SALEM CHAPEL
BAT INSPECTION AND EMERGENCE SURVEY
UPDATED AUGUST 2017

DATE	ECOLOGIST	READ BY	VERSION	COMMENTS
01/07/2016	Rhian Hughes	Cathy Wuster	V1	
10/08/2017	Rhian Hughes	Tim Hodnett	V2	Updated sections 3, 5, 6 – 8 Small updated sections in italics within the report
17/07/2018	Rhian Hughes	Tim Yardley	V3	Updated sections 1 and 7. Updates in green italics. Updates are regarding proposed work and mitigation timing

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1.0 Introduction

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Enfys Ecology Limited was commissioned by Barbara Phoenix to undertake a bat and bird survey for the proposed works at Salem Chapel, New Broughton.

Currently the chapel and the house are owned by one owner, however the owners are wishing to sell the chapel but retain the house. The owners are applying for planning permission *to demolish the property and rebuild a residential property in its place. The original plans had been to convert the property but due to the deterioration of the building the more feasible option is to demolish the property.*

The survey was commissioned to determine whether the proposed works would affect protected species: specifically bats. The survey work to inform this report was carried out on 31st May 2016, *followed by a further three survey in 2017, in June, July and August.* This report is valid for a period of two years from this date in accordance with best practice.

All British bats (and roost sites) are protected under the Wildlife and Countryside Act (WCA) 1981 (as amended). In addition, all bats are classified as European Protected species by The Conservation of Habitats and Species Regulations 2010 (as amended). Under this legislation, it is an offence to kill, injure or disturb a bat, or to destroy any place used as a shelter by bats (for further information see section 8.0).

Should evidence of bats be found and it is deemed likely that they will be disturbed by the proposed works; a licence from Natural Resources Wales (NRW) must be obtained.

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2.0 Site Description

The Chapel is located off Pisgah Hill which is located on the edge of Pentre Broughton, near Wrexham, LL11 6DB (figure 1). The immediate surroundings of the building comprised a small road to the east and south and a small garden to the north west. To the west of the building, the house adjoins the chapel via a lean to corridor.

Figure 1 – Aerial view of the site with the surveyed building outlined in red
© Google 2016

To the east of the propery and also to the north and south there is a large woodland running in a north – south orientation. This woodland provides excllent connectivtiy to the north up along Moss Valley to Caergwrle and to Highfield in the south, but also to the east to Glascoed (figure 2).

A small stream feeding a large pond in Moss Valley lies approximately 170 m to the east of the site.

