Bat Survey for Brookbottom Methodist Church, New Mills.

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Executive Summary

Mampam Conservation were engaged to conduct bat surveys at the Methodist Church, Brookbottom, New Mills, in relation to a planning application to convert the site into a single dwelling. The survey found that brown long-eared bats were roosting in the roof space and foraging around the building, Four other species of bat also used areas of the site to forage and commute, but were not observed to be roosting at the site. The proposed development involves destruction of the existing roosts and therefore requires sufficient mitigation to procure a European Protected Species licence from Natural England before development can proceed. This report provides information on bats necessary to inform the development proposal and makes specific recommendations about constraints that should be applied to any permitted development.

Introduction

On 23 April 2012 the author received a forwarded email via Derbyshire Bat Group from the owners of Brookbottom Methodist Church, asking about the potential presence of bats at the site. The author agreed to conduct a survey if required in exchange for a donation of two heterodyne bat detectors to Glossop Bar Group. On 3 July 2012 the owners contacted the author saying that HPBC had informed them that a bat survey was required as part of the planning application. A roost assessment of the building conducted on July 6th 2012 revealed the presence of a bat roost at the site, and the author agreed to conduct any bat studies necessary at the site free of charge.

Site Description

The site is at SJ986865, in Brookbottom, New Mills, Derbyshire (Figure 1). It is within the Brookbottom Conservation Area. The site consists of a church, vestry and outbuilding with a hard standing car park.

Proposed Works

The proposed works involve conversion of a former Methodist Church and attached car park to a single dwelling. This will require extensive modifications to the interior of the building and include creation of an extension to the western side of the building. The work will also involve removal of roof slates, installation of a breathable roof membrane and roof lights, and removal of cement on outer stonework and replacement with lime mortar.

Aims of Survey

The aims of the survey were:

- To provide sufficient information on the potential effects of the proposed development on bats to allow planning permission to be considered.
- To identify if European Protected Species licences (issued by Natural England) for development purposes will be required in respect of bats at the site.

- To assess the impacts of development on roosting, foraging and commuting bats.
- To provide appropriate mitigation, recommendations and enhancement measures for bats.

The objectives of the survey were:

- To identify if there are any historical records of bat roosts within the vicinity of the site;
- To identify how bats are utilising the site;
- To identify the species of bats utilising the site; and
- To identify if there are any roosts present within the site boundary, to determine the type of roost and its size.

Methods

Summary of survey methods

Bat activity at the site was assessed by watching and listening to bats using the equipment listed below. Surveyors attempted to cover as much of the site as possible at all times that bats were likely to be active. All sound (except heterodyne detection) and video monitoring was recorded and saved in electronic format.

Equipment used

The following equipment was used for bat surveys at the site:

Night Vision Equipment

Sony HDR-SR11 video camera with nightvision facility.

Yukon Ranger 5 x 42 night vision scope NV 28041 and recorder.

Bat Detectors

2 x ultrasound recorders (Dodotronic Ultramic 200/250 and netbooks)

4x heterodyne bat detectors (Pettersson D240X, Ciel CBD101R2, 2 x Magenta Bat 4)

1x Time Expansion bat detector (Pettersson D240X)

Other Equipment

VO Scope VO3610WW Endoscope

Torches with red filters

SLR and camera phones

Pre-survey data search

To inform this survey I referred to:

HPBC planning portal – for records of other church conversions in the area.

Derbyshire Bat Group (personal communication) – Records of bat roosts in the New Mills area.

Glossop Bat Group records – Records of bats in New Mills area

National Biodiversity Network's Gateway at http://data.nbn.org.uk/ - Records of protected species recorded near the site

DEFRA MAGIC site at http://magic.defra.gov.uk/ - Records of protected, designated and listed areas/habitats near the site.

Surveyor Information

Daniel Bennett B.Sc (Hons), Ph.D.

Daniel has experience of bat surveys since 1996. He was trained in bat survey techniques by Professor Paul Racey, and was awarded a first class Honours degree in Zoology (1997) from the University of Aberdeen and subsequently a Ph.D. from the University of Leeds. Daniel has practised internationally in field and research ecology and ecological consultancy for over 20 years, including bat surveys using a variety of methodologies since 1996. He has carried out bat surveys throughout the UK with Corvus Consulting, Belfast, and in many areas of the world with Mampam Conservation. He is the author (with Jon Russ) of a guide to the Bats of Madagascar, and has given numerous lectures, presentations and workshops about bats worldwide. He holds bat licences from Natural England and Scottish Natural Heritage.

Malcolm Stuart Charles Goth B.A. (Hons), RNLD.

Malcolm has experience of bats surveys since 1997, in Ghana, England and Scotland. He has been involved in surveys at various castles in the U.K. and at the Bui Hydroelectric Dam site in Ghana.

Patricia Tabasuares

Patricia has experience of bat surveys since 2008, in Scotland, England and the Philippines. She has particular experience of surveying bats in noisy urban environments.

Field Surveys

The assessment criteria set out by the Bat Conservation Trust was followed throughout (Hundt 2012).

Habitat Survey

The purpose of the habitat survey was to identify features on the site of potential importance to bats. The habitat survey was conducted on 6 July 2012 in the afternoon. All features, vegetation and man made structures located within the

survey boundary as illustrated in Figure 1 were assessed and considered in the context of the surrounding environment. Because it was immediately obvious that none of the vegetation on site was suitable for roosting by bats, no structured habitat survey was conducted. To investigate if any of the trees at the site were used by perching bats the area around tree lines on the site was searched for lepidopteran wings.

Roost Surveys

Roost surveys followed assessment criteria set out by the Bat Conservation Trust (Hundt 2012).

The purpose of roost surveys was to identify actual or potential bat roosts at the site. The survey included all buildings and trees located within the survey boundary as illustrated in Figure 1. Dates and times of surveys are given in Table 1.

Features were assessed visually and accessible crevices deemed suitable for bats were investigated with a flexible endoscope. Attic spaces were monitored with night vision equipment and ultrasonic microphones. Night vision equipment was pointed at likely roost access points from positions given in Figure 2. Bat detectors (Ultramic 200/250 and Petersson D240X) were attached to recording devices and positioned in areas of buildings considered suitable for bats (given in Figure 2). Roost access points were monitored from outside the building visually and with night vision equipment from positions given in Figure 2. Sound recordings were subsequently scanned using Wavesurfer software. Video recordings were assessed using standard editing software.

To avoid unnecessary disturbance to roosting bats, visits to attic spaces were limited to ten minutes per hour using a torch with red filters. Only licensed surveyors entered attic spaces.

Activity Surveys

Activity surveys followed assessment criteria set out by the Bat Conservation Trust (Hundt 2012).

The purpose of activity surveys was to identify which species of bats used the site and what they used it for. The survey included the area within the survey boundary as illustrated in Figure 1 and immediately adjacent areas with public access. Dates, times and conditions of activity surveys are given in Table 1.

