Musgrave Church Field Barn

Protected Species Survey: - bats and barn owl

Aim: Bat and barn owl survey of traditional stone barn with restoration impact assessment and mitigation recommendations.

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Summary of development and mitigation

A series of surveys for bats and barn owls was carried out as a condition of the award of an HLS scheme Capital Works Plan and Heritage Lottery Fund award to restore a former tithe barn, byre and stables at Musgrave Church Field.

The roost survey of the barn and adjoining buildings did not detect any signs that bats were present at the time it was undertaken. Activity and emergence surveys revealed considerable bat activity in the area around the barn and wider site. The surveys did not indicate that any of the buildings are used as a day roost by bats.

The survey did not reveal that the buildings are used as a roosting or feeding site by barn owls and there were no signs that the birds have been using it for nesting.

Based on the survey information and specialist knowledge of bat species it is considered that the proposed restoration works are unlikely to result in an offence under regulation 39 of the Conservation (Natural Habitats, etc.) Regulations 1994.

The proposed restoration works will not disturb barn owls

The survey was carried out within the recommended survey period and a follow up inspection of the barn and activity survey is not required prior to the restoration works commencing. The building contractors must be made aware of the potential presence of bats and barn owls.

Care must be taken at all times when undertaking the work, particularly if removing any of the existing roof coverings from the buildings. If any bats are found work should stop immediately and Paul Arkle or Natural England should be contacted. A further evaluation should then be conducted and an EPS Licence applied for if it is considered necessary.

Mitigation measures should be included in the restoration works to ensure that the habitat value of the barn for bats is maintained. The ventilation gaps in the upper walls should be retained to maintain access into the barn. Some crevices in the stonework should be left unpointed to maintain potential roost sites in the walls. Gaps could also be left in the ridge tile pointing and under some of the stone flags.

1 Introduction

The following report provides details of a survey for bats and barn owls (and other nesting birds) carried out at Musgrave Church Field Barn, Great Musgrave on 6th September 2012. The survey was carried out in respect of a proposal to restore the building, a traditional stone tithe barn with adjoining byre and stables.

1.1 Bats and their requirements

There are eighteen species of bat that have been recorded in Britain. Of these eight species have been recorded as breeding in Cumbria and there are a further two that have been confirmed as present from bat detector records. Bats use a wide variety of roost types and have varying ecological characteristics. It is therefore important to determine the type of bat species that may be using a building, and the nature of the roost, before advice can be given on the timing of building works and any mitigation that may be required to minimise the potential impact on bats.

1.2 Bats and the law

In response to significant declines in the numbers of bats in the UK, all bats and their roosts are fully protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Under this legislation, it is illegal to:

- Deliberately kill, injure, capture (or take) a bat.
- Possess or control a live or dead bat or any part of a bat.
- Intentionally or recklessly damage, destroy or obstruct access to any bat roost
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection or deliberately disturb a bat anywhere, not just at its roost. Disturbance means any action that is likely to significantly affect the ability of any significant group of animals of that species to survive, breed or rear or nurture their young or likely to significantly affect the local distribution or abundance of the species, whether in a roost or not.
- Set and use any equipment that is capable of catching, injuring or killing a bat (e.g. a trap or poison), or knowingly cause or permit such an action.
- Sell (or offer) for sale or exchange any living or dead bat, or any part of a bat or anything derived from it.

If the proposed works at Musgrave Church Field Barn should result in the damage or destruction of a bat roost or disturb bats, then a licence will be required from the Department of the Environment, Food and Rural Affairs (DEFRA) to obtain a derogation from the Regulations.

The licence must be applied for by a qualified consultant; it will be processed by Natural England and is held by the developer.

1.3 Barn owls and their requirements

The barn owl (*Tyto alba*) is a specialist bird and highly adapted for hunting small mammals in open habitat and low light conditions. Barn owls use barns and other traditional agricultural buildings as breeding and roosting sites. Roosts are usually free from direct or unusual disturbance where the birds can remain unseen. Providing these conditions are present, barns owls can be quite tolerant of regular noises.

1.4 Barn owls and the law

Wild barn owls are given the highest level of legal protection under the 1981 wildlife and Countryside Act (as amended). Carrying out or attempting any of the following actions against a wild barn owl is illegal and punishable by a maximum fine, upon conviction, of £5000.

- Killing or injuring a barn owl
- Catching a barn owl
- Taking or destroying any egg of a barn owl
- Damaging or destroying the active nest site with eggs or young or before eggs are laid
- Disturbing the dependent young of a barn owl

2 Proposed works

2.1 Background to activity

A Higher Level Stewardship (HLS) scheme Capital Works Plan and Heritage Lottery Fund (HLF) grants have been awarded to restore the traditional stone barn known as Musgrave Church Field Barn.

A survey for bats and barn owls, and other nesting birds, in respect of the application was commissioned by the Mr John Alderson on behalf of Musgrave Church Field Trust.

2.2 Full details of proposed works on site

Under the terms of the funding awards, the former tithe barn and adjoining outbuildings are being restored to their original condition using traditional materials and techniques. Where necessary, the proposed restoration works will involve stripping the existing roofing flags and repairing sections of the outer walls and replacement of roofing timbers. Other works to restore the buildings include the repair or replacement of rainwater goods, wooden doors and windows as necessary. The barn will be used as a community and education resource.