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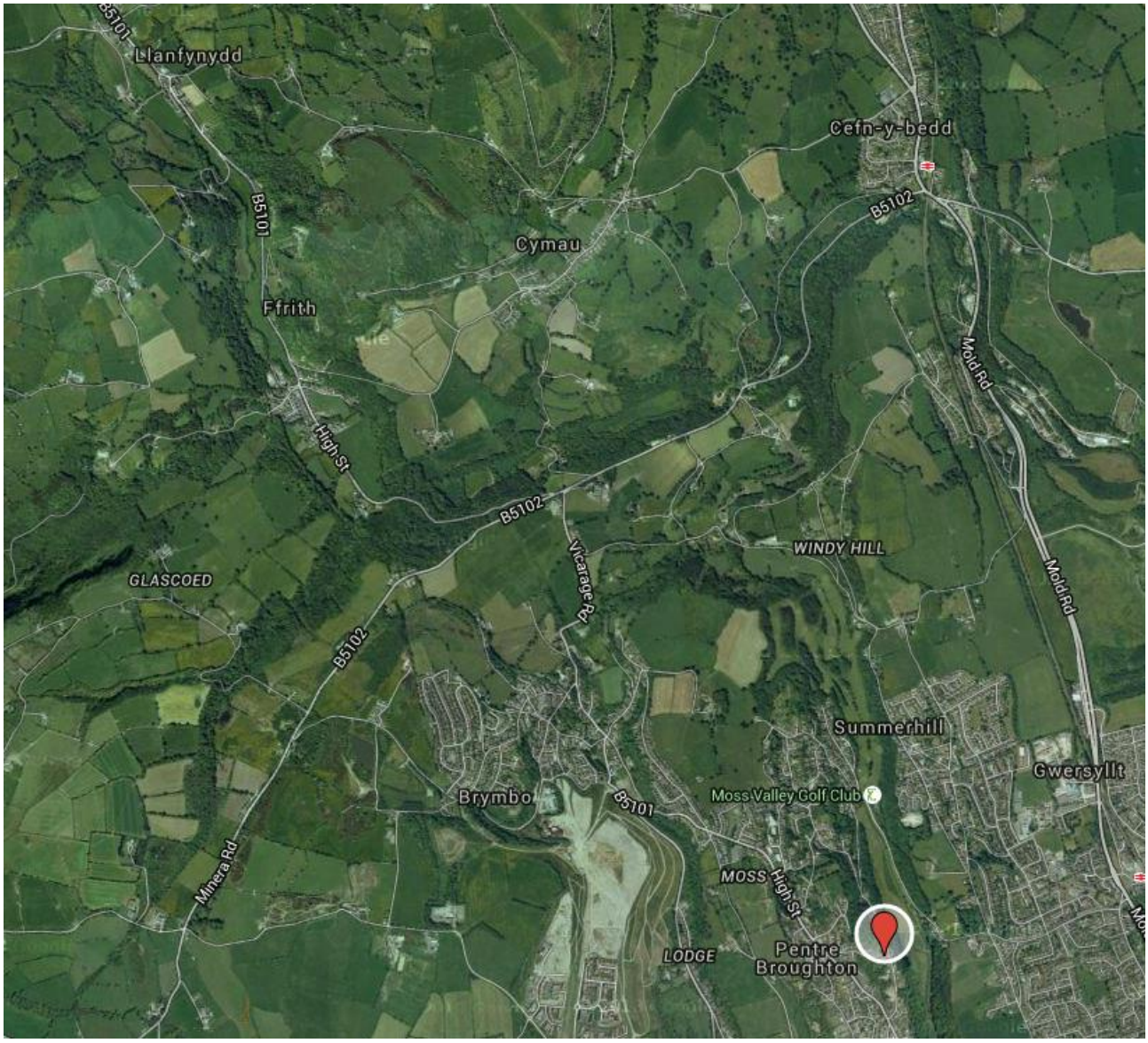

Figure 2 – Aerial view of the connectivity from the site (red pin)
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Brymbo fossil forest is approximately 1350m to the west of the site, Gatewn Marsh 1500m to the south east and Llay Bog 2500m to the north east.

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3.0 Methodology

3.1 *Building Inspection*

The building was assessed internally and externally for any signs of bats; these include droppings, feeding remains, and other indicative marks, plus features of potential use to bats such as crevices, cracks and other holes, and any potential access points into the building.

High powered torches were used to inspect any identified features, and an endoscope was used to investigate any gaps or crevices, where appropriate.

An inspection of the building for nesting birds was also undertaken.

3.2 *Dusk Emergence Survey*

The building was monitored by three surveyors, one on the north eastern corner, one on the north west side and one observing the southern side of the building, all were using Bat Box Duet detectors. Records were taken of any bats observed emerging from the building, and of any other bat activity taking place in the area during the survey. In addition, two Anabat SD2 frequency division bat detectors were positioned near the surveyors on the north east and western side, and an anabat express was used to the south of the building, and also one express was left inside the chapel to record any bat calls. The survey began approximately half an hour before sunset and continued for approximately 90 minutes after.

The follow up surveys in 2017 also used the same methodology, although for the third survey a surveyor stayed within the chapel and observed the bats using night vision to understand their behaviour and how the roost is used. This surveyor was instead of the surveyor who previously surveyed the north eastern corner due to little activity here which wasn't picked up by the surveyor on the north west.