The small size of the site made transects for activity surveys unnecessary. Surveyors walked around the site or sat in loft spaces and made observations on bats using ultrasound recorders, bat detectors and, where necessary, torches with red filters. Positions of ultrasound recorders is given in Figure 2. All surveyors were able to differentiate long eared bats in flight from other species by sight. Surveyors recorded flight paths and used clues from bat detectors and biological intuition to interpret activity as foraging, commuting or social activity.

Date	Activity	From	To	Temperature	Humidity	Wind	Cloud	Rain	Light
July 6, 2012	Bat Roost Potential Survey	4:45 PM	7:30 PM	About 19oC	Not available	Not available	Not available	Not available	Daylight
July 10, 2012	Roost and Activity Surveys	8:45 PM	6:00 AM	Minimum >12oC	Not available	Intermittent breeze	100% cover	Intermittent light drizzle	No moon, dark
July 24, 2012	Roost and Activity Surveys	8:45 PM	6:00 AM	Minimum >12oC	Not available	Mainly still	Light, scattered	Dry	Waxing crescent
August 5, 2012	Roost and Activity Surveys	8:30 PM	6:00 AM	Minimum >12oC	Not available	Still	Light, thin, moon shines through	Very light drizzle approx 2-3am	Waning gibbous

Table 1. Timing and climatic conditions of surveys.

Results

Pre-survey data search

Neither Derbyshire Bat Group nor Glossop Bat Group have records of bat roosts from the New Mills area. The Biological Records Centre holds no data for the site but contains 12 records of five species of bats (*Myotis daubentonii, M. mystacinus, Pipistrellus pipistrellus. P. pygmaeus* and *Nyctalus noctula*) from within 5km of the site (see Appendix 1).

The Defra MAGIC site shows that the site is within a stretch of riparian habitat listed on the National Inventory of Woodland and Trees, within 450m of areas of ancient and semi natural woodland to the west and 1.4km north of a Local Nature Reserve at New Mills.

Designated sites

The site is about 4km west of the Peak District National Park and about 8km north of Goyt Valley SSSI.

Field Surveys

Habitat Description

The church was built in the 1870s. It is made of stone and the roof has slate tiles. A vestry and a small outhouse of the same materials were added subsequently. The west wall of the vestry is partly brick and rendered, other external walls are bare stone and pointed with cement. Church walls are approximately 50cm thick and composed of a double skin filled with stone debris. There are flush eaves and fascia boards masking the top of the wall caps. The roof is of king post truss design with heavy underpurlin beams. There are chimneys at the western gable ends and a stone cap and finial on the verge of the eastern gable end. There are recessed wooden slatted windows in east and west gable ends. There is attic space above the vestry and above the western part of the church. There is a car park of hard standing material to the north of the buildings bordered by tree

lines running north-south and east-west. Most of the trees are outside the site boundary. A narrow passage of hard standing to the north of the building is bordered by a retaining wall to a neighbouring garden at lower elevation and a west-flowing brook. Main features are depicted in Figures 3-14. It was noted that there was no Japanese knotweed growing on the site. However a large clump of knotweed is growing close to the property on the opposite side of the road.

Strong riverine treelines connect the site directly with the River Goyt and associated woodland and waterbodies approx 1km to the west (Figure 15). Excellent habitat also exists to the east (New Mills and Peak District National Park) and all habitat adjacent to the site is suitable for bat foraging for at least 1km in all directions.

Roost Survey

Trees

No trees on the site have the potential to support bats and are classed as Category 3 under the definitions given in Table 8.4 of Hundt (2012). No evidence of perching bats was found under trees.

Cellar

The cellar of the building contained numerous crevices suitable for bats and multiple potential entry/exit points (Figures 7&8). All such crevices were investigated endoscopically, but no signs of bats were found anywhere in the cellar.

Interior

The ground floor space was recently swept and contained little evidence of bats. Essential maintenance work had been carried out on the building in Spring 2012 which had resulted in the disturbance of cobwebs on areas of the walls and ceilings, making easy identification of potential areas used by bats impossible. The attic floors showed no evidence of disturbance and are unlikely to have been disturbed since the church ceased to be a place of worship in 2009.

The interior of the building contains numerous crevices suitable for bats, primarily in the upper stonework on the eastern and western walls and at insertion points of roof timbers.

There was evidence of bats (droppings and lepidopteran wings) in the church attic space and in the vestry attic space (Figure 16-18). In both attic spaces droppings and lepidopteran wings were concentrated along the apex of the roof. The quantities of droppings and lepidoterans wings suggested that the church attic space was more heavily utilised by bats than the vestry attic space, and indicated either a low colony size or very recent utilization of the roost.

During the bat roost potential survey, a cluster of about 10 long-eared bats (*Plecotus auritus*) was discovered hanging between beams near the ridge of the church roof by the western king post (Figure 19). Because of the possibility that newly born bats were present, the animals were only examined with nightvision equipment and were not disturbed. This area has an open attic floor with no

built in access. Subsequently bats were also seen in the vestry attic space (Figure 20). Areas where bats were observed to rest are given in Figure 21. Bats were mainly seen hanging near the intersections of ridge beam and rafters and also seen entering a crevice around the window frame on the western wall of the building (Figure 10). Bats may also occupy crevices where purlins, beams and rafters insert into walls, and in chimney structures.

From the interior bats appeared to use only the western window to enter the roost. However bats were seen flying around the eastern window inside and outside the building although none were seen to enter. Local residents have also seen bats around the eastern window and it seems likely that it is used by bats under some circumstances.

The largest estimate of colony size is at least ten individuals, based on a cluster of bats observed in the church attic on 6th July 2012 (Figure 19 and Appendix 2). Counts from activity surveys (Appendix 2) suggest that 5 – 9 bats entered or left the roost by the western gable window or the missing fascia board on south side of the church on all three evenings of the survey.

Exterior

There was no evidence of bats on the exterior of the building. Potential access points to the interior were identified in the eaves and roof of the building via missing fascia boards, wooden slatted windows and gaps between roof tiles. External stonework has been pointed in recent years and the only crevices suitable for bat roosting were <2m from the ground and unlikely to be utilized by bats. None of the accessible crevices showed evidence of use by bats. Roof tiles provided numerous opportunities for crevice dwelling bats, but no evidence of their use was apparent.

Roost Access Points

Long-eared bats were observed at three entry points to the roost (Figure 22). The western window was used by bats during all activity surveys. Bats regularly flew through the space created by the dislodged top slat of the window, occasionally resting on the slat. They were also recorded flying through other slats in the window (Figures 22&23). Early in the morning of July 24th at least five long eared bats were seen to enter the roost via a missing fascia board on the south side of the building (Figure 14). This point was monitored from 21:00 to 00:00 and 03:20 to 05:30 during the survey on August 5th but no bats were seen to use the entry point. Bats often flew around the eastern window of the church but were not recorded entering the roost by this route.

High levels of pipistrelle bat activity were recorded around the roof of the building but no activity was observed that indicated roosting behaviour. There is probably a large roost of pipistrelle bats in a building to the south of the site (see below).