3 Survey and site assessment

3.1 Pre-existing information on species at site

A search of pre-existing data of records of bats or barn owls at or around the property was not commissioned for this site but the local biological records office website of Tullie House Museum – "Virtual Fauna of the Lake District" was consulted. The Cumbria biological records on the National Biodiversity Network (NBN) website were also consulted.

3.2 Status of bat species in the local/regional area

Details of the local status of Cumbrian bat species and their habitats

Species	Local Status	Habitat
Noctule *Nyctalus noctula*	Widespread but uncommon; mobile populations; breeding roosts recorded.	Tree dweller; predominantly in lowlands. Occupies woodpecker and rot holes. Seldom in buildings. Will utilize bat boxes. Feeds over deciduous woodland, parkland, pasture, water and forest edges.
Daubenton's bat *Myotis daubentonii*	Widespread; hibernacula and breeding roosts recorded.	Bridges, tunnels, caves, mines, stone buildings and trees. Has been found hibernating underground at high altitude (550m). Feeds over rivers, canals and other water bodies. Will forage in riparian woodland.
Natterer's bat *Myotis nattereri*	Widespread; hibernacula and breeding roosts recorded. Less common than Daubenton's.	Similar to Daubenton's and can be found together; bridges, old buildings, barns, trees and underground sites. Feeds in woodland and parkland. Has recently been recorded in some upland areas, mainly using riparian habitats.
Whiskered bat Myotis mystacinus	Widespread but uncommon; breeding roosts and hibernacula recorded.	Older, mainly stone buildings, churches, trees and often in bat boxes. Feeds mainly in deciduous woodland
Brandt's bat Myotis brandtii	Widespread but uncommon; hibernacula and breeding roosts recorded. "Swarming" sites recorded.	Similar to whiskered.

Details of Cumbria bats species and associated habitats cont'd.

Brown long-eared bat *Plecotus auritus*	Widespread and common; hibernacula and breeding roosts recorded.	Old buildings, churches, barns (often with trees close by), underground sites and trees. Often found in bat boxes. Feeds in deciduous and coniferous woodland often within the canopy; around parkland trees, gardens, along hedgerows
Common pipistrelle *Pipistrellus pipistrellus* (45kHz)	Widespread and common; breeding roosts recorded but species recognition only recently recorded; rarely found in hibernation.	Wide age range of buildings; favours modern structures, trees occasionally and bat boxes. Feeds over diverse habitats; rural and urban gardens, woodland, farmland, or near water.
Soprano pipistrelle *Pipistrellus pygmaeus* (55kHz)	Widespread and common; breeding roosts recorded but species recognition only recently recorded; rarely found in hibernation.	As common pipistrelle, but further work is required to establish how these two species differ in habitat requirements.
Nathusius' pipistrelle *Pipistrellus nathusii*	Rare. Three UK breeding sites known. A single bat detector record of a night roost in Cumbria, and several foraging records.	Tree dweller; hollow trees, cracks, bat boxes and buildings. Sometimes shares nursery roost with pipistrelle or Brandt's bats. Feeds mainly around riparian and woodland edge habitats.
Leisler's bat *Nyctalus leisleri*	Rare. Unconfirmed bat detector record for Cumbria. Present in adjacent counties (Yorkshire and Dumfries and Galloway).	Woodland bat, similar to Noctule but will roost in buildings. Feeds in open deciduous and coniferous woodland, over water bodies, parkland and around street lamps in suburban areas.

(Extract of Cumbria Biodiversity Action Plan, 2001)

3.3 Objective of survey

The objective of the survey was to ascertain whether there was any evidence of bats and/or barn owls, or other nesting birds using the barn or adjoining buildings proposed for restoration. If signs of bats or barn owls (or other nesting birds) were seen, the survey would then determine the nature and extent of use of the building or the tree by them and potential impact on them that could result from the proposed restoration works.

3.4 Survey area

The survey covered the interior and exterior of the barn and adjoining stables and byre. It also included a general inspection of the wider site.

3.5 Habitat description

The church field barn is located in a low lying position beside the River Eden to the south of the village of Great Musgrave.

Aerial photograph showing location of the Musgrave Church Field Barn proposed for restoration outlined in red, adjacent church and neighbouring houses.

In addition to the barn, stable and byre, there is a church and two semi-detached houses. These lie immediately to the east and northeast of the barn respectively.

There are numerous mature trees within the field in which the barn is located. These form what is effectively an open, parkland habitat with semi-improved grassland that is currently being managed and restored as a traditional hay meadow. There are further trees and shrubs around the church and nearby houses and the banks of much of the River Eden beside the church field are tree-lined.

The wider landscape beyond the church field includes an extensive network of hedgerows with mature boundary that provide valuable links (wildlife corridors) and foraging routes to other habitats including the wider River Eden corridor and scattered woodlands.

3.6 Site Description

The barn and adjoining byre lie in a broadly north-south orientation with the former, single-story stable offshoot lying perpendicular to this on its north-western side.