3.3 *Survey Details*

The internal building inspection and the emergence surveys were both carried out on 31st May 2016 by Rhian Hughes (Bat licence number 68726:OTH:CSAB:2015) with assistants Amy Green and Jenny Butler.

During the 2017 surveys these were carried out by Rhian Hughes, Amy Green and Lucy Boyett.

Building and potential roost assessments were carried out following the guidelines set by the Bat Conservation Trust, 'Bat Surveys – Good Practice Guidelines'. Photographic evidence was taken where necessary.

3.4 *Limitations*

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Bats are a difficult group to survey, and as bats are highly mobile animals it is possible that they could move into a building after the survey has occurred. Therefore absence of bats cannot be guaranteed. Lesser horseshoes have a very unidirectional call so it is possible that some calls were not detected, however, all surveyors had a good view of the building. Bats may have flown between sections within the buildings which could not be observed. Due to the nature and height of the buildings the cracks could not be examined with an endoscope, ***and the loft was not fully surveyed. It was possible to look into the loft hatch, and look in from the loft hatch but due to safety issues, it wasn't possible to enter the loft space fully.***

4.0 Building Description

4.1 *Building Description*

The chapel is aligned in a north to south alignment with the east side running parallel to Westminster road and the south side parallel to Pisgah Hill road.

South

The Chapel was built in 1897, and many of the windows are partially boarded up but with large areas where there is no boarding as can be seen on the south of the building in figure 3. The south side has the most potential features for use by bats on the chapel, there is a "slit" near the apex of the building, directly below this there is a clover shape window which is missing all the glass and is not boarded up. Below this there are windows on either side, with large sections unboarded.

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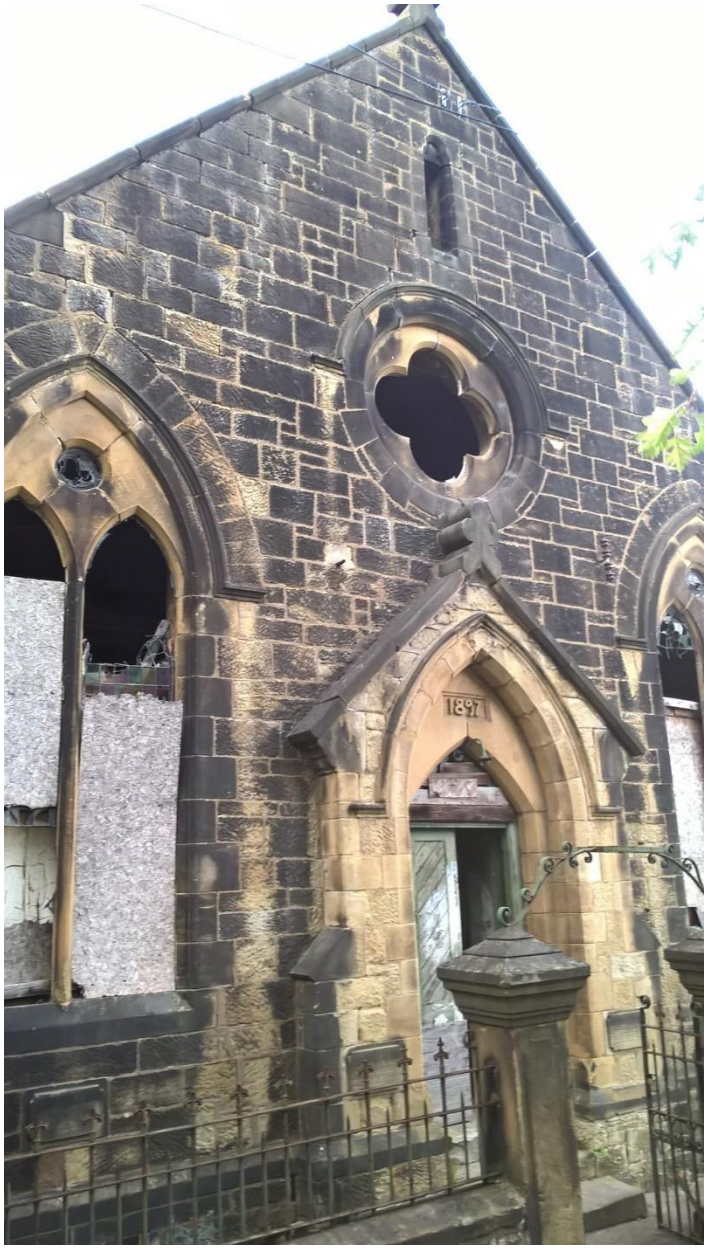