Activity Survey

At least five species of bats were recorded at the site: common pipistrelle bats (*Pipistrellus pipistrellus*), soprano pipistrelle bats (*Pipistrellus pygmaeus*), noctule

bats (*Nyctalus noctula*), *Myotis* bats (*Myotis spp.*) and brown long-eared bats (*Plecotus auritus*).

Noctule bats

Nyctalus bats with echolocation calls containing peak frequencies between 19 and 25kHz were recorded feeding and commuting over the site on all nights of the survey (Figure 24). Two observations estimated flying heights as above 20m. Two species of *Nyctalus* are known from the High Peak; noctule bats and Leisler's bat (Bennett et al, 2012). Noctule bats are most commonly reported, and in the absence of further information the bats recorded at Brookbottom are presumed to belong to that species. The earliest record of noctule bats at the site was at 21:54 (58 minutes after sunset). Last record was 05:18. Calls of noctule bats were the least frequently recorded bat sounds at the site.

Common pipistrelle bat

Common pipistrelle bats were the most commonly recorded bats in echolocation surveys. They were observed foraging around and commuting through the site, and social calls were recorded (Figure 25). On two nights of the survey they were first observed flying from the area south of the site at six and nine minutes after sunset, indicating the presence of a nearby roost. Within the site foraging occurred mainly around dusk and dawn and was mainly concentrated in the car park area and treeline at the northern and eastern boundary of the site. Foraging was also recorded along the stream, along all treelines, along the road, and in fields and gardens close to the site. At least two well defined commuting routes were observed within the site, which were used by bats to access habitats to the north of the site (Figure 23).

Soprano pipistrelle bat

Soprano pipistrelle bats were recorded on all nights of the survey, foraging, commuting through the site and making social calls (Figure 26). The earliest calls noted were about 15 minutes after sunset, suggesting that there is a roost nearby. Field observations were often unable to distinguish between soprano and common pipistrelle activity, consequently activity of both species is given in Figure 23.

Brown long-eared bat

Brown long eared bats were the only species of bat recorded within the building (Figure 27) and were regularly recorded around the building (Figure 28). Activity of brown long-eared bats on the site was concentrated around two roost access points on the northern and western sides of the church (Figure 22). They were also seen to forage around the site and commute in all directions. Long-eared bats emerged from their roosts at least an hour after sunset and were observed foraging above the garden to the south of the site and around treelines to the southwest of the site on all nights of the survey. This activity was intermittent throughout the night. Long-eared bats were observed commuting from the site into tree lines to the west and east of the site on all nights of the survey. Because the vestry roof access hatch was left open during surveys, bats

were able to enter the vestry and were observed chasing moths in illuminated rooms.

Myotis bats

Traces of *Myotis* bat calls were heard in the area immediately south of the site boundary with heterodyne bat detectors on the evenings of July 24th and August 5th 2012 between 2200 and 0000 hrs. The bats were not seen and were not recorded by any devices. Extensive *Myotis* activity is expected in the wooded and riparian habitats to the west of the site. At least three species of *Myotis* bats are likely to occur in the New Mills area. All have very similar echolocation calls that are very difficult to distinguish. Recent discoveries about *Myotis* distribution in the UK (Jan *et al.* 2010) make identification of all *Myotis* bats except *Myotis daubentonii* highly problematic without capturing the animals.

Assessment

Constraints on survey information

Because of health and safety considerations many crevices in the building could not be examined endoscopically. These include the entire external stonework above head height, the chimney stonework and all areas of the roof where no attic space was present. Examination of these areas might have revealed evidence of previous bat roosting behaviour.

This survey was conducted during July and early August and does not represent an assessment of total bat activity at the site. Bats are highly mobile animals and all local species except long-eared bats shift roost regularly. The survey was undertaken in an unusually wet year, and many bat workers have reported increased mortality in reproductive populations over June and July[1].

The time and health and safety constraints on the survey, combined with the high levels of bat activity recorded at the site and the high quality habitat of the local area, mean that the possibility that pipistrelle bats use crevices in the building as roosts cannot be discounted. No pipistrelle bats were observed roosting at the site during July – August surveys, but the building provides many suitable crevices and in the absence of surveys at other times of year a precautionary approach should be adopted in the event that bats are discovered at the site.

Constraints on equipment used

The equipment used is sufficient to detect all bat species known to occur in the U.K. Long-eared bats are common in the High Peak, but they emit very quiet calls that can be difficult to detect, particularly against background noise. Furthermore they often hunt by listening for prey rather than by echolocation. The use of night vision equipment and highly sensitive microphones is therefore essential in order to collect quantitative data about these bats.

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[1] E.g. http://www.bbc.co.uk/news/uk-england-sussex-19060829, 31st July 2012. "Bats starving after wet weather, Sussex Wildlife Trust says". Downloaded 4th August 2012.

There were some constraints on data collected by recording devices due to limited battery power and storage capacity (see Appendix 4).

Potential impacts of development

In absence of mitigation, the following potential impacts have been identified.

1 **Short-term impacts.** Without the implementation of mitigation this development would result in the potential death of bats by crushing or entombment, and the destruction or damage of roosts and their access points. Increased noise, light, dust and vibration at the site would potentially have a negative impact on foraging and commuting bats.

The impact on bats at a local scale could be high.

2 **Long-term impacts: Roost modification.** Flight space, roosting crevices, perches and access points in the church and vestry attic will be lost in the development. Without mitigation the loss of roost sites and access points would potentially make the new roof space available to bats unsuitable because of inappropriate humidity and thermal gradients. The use of an inappropriate roof liner could make roosting space unsuitable for bats or resulting in entanglement of bats from frayed edges. Any inappropriate timber treatments would also be detrimental to bats.

The long term impacts on bats at a local scale could be high

3 **Long-term impacts: roost loss.** Only *Plecotus* bats are likely to suffer significant impact from the development, through loss of roost space.

4 **Long-term impacts: fragmentation and isolation.** There are no fragmentation or isolation issues relating to this development.

5 **Post-development interference impacts.** Increased lighting at the site could have an impact on commuting and foraging bats, particularly *Plecotus* and *Myotis* species (e.g. Boldogh *et al. 2007*; Kuijper *et al.* 2008; Stone *et al.* 2009).

6 **Predicted scale of impact on species status at the site, local county and regional levels.** The impact of this development is predicted to be very high at site level and medium at parish level for *Plecotus* bats, and low for all other bat species.

Designated sites

The development is too distant, and the bat colony too small, to have any detrimental effect on populations of bats at those sites.

Roosts

The development will involve disturbance and destruction of a long-eared bat roost at the site and will therefore require a detailed mitigation and exclusion strategy and European Protected Species licences from Natural England in order to proceed. Long-eared bats show high roost fidelity and have specific roost requirements that cannot be met with bat boxes alone (e.g. Park *et al.* 1988; Entwistle *et al.* 1997, 1998, 2000; Moussy 2011). Therefore a dedicated bat loft must be provided.

The development may involve disturbance or destruction of temporary pipistrelle bat roosts and a detailed mitigation strategy should be prepared and appropriate licensing obtained if required.