The barn, byre and stables are traditionally constructed of local stone bonded with lime mortar. The roofs comprise sandstone flags with stone ridge tiles. The barn roof is supported by four tie-beam trusses.

Entrance to the interior of the barn is via a main double-door in the west -facing wall. A former, single 'winnowing' door in the rear wall of the barn has been built up. A single door in north-facing gable wall provides access to the byre, which has stalls that will have provided spaces for up to 8 cattle. Two single doors in the front (south-facing) wall provide access to the stables. There are also small windows in the front and rear walls of the stables.

In addition to the doors and window openings, there are numerous, square ventilation holes in the upper sections of the front and rear walls of the barn. These are approximately 20cm x 20cm and provide potential access for bats and birds into the interior of the barn (see pictures section). Similarly, three round ventilation holes in the upper gable wall provide access into the end stable.

3.6.1 Location, ownership and status

Musgrave Church Field Barn is located at National Grid Reference: NY7673 1323. It is owned by Musgrave Church Field Trust.

3.7 Field survey:

3.7.1 Methods

Bats

A search of the interior and exterior of the barn, byre and stables was made to inspect them for signs of bats. Signs of bats that were looked for included bat droppings, feeding remains (e.g. insect wings), stains on timber or stonework from the natural oils in bats' fur, claw marks on timbers regularly used by roosting bats, wear marks on potential egress points, areas clear of cobwebs, audible signs of bats, odour of bats, remains of dead bats and live bats.

The buildings were also surveyed for roosting bats and potential access/egress points. A high-powered torch was used to aid this part of the survey particularly the interior inspection of the buildings. A visual inspection of the exterior walls of the buildings was carried out to see if there were any bat droppings adhering to them or any access points.

A wider survey of the site was also carried out to determine potential flight paths, commuting routes, feeding areas and roosts of any bats present.

Bat Activity Surveys

An initial activity survey and a further emergence survey were undertaken for the barn, byre and stables and surrounding open areas to determine bat activity (emergence, flight paths/commuting routes, feeding activity, foraging routes, and species where possible)

in and around the buildings. The surveys involved direct observations and listening to bat calls by means of an ultrasonic bat detector.

Barn owl

During the search of the interior and exterior of the barn signs of barn owls were also looked for. Particular attention was paid to the upper levels and wall tops. Signs of barn owls that were looked for included pellets, faeces remains (white vertical streaks on roof beams and large white splashes on floors – 'whitewash'), feathers, dead chicks, prey remains or the presence of owls.

Signs such as abandoned or active nests that would indicate whether the buildings are used by other nesting birds were also looked for during the survey.

3.7.2 Timing

Roost survey Date & Time:

Date & Time: The initial site survey was conducted during the afternoon of Thursday 6th September 2012.

Bat activity surveys

The initial activity/emergence survey was carried out on the evening of Thursday 6th September 2012 from 19:25 – 21:00 hrs. (sunset time 19:47). A second emergence survey was conducted during the evening of Tuesday 18th September 2012 from 19:00 – 20:45 (sunset time 19:17).

3.7.1 Weather conditions

Initial activity survey – fair, wind – light breeze (Beaufourt scale 2), cloud - overcast (90% cover), temperature at start of survey 18°C, temperature at end of survey 17°C.

2nd Emergence survey – fair, wind – light (Beaufourt 2), cloud – patchy (40% cover), temperature at start of survey 10°C, temperature at end of survey 9°C.

3.7.2 Personnel

The roost survey was carried out by Paul Arkle, Natural England licence no. 20123319 - which is issued for the survey, disturbance and handling of bats for conservation, scientific and educational purposes. The emergence surveys were also carried out by Paul Arkle.

3.7.3 Equipment

High powered torch, low powered head torch, and ladder. Batbox Duet (heterodyne/Frequency division) bat detector, Panasonic RP-HT225 stereo headphones, Edirol R-09HR Wave/MP3 recorder. Bat recordings analysis with BatSound Software.

3.8 Results

3.8.1 Bats

The inspection of the barn, byre and stable did not reveal any roosting bats. There were no other signs of bats in any of the buildings.

There were no droppings to be seen anywhere on the exterior of the buildings.

There were numerous potential access points into the barn and the stables, the main ones being the main doorway, ventilation gaps in the upper walls and gaps above the byre and stable doors.

