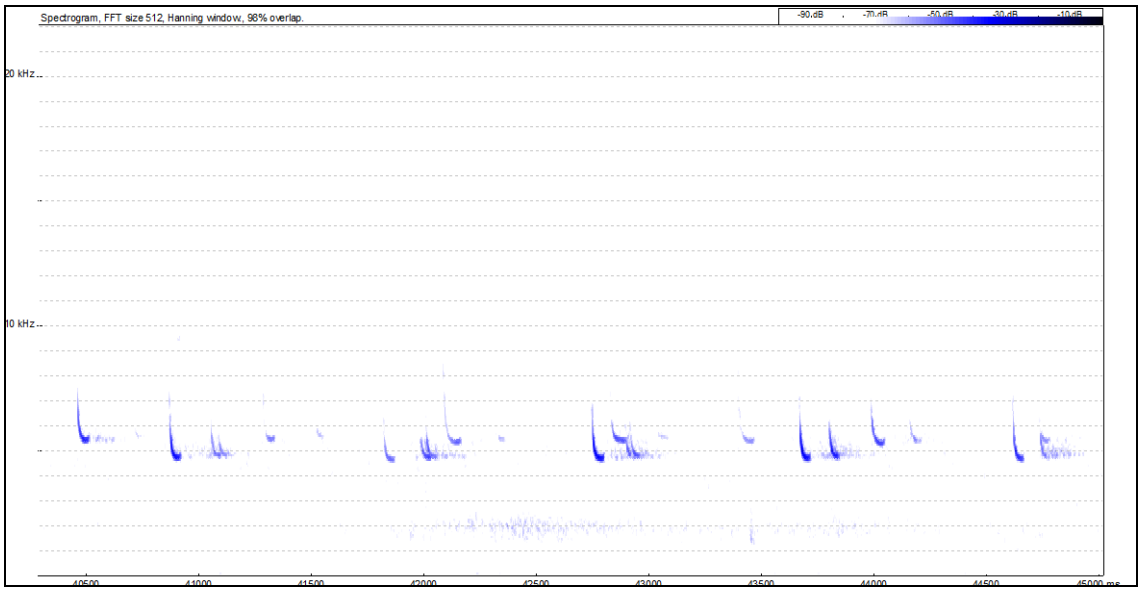
C:\Users\Pat\Desktop\Datalogger\Stonyhurst\Garnet House 2014\Stonyhurst College.ttd