Foraging and commuting habitat

Foraging habitat at the site is limited to the hard standing carpark and paved areas. The site is important for commuting bats traveling to habitats to the west and northeast of the site (Figure 23). Increased light levels at the site would be detrimental to local populations of *Plecotus* and *Myotis* bats (e.g. Boldogh et al. 2007 Kuijper et al. 2008, Stone et al. 2009). The development will have no impact on *Nyctalus* bats at the site.

Legislation and policy guidance

Bats receive very strict protection under European and English law. The following legislation is relevant to bats at this development:

EC Council Directive 92/43/EEC1992 (Habitat Regulations)

Conservation of Habitats and Species Regulations, 2010

Wildlife and Countryside Act, 1981 (as amended)

Countryside and Rights of Way Act, 2000

Natural Environment and Rural Communities Act, 2006

These laws make the following activities illegal:

- Catch, kill or hurt bats
- Do anything likely to disturb bats or impair their ability to survive, reproduce, hibernate or migrate
- To cause significant detriment to the local distribution and abundance of bats of any species.
- Damage or destroy any place that has been used by bats as a roost.
- Obstruct any entry to a roost.
- Own or be involved in the sale or exchange of live or dead bats and their derivatives.

Some of the above activities are permitted by licences issued under the Habitat Regulations by the Wildlife Licensing Unit of Natural England. These licences are known as European Protected Species (EPS) licences and are issued subject to three tests.

1. Need to perform the activity for reasons of overriding public interest (primarily health and safety, economic, social or environmental reasons.
2. No satisfactory alternative to the activity.
3. The activity will not be detrimental to the favourable conservation status of the species.

Recommendations and Mitigation

1. No activity must be conducted on the site that might disturb bats until an EPS licence has been issued by Natural England. If there is any doubt about the risk of disturbance, the advice of a competent authority should be sought.

2. For planning application purposes, this survey has adequately assessed the risk to bats at the site and provided a suitable outline mitigation strategy[2]. However further surveys and investigations into the thermal properties of the roost and its use will be required before a complete mitigation strategy can be prepared and the relevant EPS licence applications submitted.

3. A condition limiting external lighting to the building should be imposed to avoid disturbance to bats.

4. A condition requiring a section 106 agreement between the site owners and the local authority must be imposed as a prerequisite of any licence application to Natural England, and to ensure the long term protection and monitoring of the newly created roost.

5. No trees at the site are suitable for roosting bats. Individual trees and shrubs can be removed from the site without detriment to bats, providing tree lines are not disrupted.

Further Survey

This survey has adequately assessed the potential risks to bats by the proposed development and no further surveys for planning purposes are necessary.

To increase the likelihood of delivering successful mitigation at the site, to ensure compliance with EPS licensing and to more fully assess possible use of the roof by *Pipistrelle* bats, regular surveys (a minimum of two per month) should be carried out at the site until bats have vacated for the winter.

Mitigation measures

Proposed mitigation for roost sites (subject to agreement from Natural England)

Mitigation for this site will include the following measures:

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[2] Attention is drawn to http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/standingadvice/faq.aspx#q12

12.4 Where a local authority is satisfied that sufficient information and certainty about the deliverability of mitigation has been provided at the application stage it may be appropriate to impose a condition which compels the submission of a detailed mitigation strategy which should be implemented once planning permission has been granted.

- Controlled destruction of place of shelter/breeding site
- Replacement of place of shelter / breeding site
- Avoidance of harm through best practice
- Habitat enhancement measures

The following key mitigation measures must be applied to avoid harm to bats:

1. No roost destruction work, or other development work likely to disturb bats, to be undertaken until bats have left the site for the winter
2. Provision of a bat loft at the western end of the building, with floor space of approximately 5.8m x 2.6m, and a maximum height of approximately 2.3m, providing suitable flight space, entry points, thermal properties and roosting features to accommodate *Plecotus* bats
3. Provision of bat boxes around the site
4. Control of external lighting around roost entrances and transit routes
5. Section 106 agreement between property owners and High Peak Borough Council to ensure long term security and monitoring of new roost

Mitigation Plan – Summary

A full mitigation plan is being developed according to data collected at the site. Regular data collection and site monitoring will continue until bats have left the site for the winter.

Provision of a dedicated bat loft at the western end of the building providing suitable flight space, entry points, thermal properties and roosting features (exposed timbers and crevices) to accommodate *Plecotus* bats.

Bat loft to include timbers from vestry attic currently used as perches and wooden window frame from church attic currently used as a perch and main entry point to the roost.

Flexible internal design of bat loft to provide optimal thermal gradients and maximize available flight space.

Flexible design of roost entry points allowing subsequent modifications if required.

Detailed study of thermal properties of existing roost, and creation of suitable thermal conditions in new roost using heating (if required).

Bat droppings from the church attic will be deposited in new loft to provide additional olfactory.

Schwegler 1FD woodcrete bat boxes erected on the southern and western walls of the building.

Awnings fitted over windows at west end of property to avoid light pollution of roost entry points and bat flight routes.

Timing of work will avoid direct disturbance to bats.

Pre-works inspection survey of site to ensure no bats are present.

All workers at the site to be provided with guidance and clear instructions (method statement) on correct procedure in the event that bats are discovered during development work.

A licensed bat worker will supervise the removal of roof materials whenever bats are likely to be present.

Light pollution at the site to be strictly controlled through planning conditions limiting external lighting and use of awnings on windows where necessary.

Monitoring of the dedicated bat roost with infra red cameras and ultrasonic microphone via USB links in the house.

Long term security of lighting limitations and roost monitoring through section 106 agreement between local authority and property owners.

Proposed mitigation for foraging and commuting habitat

No mitigation is required for foraging and commuting habitat if strict lighting conditions are imposed on the proposed development.

Mitigation licences

A European Protected Species mitigation licence will be required in order for this development to proceed lawfully.

Summary

The site contains a small roost of long-eared bats, which may not be disturbed without a specific licence issued by the Licensing Unit of Natural England. For the development to proceed Natural England must be convinced of the likelihood of the proposed mitigation measures being successful.

Unlike other common bats in the area, long-eared bats show strong site fidelity both within and between years, and adult male bats are not excluded from maternity roosts (Entwistle *et al.* 1997;1998; 2000). Therefore this roost is likely to be used throughout the spring, summer and autumn by the same group of bats for the purposes of shelter, breeding and feeding. The site does not appear to be suitable for hibernating bats and so the animals are expected to be absent from the site between approximately November and March. Based on the author's personal experience, long-eared bats appear to be common in the High Peak wherever suitable roosts, woodlands and dark corridors still exist, and so it is surprising that, despite many church conversions in the New Mills and Glossop area, this appears to be the first such development in the area that has ever been found to contain a bat roost and require mitigation and EPS licensing. The importance of the site on a local, parish and borough is therefore problematic to assess. If the site were as rare as is suggested by the lack of similar discoveries locally, its importance would be considerably greater than if similar sites have simply not been found through negligence. Overall, long-eared bats are common in England (Joint Nature Conservation Committee. 2007).