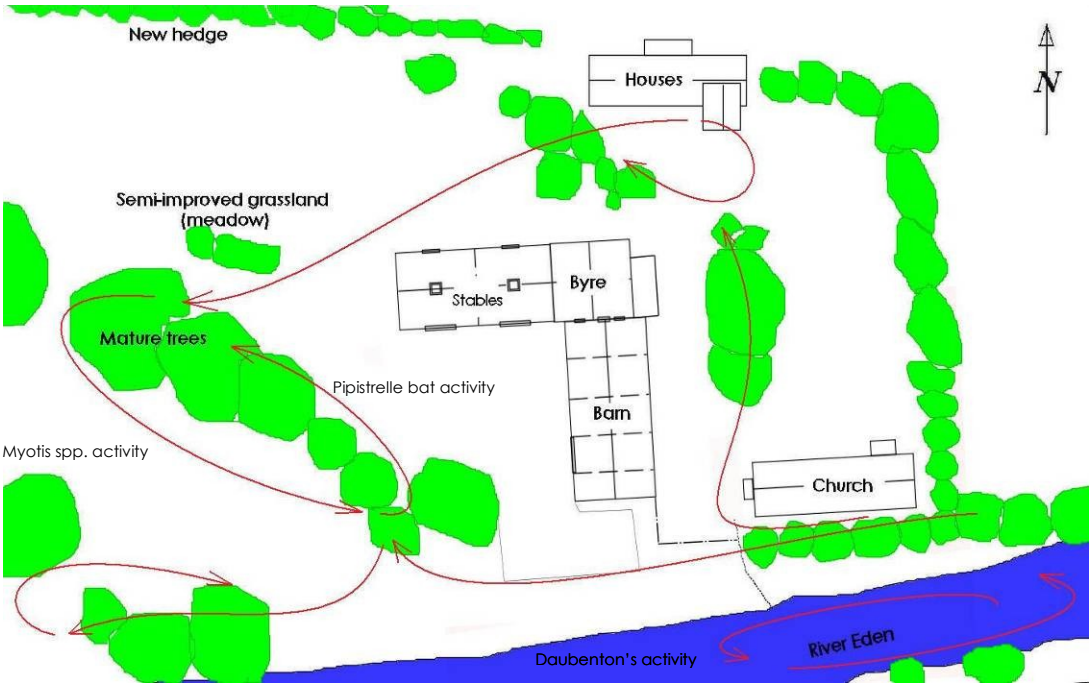


Diagram showing layout of the barn, byre and stable and other, nearby buildings at Musgrave Church Field, and the location of bat habitat features. Red lines represent main bat foraging and commuting routes recorded during the activity surveys.

Considerable bat activity was recorded in the area around the barn and other buildings, around the mature trees and over the nearby river. At least two Soprano pipistrelle bats were seen and heard with the aid of the bat detector around the wider site. Common pipistrelle bat calls were also detected. Numerous bat calls were detected from bats commuting and foraging around the mature trees opposite the barn.

Bats were also detected near the church and neighbouring houses and between the houses and trees in the main area of parkland to the west of the barn (see Diagram above).

Two Daubenton's bats were recorded and seen foraging over the surface of the River Eden to the south of the barn. No bats were seen emerging from the barn or entering it during any of the activity surveys.