Figure 3 – south side of the chapel

Above the doorway there is a large crack in the stone work above the date (1897), and the area above the door is boarded up with wood. The stone work is generally in good condition but there are a few gaps between the stonework. Along the front gable there are some gaps between the coping stones.

On the south side there is a door to the west which is boarded up which provides access into the basement below the house. There are large cracks in the stone work surrounding the door (figure 4). ***During the 2017 surveys this door is now unboarded and allows access into the basement of the house.***

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Figure 4 – door to the west of the main entrance

East

On the east side there are some large cracks present in the stone work above the window and also in the decorative stonework below the eaves. There was also loose stone work below the gutter and barge boards exposed where the gutter was missing (figure 5).

Figures 5 – loose stone where barge board is missing

Figures 6 – large gaps between stonework

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The roof itself was generally in good condition, a few ridge tiles had been replaced so were of a different design, which on first look appeared to be missing. A few slates were missing, but overall there were not many gaps present (figure 7).

Figure 7 – The roof from the east side

North

There were some gaps in the stone work around the north chimney and also some loose stone work underneath the chimney (figure 8). Two vents were present on the northern aspect, however these holes are very small and would not be big enough to be used by bats (figure 9).

Figure 8 – gaps in stone work

Figure 9 – vents present on the northern side of the building

There were small gaps present on the north side within the mortar.

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West

The majority of the west side of the building was observed from the garden of the house. Again the roof was in good condition, there were some raised slates, however these were restricted to two areas, one of these was by the chimney and the other was close to where the chapel roof and the house roof join. Where the chapel joins the house there is a window at ground level (basement of the house) which is currently blocked up with rubble.

The lean-to corridor between the chapel and the house is visible. Much of the roof is what appears to be corrugated cementatious sheeting. There were large gaps present in the roof of the lean-to, these have currently been boarded up with timber.

4.2 *Interior*

The Chapel was largely empty and used for storage, all the pews had been removed. ***The Chapel had a high ceiling with one loft hatch, the roof space was accessed but could not be entered fully for health and safety reasons, not only due to the height reasons but also due to the roof structure being unsafe.*** Some of the roof space was incorporated in the vaulted ceiling as illustrated in figure 11.

In some sections of the chapel, plaster had fallen off or been removed especially on the west wall, exposing the stone work (figure 10), providing roosting opportunities both behind the plaster abut also in the gaps in the stone work. The east wall was in much better condition with plaster remaining.

Figure 10 – illustrating the condition of the plaster on the western wall, also the window to the right which leads into the lean-to

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One of the windows is unboarded as can be seen in figure 10 above, this leads into the lean-to corridor which is an area between the chapel and the basement of the house to the south. The corridor also leads to a set of stairs to the north which lead to the coal bunker/boiler house and underneath the pulpit.

The main chapel ceiling is constructed of lathe and plaster as can be seen in figure 11.

Figure 11 – Lathe and plaster construction of the ceiling

After going through the door into the lean-to corridor, turning south goes into the basement of the house. There were two sections, the main room and then a small porch section which joins to the door illustrated earlier in figure 4. The basement was used for storage and had recticel insulation boards installed. There were some gaps round some of these. All the walls were plastered, and the floor was a mix, half concrete and the remaining half appeared to be sand.