The primary roost area at the site is the church attic space, and the primary roost entrance is the window in the west gable end of the church. Bats also use the vestry attic space, and have been accessing the interior of the church from here

since the attic cover was removed by the site owners in early spring this year. Based on the paucity of bat droppings and other signs in the vestry attic space there is no evidence of long term occupancy of this area. Nevertheless the area receives complete protection in law and even replacing the vestry attic hatch would constitute a breach of the legislation referred to above.

Other bats use the site for foraging and commuting, and there is evidence of pipistrelle bat roosts nearby. If illumination of bat flight paths is avoided the development is unlikely to have a detrimental impact on local populations of these species.

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Glossary or Definition of Terms

Myotis – A group of bats that are difficult to identify to species level without capture. Not observed at the site but heard nearby.

Nyctalus – Large bats that were recorded foraging high above the site. Probably noctule bats (*Nyctalus noctula*), but possible Leisler's bats (*N. leisleri*)

Pipistrelles – A group of two species of bats (*Pipistrellus pipistrellus* and *P.pygmaeus*) recorded on the site.

Plecotus – The long-eared bat, *Plecotus auritus*, which roosts at the site.

Appendix 1. Pre-survey data search results

Date	Species	Site	Source
1980	*Myotis mystacinus*	SJ9884	Biological Records Centre
2011	*Pipistrellus pipistrellus*	SJ9686	Biological Records Centre
2011	*Myotis daubentoni*	SK0182	Biological Records Centre
2011	*Pipistrellus pipistrellus*	SJ9685	Biological Records Centre
2011	*Pipistrellus pygmaeus*	SJ9685	Biological Records Centre
2007	*Pipistrellus pipistrellus*	SJ9883	Biological Records Centre
2007	*Pipistrellus pipistrellus*	SK0283	Biological Records Centre
2007	*Chiroptera*	SK0383	Biological Records Centre
2010	*Pipistrellus pipistrellus*	SJ9782	Biological Records Centre
2010	*Pipistrellus pygmaeus*	SJ9782	Biological Records Centre
2010	*Nyctalus noctula*	SJ9782	Biological Records Centre
2005	*Pipistrellus pipistrellus*	SJ9588	Biological Records Centre

Appendix 2. Bat roost report forms

Date	Point	Time	Max Count of Long-eared	Method	Notes

Bats

06-Jul-12	church attic	day	10	eye	Near king post on ridge, tight cluster
06-Jul-12	vestry attic	day	0	eye	
10-Jul-12	west window	dusk	5	camera	BATS IN ATTIC ALL NIGHT
10-Jul-12	east window	dusk	0	eye	
10-Jul-12	church attic	dusk	3	eye	Perched along ridge, not clustered
10-Jul-12	vestry attic	dusk	2	eye	Bats flying through vestry and into attic
10-Jul-12	south roof	dusk	0	eye	Pips from south - roost near The Fox
11-Jul-12	west window	dawn	3	camera	VERY DARK
11-Jul-12	east window	dawn	0	eye	
11-Jul-12	church attic	day	0	eye	
11-Jul-12	vestry attic	day	0	eye	
11-Jul-12	south roof	dawn	0	eye	Pips go back towards The Fox
11-Jul-12	north roof	dusk	0	eye	
24-Jul-12	west window	dusk	4	camera	NO SOUND AFTER 2243
24-Jul-12	east window	dusk	0	eye	
24-Jul-12	church attic	dusk	0	eye	
24-Jul-12	vestry attic	dusk	4	eye	Along ridge, not clustered
24-Jul-12	south roof	dusk	0	eye	
24-Jul-12	north roof	dusk	0	eye	

25-Jul-12	west window	dawn	4	camera
25-Jul-12	south wall	dawn	7	eye
25-Jul-12	church attic	day	0	eye
25-Jul-12	vestry attic	day	0	eye
25-Jul-12	south roof	dawn	0	eye
06-Aug-12	west window	dusk	6	nightvision
06-Aug-12	east window	dusk	0	eye
06-Aug-12	south wall	dusk	0	camera
06-Aug-12	south roof	dusk	0	eye
06-Aug-12	north roof	dusk	0	camera
07-Aug-12	west window	dawn	6	camera
07-Aug-12	east window	dawn	0	eye
07-Aug-12	south wall	dawn	0	nightvision
07-Aug-12	south roof	dawn	0	eye
07-Aug-12	north roof	dawn	0	camera

Appendix 3. Figures

Figure 1. Site plan and boundary map (red line).

Figure 2. Main nightvision, ultrasound and visual monitoring points for observing roost access. Points A and B are within attic space.

Figure 3. East end of Brookbottom Methodist Church.

Figure 4. West end of Brookbottom Methodist Church.

Figure 5. North side of Brookbottom Methodist Church.

Figure 6. South side of Brookbottom Methodist Church.

Figure 7. Cellar space at Brookbottom Methodist Church.

Figure 8. Cavities in cellar at Brookbottom Methodist Church.

Figure 9. Church attic space

Figure 10. Main roost access point in west end of Brookbottom Methodist Church. Note cavity above window frame.

Figure 11. Vestry roof showing spaces between tiles in Brookbottom Methodist Church.

Figure 12. Internal view of roof at Brookbottom Methodist Church.

Figure 13. Entry hatch to vestry attic space, Brookbottom Methodist Church.

Figure 14. Missing fascia board on western end of south wall, showing roost entry point.

Figure 15. View west of site.

Figure 16. Faeces/feeding signs of bats in the church attic.

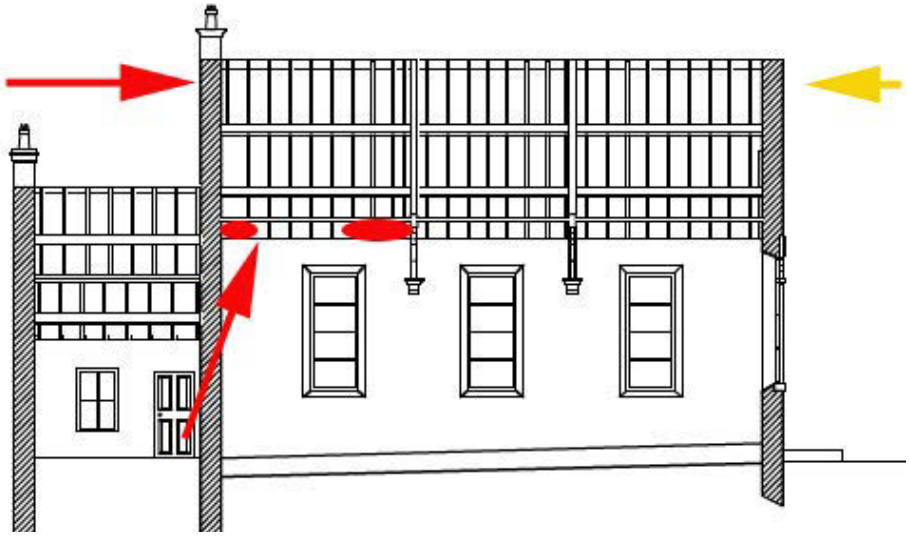

Figure 17. Position of concentrations of faeces/feeding signs at site and potential roost access points (red arrows – observed to be used, brown arrow – likely used), south view.