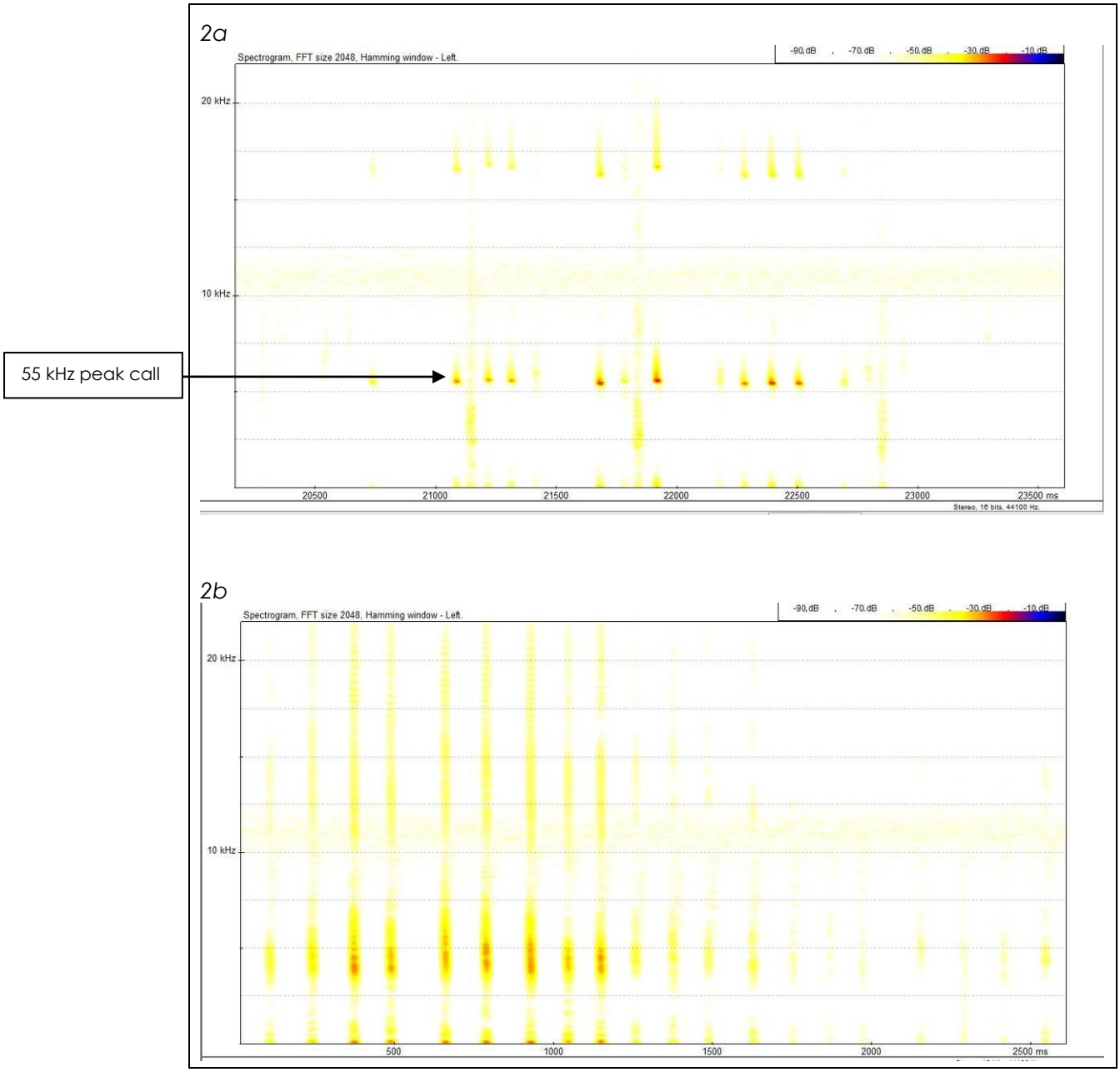


Diagram 3 - Sonograms of bat calls recorded during emergence survey at Musgrave church field barn on 6-9-2012, 2a (top) indicates Soprano (55 kHz) pipistrelle bat, 2b (bottom) indicates Daubenton's bat.

Faint Myotis bat calls were heard to the west of the barn over the parkland via the bat detector during each of the activity surveys. These were possibly Natterer's bats but there were no positive sightings of them. See Appendix for full details of bat activity surveys.

3.8.2 Barn owls

There were no owls present in the barn or any signs that they may use the adjoining buildings at the time of the survey. There were considerable signs that the barn is used as a nesting by pigeons.

3.9 Interpretation and evaluation:

3.9.1 Presence / Absence

Bats

There were no signs within the barn, byre or stables or any of their external surfaces to indicate that bats were using the buildings as a day roost at the time of the surveys.

There were no signs to indicate that the buildings are used as a night feeding roost.

Bat activity surveys

There was considerable bat activity (commuting and foraging) in the area around the barn. Pipistrelle, Daubenton's and Myotis bat species were detected in this area but no bats emerged or entered the barn of adjoining buildings.

Barn owls

There were no signs that barn is used by barn owls.

3.9.2 Population size class assessments

The survey indicates that there are no bats directly associated with the barn or either of the adjoining buildings.

3.9.3 Site status assessment

The mature trees and river surrounding the barn clearly offer very good quality foraging and commuting habitat for bats. There were no active roost sites within the barn, byre or stables. The buildings are not used by any bat species as a covered foraging area. Based on this evidence, they are not significant to local bat populations.