The window to the North was half boarded up and appeared to have been blocked with rubble (figure 12).

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Figure 12 – Window to the north of the basement

Figure 13 – Stairs to the coal store/heating room

The roof in the lean-to corridor between the chapel and the basement appeared to be corrugated cementatious sheeting with sections boarded up. There was a membrane present, however much of it had peeled back. There were also sections of daylight present.

Along this corridor, at the northern end were stairs leading down to the coal store/heating room which then lead to an area under the pulpit. The coal store area was very draughty with a hole to ground level. There was a separate area under the pulpit which was approximately 18 – 20 inches high – this could be accessed by gaps in the stonework under the pulpit. This area was very dusty.

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5.0 Survey Results

5.1 Building Inspection

There were lots of potential areas of entry/exit for the bats as discussed in the descriptions above.

During the internal survey a low number of scattered bat droppings were found throughout the main building. These appeared to be pipistrelle *(Pipistrellus)* droppings and also Lesser Horseshoes (*Rhinolophus hipposideros).*

In the basement of the house many more droppings were found on the floor, these appeared to be Lesser horseshoe droppings. A Lesser horseshoe bat was then discovered in the porch area of the basement (figure 4), which was hanging up, this then flew into the corridor, there was a high concentration of bat droppings in this porch area. Two bats were observed flying whilst we were in the basement. One was later seen hanging up above the stairs to the coal bunker area and another underneath the pulpit. Figure 1 illustrates the layout of the Chapel. The pink lines illustrate the windows and door as described above.

Figures 14 and 15 – droppings in section a (see figure 16)

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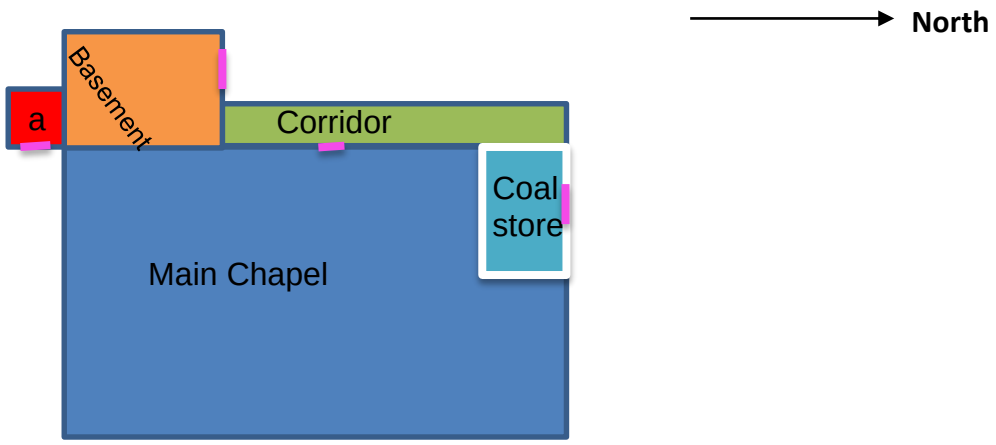

Figure 16 – a diagram to illustrate the layout of the Chapel

When the loft space was accessed only two bats were visible from the loft hatch (to the south of the building) suggesting most of the bats were present in the northern area of the roof.

Bird nests were also searched for and one was identified in the chapel, this appeared to be old, this was located along the eastern wall of the Chapel.

5.2 *Dusk Emergence Survey*

Sunset was at 21:28, and monitoring of the building commenced thirty minutes prior at 21:00, and continued until 23:00.

The temperature was 14°C, it was cloudy and there was a slight breeze during the survey.

2017 surveys were carried out monthly between June and August.