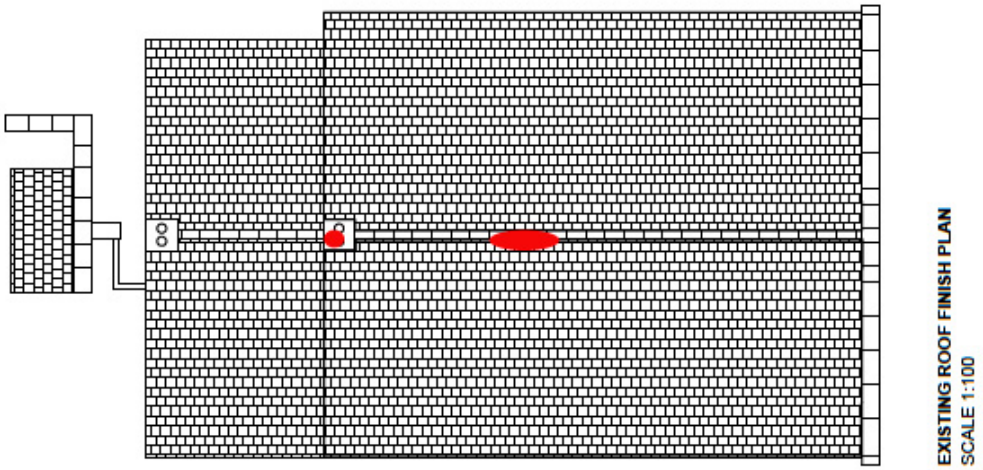

Figure 18. Position of concentrations of faeces/feeding signs below ridge beams in loft space, top view.

Figure 19. Group of about ten long-eared bats (circled), ridge of church attic space, Brookbottom Methodist Church.

Figure 20. Long-eared bat on rafter near ridge of vestry attic, Brookbottom Methodist Church.

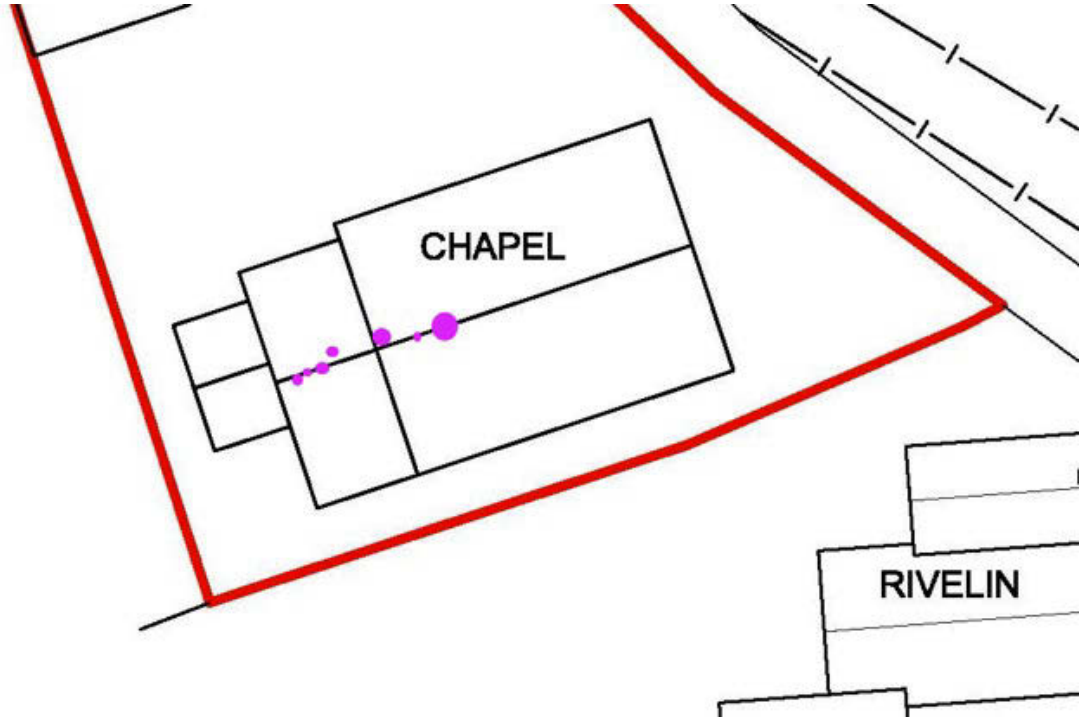

Figure 21. Perching areas observed to be used by bats in attic spaces.

Figure 22. Roost entry points (green=observed to be used, brown= probably used)

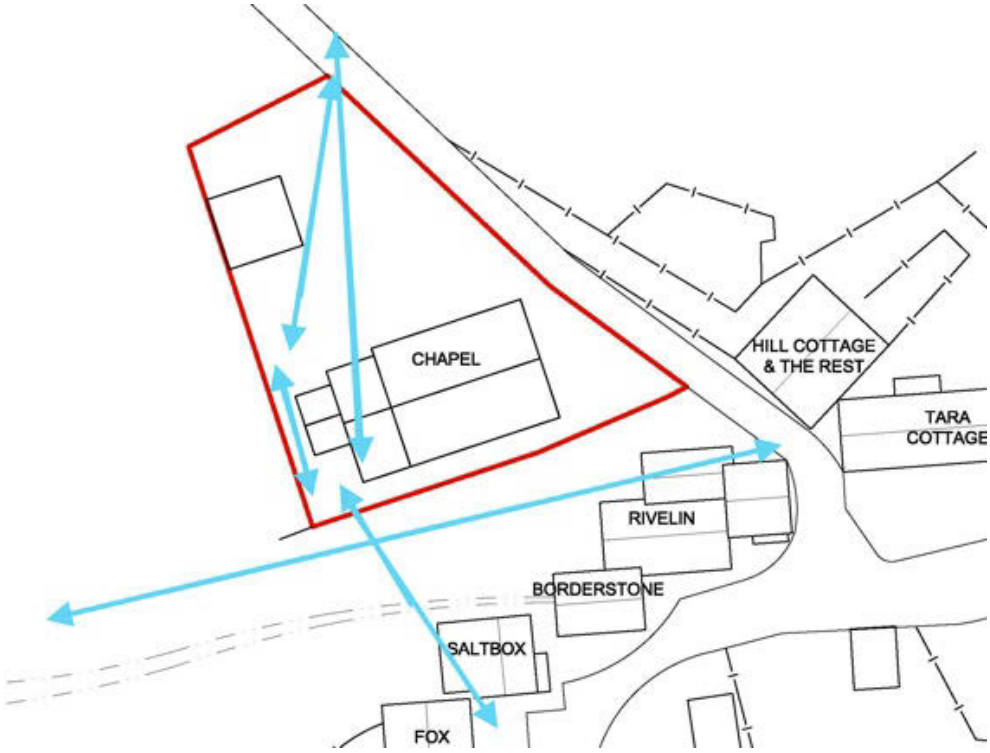

Figure 23 Main commuting routes used by bats at the site.