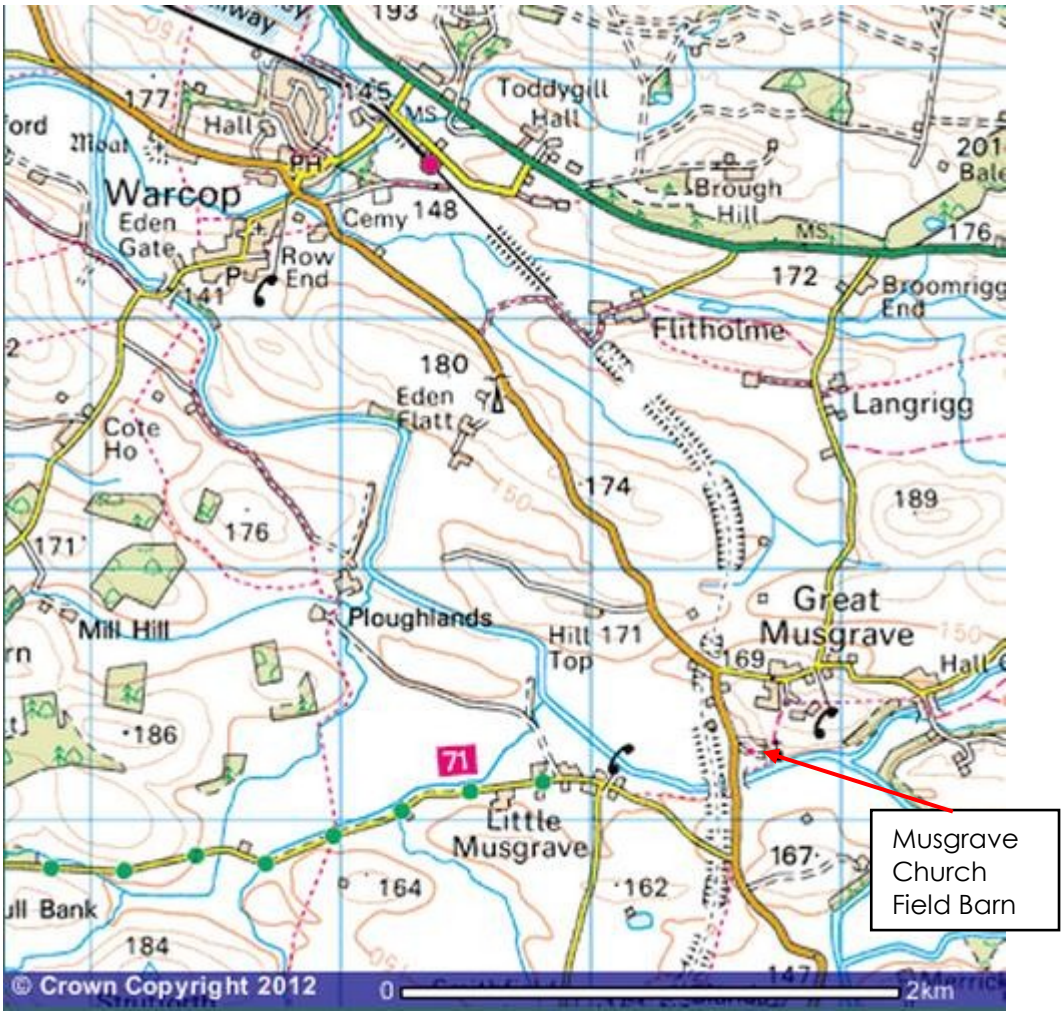
3.9.4 Constraints

Only a single surveyor was used for the activity survey, alternating between the south-western and south-eastern sides of the buildings, as the northern elevation was deemed to have only limited potential for roosting bats.

The surveys were carried out towards the end of the main season that is considered to be optimum for recording bat activity. Conditions at the time were favourable for the surveys and considerable bat activity was recorded around the wider suite. Bats move roosts regularly and they may have moved away from the barn after using it as an early summer roost. The inspection and surveys did give some understanding of how bats use the site and surrounding area during the late summer.

Full co-operation was given by Mr Alderson and the Musgrave Church Field Trust throughout the survey.

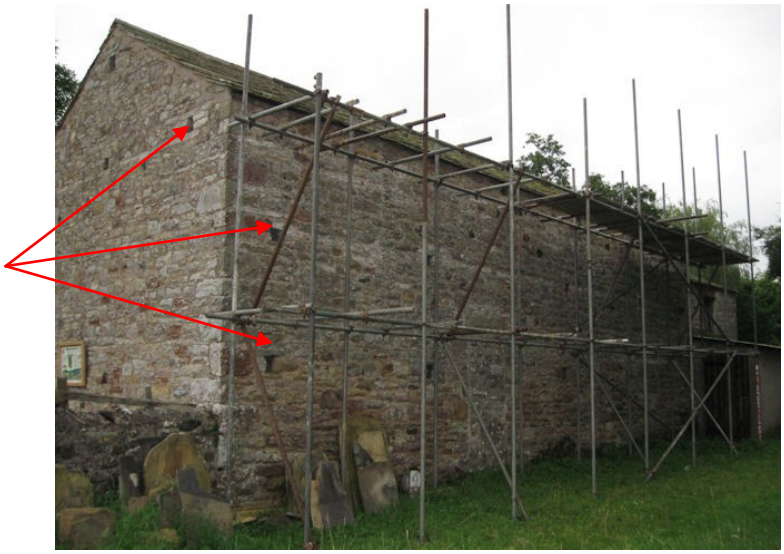
3.9.5 Map of survey area



3.9.6 Photographs of site

View of front (west elevation) of Musgrave Church Field Barn and nearby church.

South-facing gable of the Musgrave Church Field Barn – showing the proximity of some of the mature trees around the barn site.



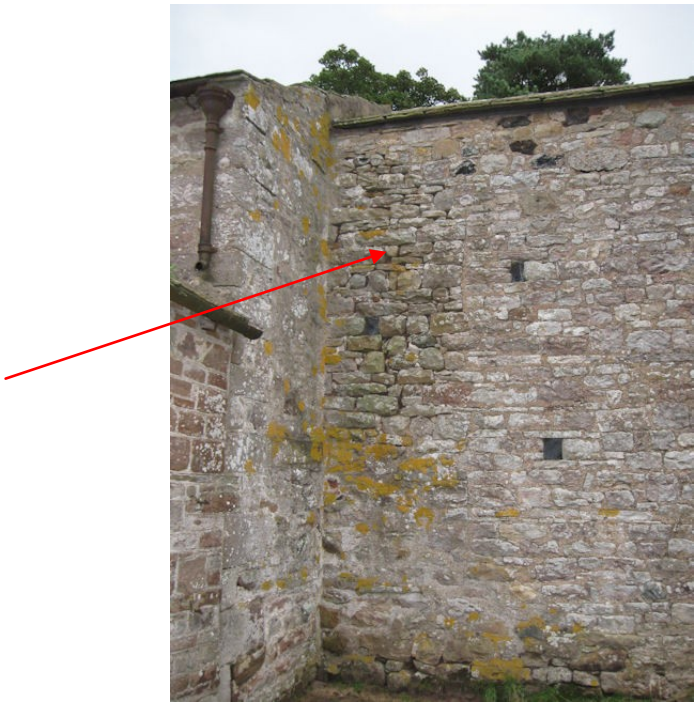
Rear (east) elevation showing some of the numerous ventilation holes, which provide potential bat access to the barn.