Figure 17 – Table of survey conditions

Date	*Sunset time*	*Survey start time*	*Survey end time*	*Temperature*	*Weather conditions*
31/05/2016	*21:28*	*21:00*	*23:00*	*14°C*	*80% cloud, slight breeze*

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13/06/2017	*21:39*	*21:10*	*23:15*	*10°C*	*10% cloud, calm, mild*
12/07/2017	*21:35*	*21:05*	*23:00*	*17°C*	*70% cloud, dry, calm*
09/08/2017	*20:52*	*20:30*	*22:22*	*16°C*	*10% cloud, light breeze*

2016 Results
South of the building:

The first bat activity recorded was at 21:36, this activity was not picked up on the detectors. The activity was lesser horseshoe activity, they were seen through the "slit" at the south end of the building. Bats were seen flying from the slit into the main chapel through the "clover" shaped window. 16 bats were observed flying into the main chapel. This activity was recorded between 21:36 and 21:54. At 21:54 the first lesser horseshoe emerged from the chapel and flew south into the woods across the road, 21 lesser horseshoes were seen to emerge in total.

During this time, other bat activity was recorded, a noctule (*Nyctalus noctula*) was recorded at 21:50, this was a faint pass however and not observed. A common pipistrelle (*Pipistrellus pipistrellus)* was recorded at 22:14, this appeared to emerge from the slit, although it is possible that is just flew close to the building around the corner of the building. Another faint noctule was also recorded at 22:36.

Lesser horseshoes were seen to re-enter the chapel at 22:04, 22:06 and 22:28 – the latter re-entered through the window to the left of the main entrance door.

North east corner of the building:
A *Myotis* was recorded at 21:44, this was observed foraging along the tree line on the far side of the road, a noctule was detected at 21:49, this is likely to be the one which was recorded at the south side of the building at 21:50 – again this was a faint pass and not seen so likely to be in the distance (this was also detected at the west of the building). At 21:51 common pipistrelle was recorded foraging in the wood opposite the chapel. At 21:55 a lesser horseshoe was observed emerging from the window panel – furthest along the eastern wall towards the north gable. Pipistrelles were observed foraging at 22:14, 22:20 and 22:22. Two further faint *Myotis* calls were recorded at 22:20 and 22:48 but these were not observed.

West of the building:
Lesser horseshoes were detected between 21:30 – 21:34, none of these emerged, it is thought that these were flying within the corridor.

A soprano pipistrelle *Pipistrellus pygmaeus* was observed at 21:44 which flew from the east and over the roof of the chapel. At 21:45 a lesser horseshoe was observed on the north side

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of the west roof and flew over the coping stones. This bat was thought to have emerged but the exact location was not seen.

At the end of the survey the interior of the building was checked, five bats were hanging up in area A.

Summary of 2017 results

During all three surveys similar results were observed to the 2016 results, with bats emerging from the slit, into the main chapel and then later out of the windows, however in the 2017 surveys, many bats were observed emerging out of the windows on the north, this behaviour wasn't observed in the 2016 survey. This could have been as the location of the surveyor in the garden was altered during the 2017 surveys increasing visibility down the north gable. As lesser horseshoe calls are very unidirectional, these may have been missed in the original 2016 survey.

The number of lesser horseshoes emerging varied in number, with total emergences varying from 21 in July 2016 to 51 in August 2017.

These surveys concentrated on the lesser horseshoe activity, however other bats detected during these surveys included:-

Noctules – these were recorded flying over early in the evening, they were commuting at height over the site.

Pipistrelles – both common and soprano pipistrelles were recorded periodically throughout the survey these were largely foraging along the treelines surrounding the house. One soprano pipistrelle was recorded inside the chapel during the August survey at 21:06.

Myotis – One *Myotis* pass was recorded to the east of the chapel, along the hedge at 22:11 during the July survey. One *Myotis* was recorded inside the chapel at 21:16 during the August survey and observed emerging out of the clover.

Brown long eared were also recorded during the July survey, one brief pass to the south of the chapel, and two passes to the east of the chapel, and one was recorded at 21:49 to the south of the chapel during the August survey.