Figure 22. Long-eared bat around roost entry point in west window.

Figure 23. Long-eared bat (circled in red) leaving roost through lowest slat of the west window, 22:08, 24th July 2012.

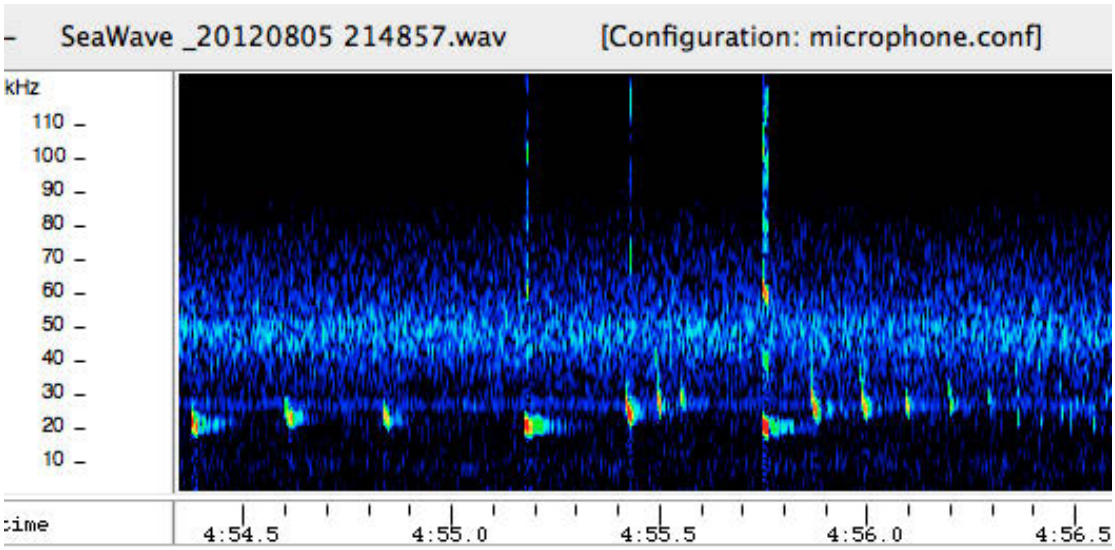

Figure 24. Foraging *Nyctalus* bat, above Brookbottom Methodist Church, 21:53, 5th August 2012.

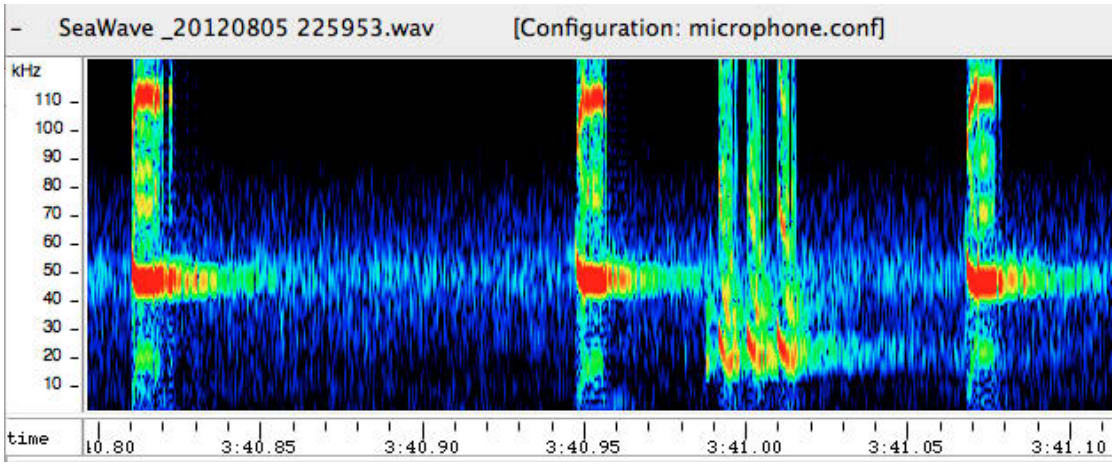

Figure 25. Foraging and social calls of common pipistrelle bat at Brookbottom Methodist Church.

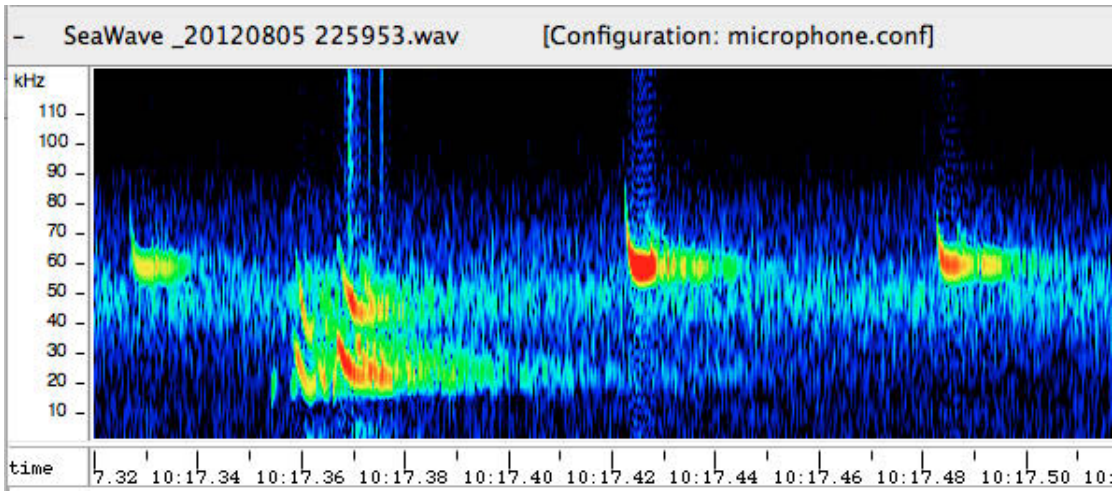

Figure 26. Foraging and social calls of soprano pipistrelle bat at Brookbottom Methodist Church.

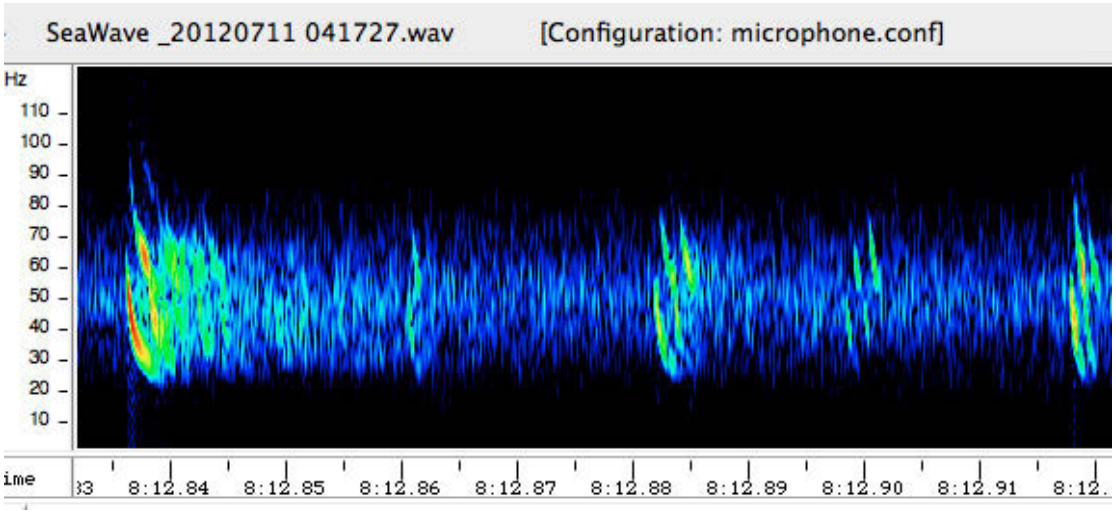

Figure 27. Long eared bat calls at Brookbottom Methodist Church.