Rear (east) elevation showing former byre with 'modern' lean-to building.

Rear of former stable annex adjoining barn showing West gable wall with round ventilation holes (red arrow) in the upper section of the wall

Close-up one of the round holes that are present in the upper parts of the stable wall

Interior of church barn showing underside of roof, which includes bitumen felt below the traditional stone flagged roof covering.



Section of front wall of barn near union with adjoining byre – there were some crevices in this section of the wall where roofwater has eroded the lime mortar pointing – these could be used as day- roost sites for bats.

4 Impact assessment

4.1 Pre- and mid- activity impacts

There was no evidence that bats use the barn or adjoining buildings so no impact on roosting bats is anticipated.

There is unlikely to be any harm to foraging or commuting bats assuming the building works will be carried out during normal working (daylight) hours.

Barn owls do not use the building and there will be no impact upon them when work commences.

There is unlikely to be any harm to foraging or commuting bats providing the works (erection of scaffolding and building works) do not extend beyond the area immediately adjacent to the barn, byre or stables and are restricted to normal working hours.

There was no evidence to suggest that barn owls use the barn. Therefore, there should not be any disturbance to barn owls during the restoration works. There was evidence that a number of feral pigeons and/or stock doves use the barn for nesting purposes but the proposed restoration works for this building are unlikely to disturb them if carried out outside the breeding season.

4.2 Long-term impacts

There will be no significant change in the construction of the barn from its original state. The proposed restoration, using traditional materials and techniques will safeguard the barn in terms of its habitat value for bats and other wildlife. Maintaining access points in the upper walls as part of the restoration works will be beneficial in this respect. There are no anticipated long-term impacts other than the following:

- Loss of potential roost sites if existing gaps in the exterior walls of the buildings are blocked as a result of re-pointing works. No evidence was discovered to suggest that any crevices were being used by bats at the time of the survey but there is potential for them to do so.
- Loss of access to the interior of the barn and stables if all of the ventilation holes are blocked as part of the restoration works.

Overall the proposed restoration of the barn is a very positive measure as it will improve what is already a potentially valuable habitat for bats in the longer term. In the absence of the proposed works the barn, byre and stables will continue to deteriorate leading to a further loss habitat for bats.

4.3 Post activity interference impacts

There should not be any post activity impacts following the completion of the construction work if mitigation measures can form part of the restoration works.

4.4 Other impacts

There are no other anticipated impacts

5 Mitigation

Mitigation measures aim to enable development or restoration works to take place without having a detrimental impact on the bat population or other protected species in the area.

5.1 Additional Survey Requirements

There is no requirement for additional survey work

5.2 Mitigation strategy

Bats

There was no evidence from the surveys that bats currently use the barn as a day roost. However, it does provide a range of potential habitat features for bats and consideration must be given to measures that will ensure that the work does not threaten any bats during or after the restoration works.

The following recommendations are made in respect of the above factors:

- Before any of the works commence the building contractors should be provided with information on the potential location of bats and the need for care during the restoration works and measures that they must undertake if any bats are found.
- During any re-roofing works, the ridge tiles and flags should be stripped off carefully and an inspection must be made of the underside of each of them before they are removed completely. Particular care must be taken when removing any of the ridge tiles or flags if there are existing gaps. There was no detectable evidence that bats had been roosting under the flags but there is some potential for them to do so.
- Timber treatments on any new or existing woodwork should only involve chemicals that are listed for use in bat roosts by Natural England.
- Some of the existing access to the interior of the barn via the square ventilation holes in the upper walls should be retained
- Some gaps in the exterior pointing works should be left to maintain potential roosting sites within the walls of the barn.

Barn owls

There is no need to mitigate for barn owls.

5.3 Replacement roost site selection:

There is no requirement for any replacement roost sites.

5.4 Capture and exclusion:

5.4.1 Timing, effort, methods, capture/exclusion methods

There is no need to restrict the timing of the development works providing they are undertaken during normal working hours.

The work will be able to commence unhindered, providing that they are carried out in a precautionary manner to protect any bats that may not have been detected by the surveys.

Contractors should not handle bats and should be advised to lift any flags or ridge tiles carefully, in anticipation that bats may be present. If any collections of droppings are found (whether or not bats are found), then access to the roof must be reinstated as close as possible to the same location.

There is no need for any timing restrictions regarding barn owls. It must be remembered though that all birds, their nest and eggs are protected by law, thus it is an offence to intentionally take, damage or destroy the nest of any wild bird whilst it is in use of being built.

5.5 Post development safeguard:

5.5.1 Habitat management and safeguard

There are no sites designated for their bat interest within 3km of the survey.

5.5.2 Population monitoring

Confirmation that restoration works have not had a detrimental impact on the use of the wider site by foraging bats could be determined by a follow-up survey in the summer immediately after the works are completed.

5.5.3 Existing species status

Bats

Common and soprano pipistrelles are common and widespread. Both of these pipistrelle species, Daubenton's bats and Myotis bat species bats were detected during the activity surveys, confirming that the area around the church barn and adjoining stretch of the River Eden are used for foraging and commuting by bats.