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Figure 17 – *Number of lesser horseshoes observed emerging from the building*

	July 2016	June 2017	July 2017	August 2017
Total number of bats emerged	21	49	51	46
Bat emerging from the south	21	21	38	22
Bats emerging from the north	0	28	13	24

Lesser horseshoes were also seen re-entering the building toward the end of all the surveys, however after the end of the survey, the inside of the building was checked and individual bats were observed, however, not the number observed re-entering.

6.0 Conclusions

Lesser horseshoes are using this building, the number of bats seen emerging from the chapel was a minimum of 21, therefore according to the Vincent Wildlife, 2013, this is a maternity roost, the numbers observed in 2017 were much higher than those observed in 2016, confirming the status of the roost to be a maternity roost. This could be due to an increase in the roost size, or due to the change of location of the surveyor at the north, more bats were observed here.

The way the building is used is complicated due to the links between different sections of the building via the corridor. The lesser horseshoes appear to be using the main loft space as the roosting area, and use the main chapel and the adjoining corridor and basement both as light sampling areas before they emerge but also as a night roost. Area “A” as illustrated in figure 16 had an accumulation of droppings and the bats were seen to be hanging up here, both in 2016 and 2017. It is also likely that pipistrelles are using the building as several pipistrelle droppings were found.

As bats have been found using the Chapel, before any works can take place a licence application will need to be submitted to NRW along with a detailed method statement, with regards to mitigation and long term maintenance of the roost.

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7.0 Mitigation and Recommendations

The proposed works are *now to demolish the existing chapel and to rebuild a residential property in its place. The new property will be 10m x 6m therefore providing a large enough footprint for the loft space. The height of the existing loft space is 2m, however according to Vincent Wildlife Trust, 2013, the ideal height for lesser horseshoe roosts should be 2.8 m. Under the original plans (when the building was being retained,) as this existing loft space was being used, the height of 2m would be kept, as it is established that bats use it, however, as the building is now being demolished an entirely new structure will be required; therefore the loft height should be 2.8m (loft floor to apex) as recommended for this species. This is because although the building will be in the same location as the existing building, conditions will be different and so this work will effectively be creating a new roost. A new roost should be built to recommended specifications. The option of a purpose built bat barn was investigated, however, space on the plot is extremely limited.*

The feature which will be lost is the "congregation" area of chapel and the adjoining areas, which is where the lesser horseshoes light sample before they emerge.

At present, the lesser horseshoes are emerging from the roosting space/loft, to the south through a small slit in the gable, before entering the congregation area through open windows below, however some bats do emerge straight from this slit. Emerging from the slit or windows at the front (south) of the building leads straight onto a single track road. Although it is not a busy road, bats were observed emerging from the building, dropping down to a low level to cross the road, before then increasing in height to fly into trees/woodland to the south. Although many bats exited from the south of the building, in June and August 2017 over half the lesser horseshoes were observed emerging through one of the windows on the north of the building.

The proposed mitigation will alter the current way in which the bats are using the building. The entrance into the roost will be moved away from the southern gable and an entrance will be created to the north of the property. The only reason it is thought that the bats are currently using the slit to emerge from is that it is the only obvious large emergence point available from the loft space into the downstairs area so the bats can get lower before emerging out of the building. It is possible that there are other possible methods of getting from the loft into the downstairs area (this would be through bats squeezing through gaps, which isn't traditional for lesser horseshoes, however, nonetheless, it is possible). No specific areas were observed where bats were moving between the two, however, as bats were observed returning into the chapel, but not visible when the building was examined following the end of the emergence survey, it is a possibility.