Garnet House roof void

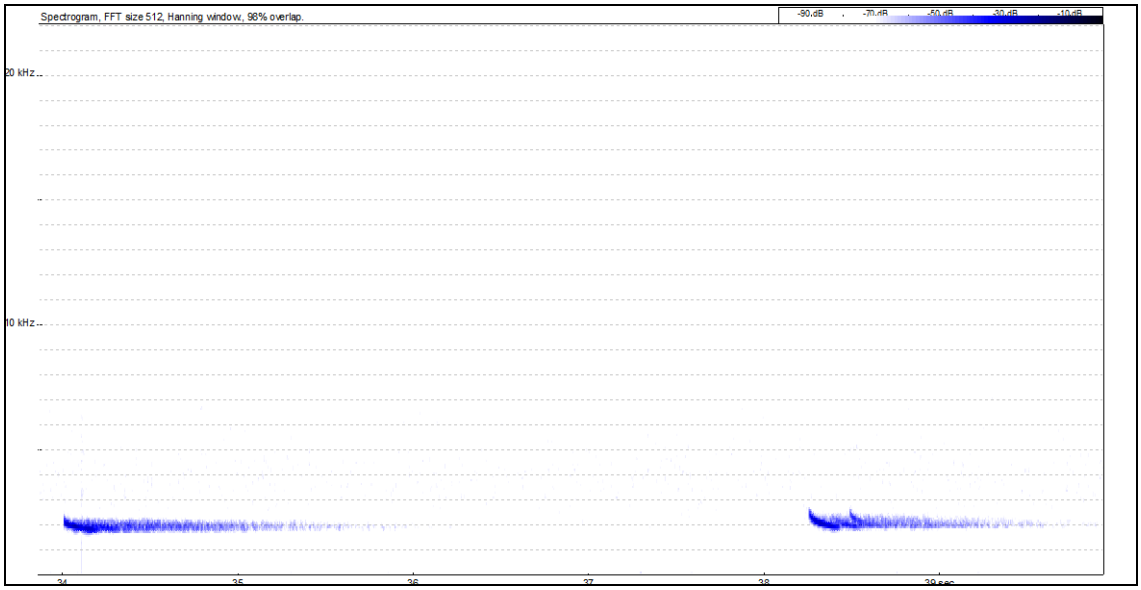


Sonograms of bat ultrasound – Garnet House, Stonyhurst College

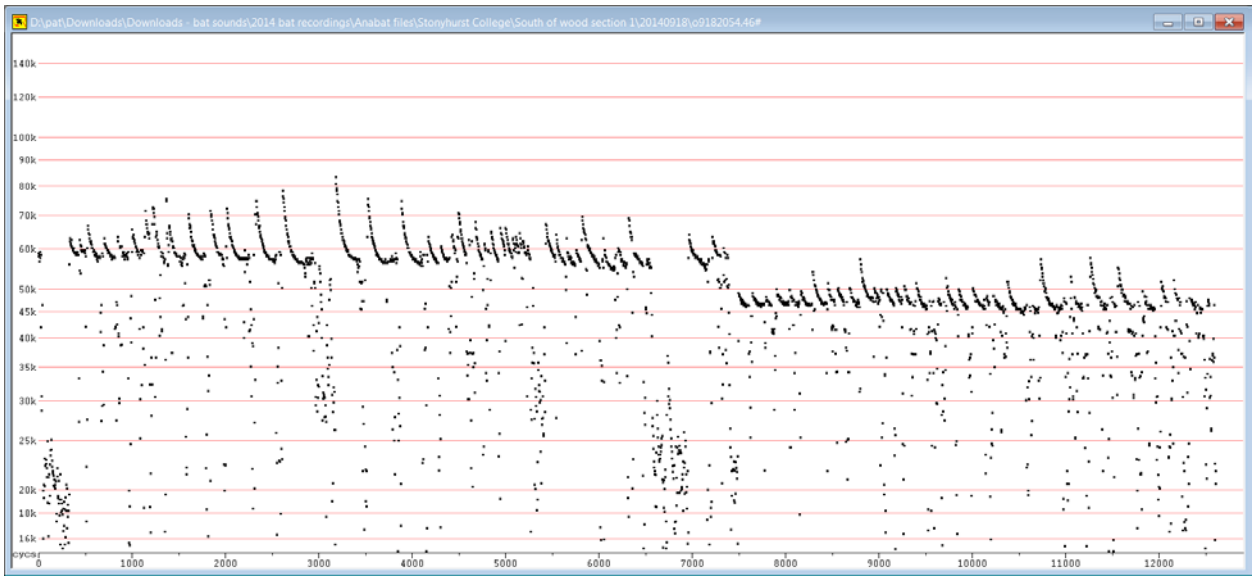
Common and soprano pipistrelle, recorded flying around Garnet House on Batbox Griffin 18th September 2014