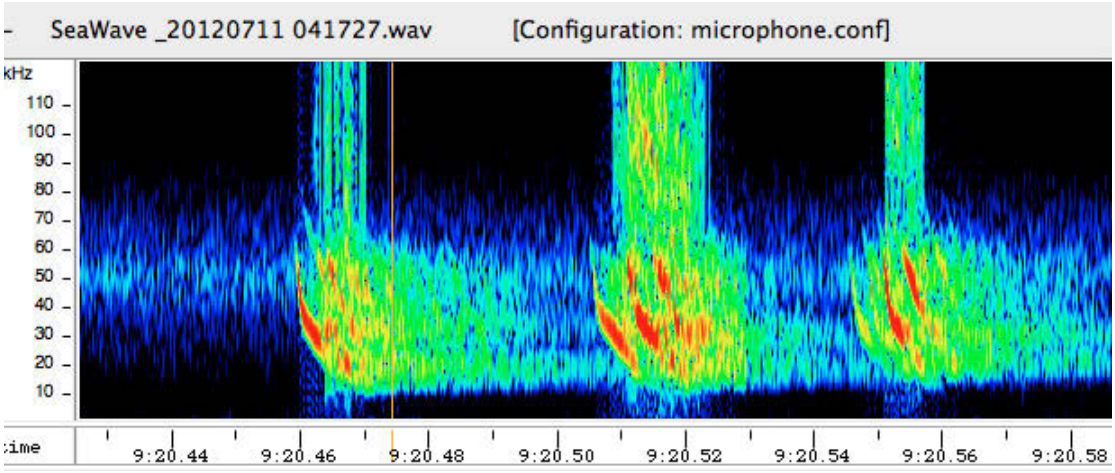

Figure 28. Social calls of long-eared bats at Brookbottom Methodist Church.

Appendix 4. Sound and Video Recordings from the site

Date-Start Time-File Ref	Position	Duration (minutes)	Device
2012-07-10-2147-709	A	31	Sony Nightvision
2012-07-10-2147-709TE	A	31	TE
2012-07-10-2218-00710	A	6	Sony Nightvision
2012-07-10-2218-00710TE	A	6	TE
2012-07-10-2224-00712	A	10	Sony Nightvision
2012-07-10-2234-00713	A	31	Sony Nightvision
2012-07-10-2234-00713TE	A	31	TE
2012-07-10-2305-00714	A	15	Sony Nightvision
2012-07-10-2320-00715	A	6	Sony Nightvision
2012-07-11-0341-00716	A	29	Sony Nightvision
2012-07-24-2148-733	A	33	Sony Nightvision
2012-07-24-2234-734	A	13	Sony Nightvision
2012-07-24-2243-735	A	4	Sony Nightvision

2012-07-24-2258-737	A	4	Sony Nightvision
2012-07-24-2258-737	A	4	Sony Nightvision
2012-07-24-2302-738	B	31	Sony Nightvision
2012-07-25-0422-742	A	34	Sony Nightvision
2012-07-25-0422-742TE	A	34	TE
2012-07-25-0457-743	A	11	Sony Nightvision
2012-08-06-0403-1807	E	32	Yukon Scope
2012-08-06-0509-1743	C	32	Yukon Scope
2012-08-06-2120-1023	D	77	Yukon Scope
2012-08-06-2123-845	C	36	Sony Nightvision
2012-08-06-2159-846	C	31	Sony Nightvision
2012-08-06-2204-1006	E	35	Yukon Scope
2012-08-06-2230-847	C	25	Sony Nightvision
2012-08-06-2240-1140	E	32	Yukon Scope
2012-08-06-2305-849	C	23	Sony Nightvision
2012-08-06-2328-850	C	30	Sony Nightvision
2012-08-06-2358-851	C	15	Sony Nightvision
2012-08-07-0315-1615	C	54	Yukon Scope
2012-08-07-0331-853	D	34	Sony Nightvision
2012-08-07-0415-00854	D	6	Sony Nightvision
2012-08-07-0426-00855	C	21	Sony Nightvision
2012-08-07-0443-1740	D	23	Yukon Scope
2012-08-07-0447-857	D	33	Sony Nightvision

2012-08-07-0520-858	D	17	Sony Nightvision
20120710 210544-SW	A	23	Microphone
20120710 222211-SW	A	3	Microphone
20120710 233056-SW	A	60	Microphone
20120711 031726-SW	A	30	Microphone
20120711 040117	A	9	Microphone
20120711 041727	A	17	Microphone
20120711 043808	A	23	Microphone
20120711 050633	A	15	Microphone
20120724 205005	B	2	Microphone
20120724 205303	B	24	Microphone
20120724 212357	A	1	Microphone
20120724 212558	A	8	Microphone
20120724 213436	A	30	Microphone
20120724 214242	B	44	Microphone
20120724 222726	A	26	Microphone
20120724 223251	B	1	Microphone
20120724 224012	B	7	Microphone
20120724 225018	B	60	Microphone
20120724 225605	A	30	Microphone
20120724 233209	A	30	Microphone
20120725 033751	A	26	Microphone
20120725 035449	B	10	Microphone
20120725 040335	A	30	Microphone
20120725 041934	B	49	Microphone
20120725 050218	A	17	Microphone
20120725 050819	B	60	Microphone
20120725 051940	A	30	Microphone
20120805 210637	D	30	Microphone
20120805 212150	C	24	Microphone

20120805 214627	D	28	Microphone
20120805 214857	C	22	Microphone
20120805 221505	D	29	Microphone
20120805 221730	C	24	Microphone
20120805 225707	D	29	Microphone
20120805 225953	C	23	Microphone
20120805 232625	D	29	Microphone
20120805 232805	C	19	Microphone
20120806 000209	D	2	Microphone
20120806 000548	D	2	Microphone
20120806 001003	D	25	Microphone
20120806 033713	C	24	Microphone
20120806 035446	C	14	Microphone
20120806 040152	D	18	Microphone
20120806 041126	D	16	Microphone
20120806 042138	D	27	Microphone
20120806 043218	D	8	Microphone
20120806 044313	D	23	Microphone
20120806 051239	D	23	Microphone