No specific data search has been undertaken for this site but the NBN website has records in the 10km grid square (NY71) for Common and Soprano pipistrelle, Natterer's, Noctule, Brown long-eared, Daubenton's and Whiskered / Brandt's bats in this grid square. The Tullie House Museum "Virtual Fauna of Lakeland" website has records of Natterer's bats in 1995, Brown long-eared bats in 1997 and Daubenton's bats in 2005 within Musgrave Parish.

Barn owl

After a substantial decline from the early 1930s, Barn owls now appear to be making a recovery and this species currently has several strongholds in Cumbria, chiefly around the outskirts of the county. There are numerous records of barn owls in Eden District. The NBN website has records of barn owls within the NY71 10km grid square.

5.6 Requirement for Habitat Regulations (EPS) Licence

On the basis of the survey information outlined in this report and specialist knowledge of bat species, the proposed restoration works will not affect the conservation status of any bat species. On this basis it is considered that, on balance, the proposed activity is unlikely to result in an offence under regulation 39 of the Conservation (Natural habitats etc.) Regulations 1994.

Disclaimer *All reasonable effort was taken to ensure an accurate assessment of the situation at the time of the survey. However, the absence of recorded presence or sign should not be taken as an absolute guarantee that the site was not being used by a particular species. There is also no guarantee that any particular species will not use the site at any time in the future. Survey results may be weather or seasonally dependent. Any interpretation of legislation is based on the surveyor's understanding and experience of the law. Natural England can provide a more definitive interpretation.*

This report is the responsibility of Paul Arkle - Cumbria Farm Environment Partnership. Please note, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment.

References

Bat Conservation Trust eds. (2007) *Bat Surveys - Good Practice Guidelines* Bat Conservation Trust.

Cumbria Biodiversity Partnership (2001) *Cumbria Biodiversity Action Plan*

JNCC (2001) *Habitat management for bats* JNCC

Mitchell-Jones, A.J. & McLeish, A.P. eds. (2004) *Batworker's Manual*. JNCC.

Mitchell-Jones, A.J. (2001) *Bat mitigation guidelines*. English Nature

Virtual Fauna of the Lake District website, www.lakelandwildlife.co.uk (Tullie House Natural History Records Centre).

The following websites were accessed to search for statutory designated sites within the 1km of the survey site and within the 10 km grid square that contains the site:

- Multi-Agency Geographic Information for the Countryside (MAGIC) - www.magic.gov.uk;
- National Biodiversity Network Gateway – data.nbn.org.uk .

Paul Arkle
September 2012

Appendix 1 - Results of Bat activity surveys

First activity (emergence) survey

19:25 – Commenced survey

19:50 – Soprano pipistrelle (55 kHz) bat pass by mature (walnut) tree opposite front of barn.

19:55 – Pipistrelle bat pass by walnut tree.

19:57 – Distant Pipistrelle bat pass heard over river, west of barn.

20:00 – Pipistrelle bat pass by walnut tree.

20:05 – Pipistrelle bat pass from walnut tree past south end of barn towards church.

20:08 to 20:12 – Two bats seen and heard foraging in trees beside church.

20:15 – Two Daubenton's bats seen and heard foraging over surface of River Eden immediately to west of barn for several minutes.

20:17 – Pipistrelle bat pass from church past south end of barn towards mature trees opposite barn.

20:20 – Two Pipistrelle bats foraging around church to rear of barn.

20:30 – Pipistrelle bat pass alongside river to large wards large ash tree on river bank.

20:31 – Pipistrelle foraging between walnut tree and barn for several minutes.

20:45 – Myotis bat call detected by mature trees near driveway to barn, halfway to entrance gate.

Further Pipistrelle bat foraging calls were heard around the mature trees opposite the front of the barn for several more minutes before activity abated.

21:00 – Survey ended.

2nd Emergence survey

19:00 – Commenced survey

19:44 – Soprano pipistrelle pass by church from the direction of the houses to the north of the barn.

19:50 – Common pipistrelle bat (45kHz) seen and heard foraging around trees by houses.

19:55 – Pipistrelle bat seen and heard flying from houses past north side of barn to mature trees opposite.

20:01 – Soprano pipistrelle bat pass from church round to front of barn over stables and foraging around trees opposite barn.

20:20 – Daubenton's bats seen and heard foraging over surface of River Eden to west of barn for several minutes.

20:45 – Myotis bat call detected above trees near middle of driveway to barn.

Further Soprano and Common pipistrelle bat foraging calls were heard around the mature trees opposite the barn for several and Daubenton's bats continued to forage over the surface of the river.

21:10 – Survey ended.

The activity/emergence surveys confirmed that at least four pipistrelle bats (predominantly Soprano but some Common) forage around the mature trees opposite the front of the barn and around the church and houses to the rear of it. Daubenton's bats also forage over the stretch of the river to the west of the barn and One or more Myotis bat species, possibly Natterer's bats, forage over the tree canopy along the entrance driveway to the barn.

No bats were seen to emerge from the barn or adjoining buildings. Observations made during the activity surveys indicate that there may be a day roost in the church and/or the houses to the rear of the barn.