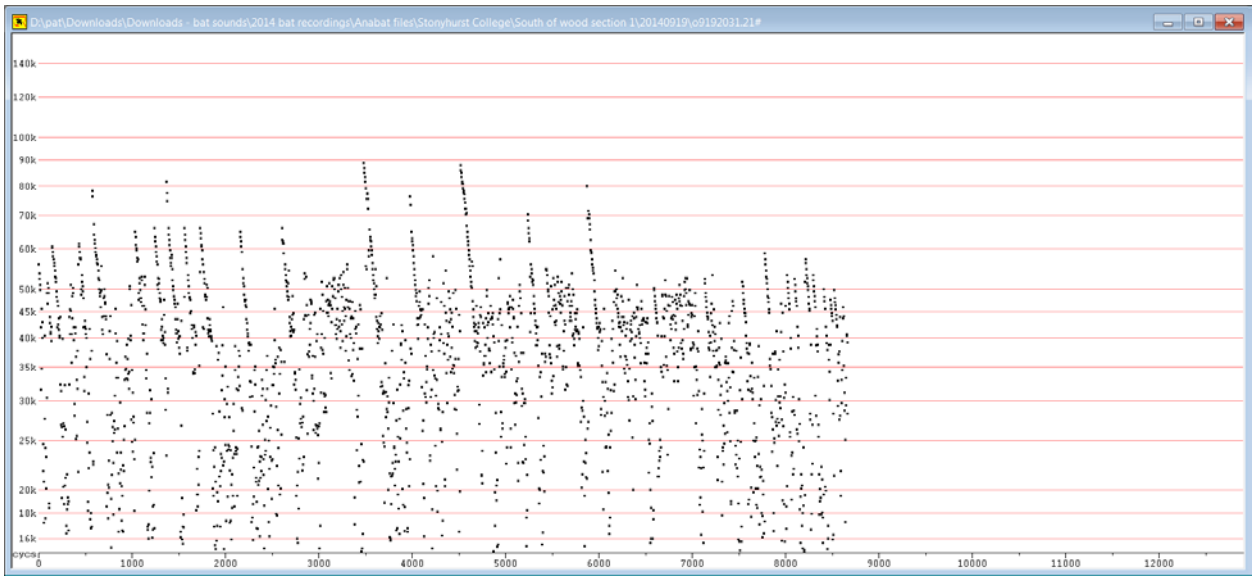
Noctule flying over Garnet House, recorded on BatBox Griffin – 18th September 2014



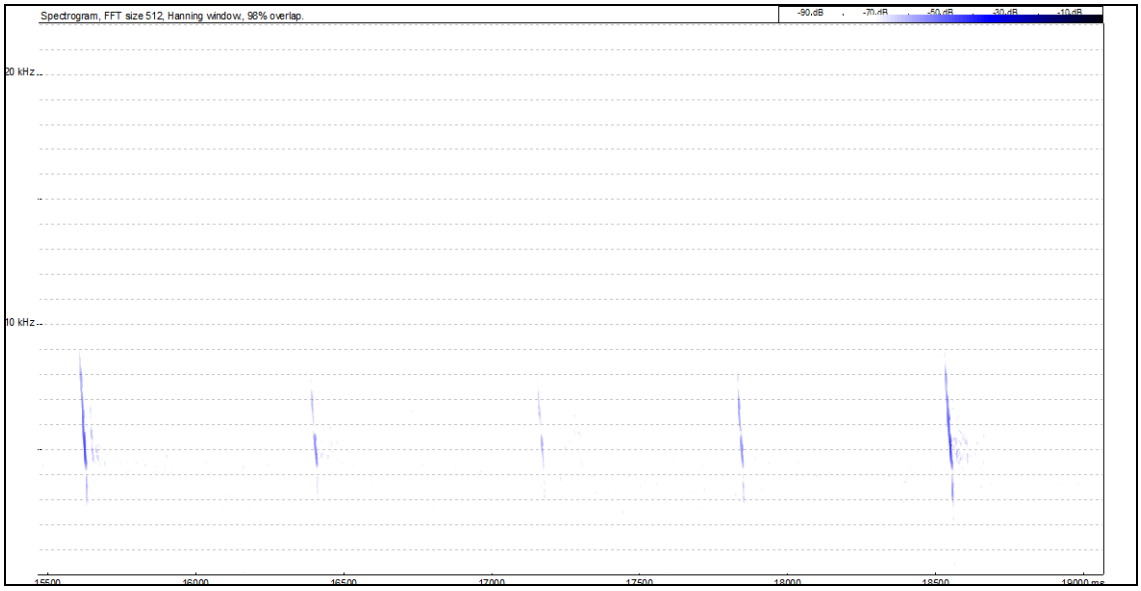
Common and soprano pipistrelles flying in woodland to east of Garnet House, recorded on Anabat SD1 – 18th September 2014



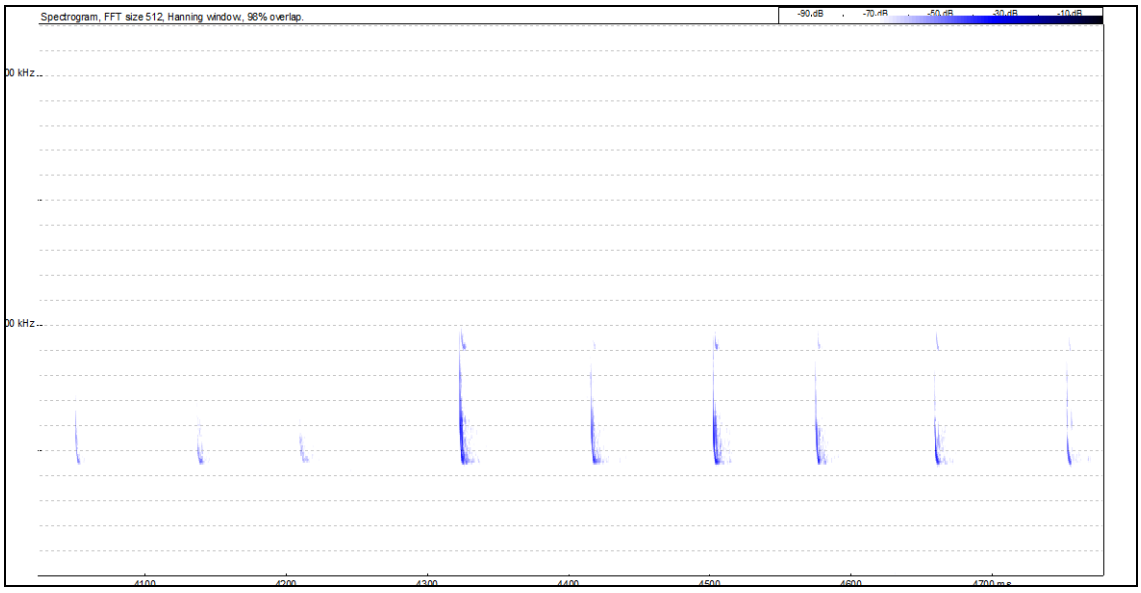
Myotis flying in woodland to east of Garnet House, recorded on Anabat SD1 – 19th September 2014



Myotis flying around Garnet House, recorded on BatBox Griffin – 24th September 2014



Common pipistrelle emerging from Garnet House, recorded on BatBox Griffin – 3rd June 2017



4. ANALYTICAL REPORT

Author	**Catherine O'Reilly**	**Date**	**06/11/2014**

SAMPLE COLLECTED BY		**SAMPLE COLLECTION**	
NAME	Patrick Waring	DATE	13-Oct-14
COMPANY	Ecology Services UK Ltd	LOCATION	Stonyhurst College, Hurst Green

SAMPLE						
Code	SEL1762	0	0	0	0	0
Suspect species (from client)	Plecotus auritus	0	0	0	0	0
Species group	bat	0	0	0	0	0
DNA EXTRACT						
Code	COR221014 4					
DNA conc.(ng/µl)	2.6					
SEQUENCE DATA						
primer set	ND					
sequence length (bases)	282					
Sequence match (%)	100					
SPECIES RESULT	***Myotis brandtii***					
haplotype	na					
Data file	41114					
POSITIVE CONTROL SAMPLE						
source	Faecal DNA sample					
result	positive					
COMMENTS						

Report date to SEL	06/11/2014	**Report date to Client**	