The entry point will be created in the northern gable. The new entry point will be inbuilt within the northern gable wall, through an internal cavity. This is required, as lesser horseshoes like to emerge from a building at a low a height as possible, and straight into vegetation. The northern gable has therefore been chosen as the location for the entry point as it avoids the

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road, and also it is possible to create a low entry point here. *Landscaping plans must take into account that vegetation is required close to the entry point, therefore tree/shrub planting adjacent to the porch will be required.*

As well as the entry point, which will be a minimum of 300mm x 200mm, an "internal tunnel" will be created linking the loft space to the entry point. This would be by created through the enlargement of a cavity wall. The cavity wall would need to be slightly wider than normal, and within the wall have a stud wall separating the area for gaps and the insulation area, before the internal wall. This would allow the bats to fly diagonally to the roof void. A full design with specific details will be submitted with the licence application but figure 18 provides an indicative view.

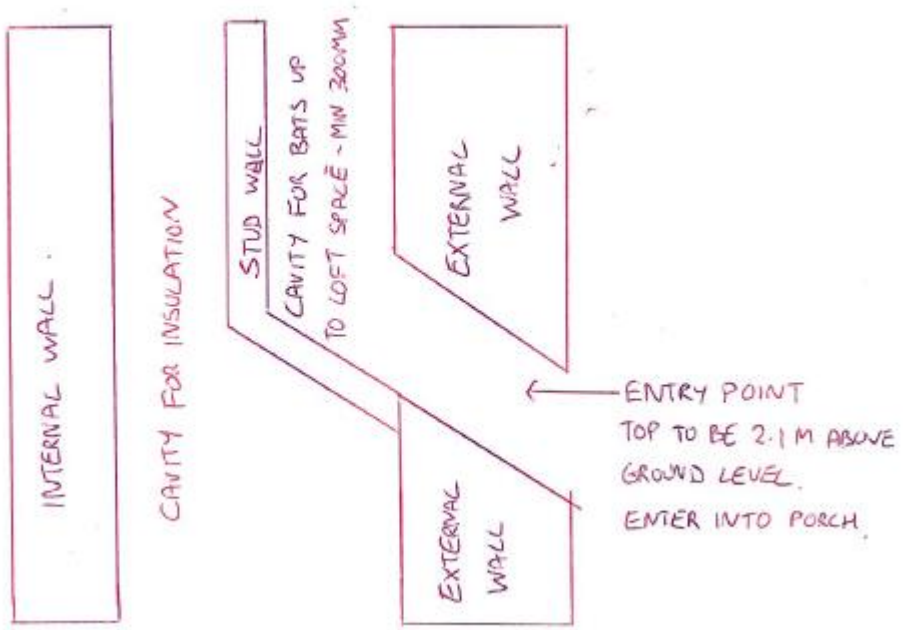

Figure 18 – Schematic view of enhanced cavity wall for lesser horseshoe access

The top of the entry point will be set at 2.1 m above the ground level. There will also be a "porch" like structure adjoining the entry point, this is required to provide opportunity for night roosting and light sampling. *It is recommended that the entry point and porch is set to one side away from any windows (preferably the north west of the northern gable although detailed plans have not been seen). The porch will allow light sampling and also night*

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roosting potential. As lesser horseshoes are sensitive to lights, the external lighting must be planned very carefully not to light up any of the entrances provided for lesser horseshoes. Windows installed should not be ones which open in the top-hinged fashion as it is more likely that juveniles mistake these for a roost entrance. Horizontal grilles can be placed over the entrance, however the gaps must be greater than 15cm. Planting along the boundary wall would be needed to link up to the surrounding vegetation.

Within the roost space itself, the roof will be lined with traditional F1 type bitumastic felt to BS 747 and NOT the breathable membrane. If timber has to be treated this must be from the NRW list of accepted pre-treated timbers. As other bat species, such as pipistrelles and *Myotis* were recorded during the surveys, roosting opportunities for these species will also be provided within the roof space and also within the porch area. This will be through the creation of bat panel boxes, which will be fixed to the walls – there will be four of these within the loft space and three within the porch and also the installation of baffles on the gable walls. As the downstairs will be living accommodation and will therefore be insulated, a hot box will created by installing two triangular plywood panels attached to the rafters (figure 19) (Vincent Wildlife Trust, 2013). There must be at least 900mm between the joists and the bottom of the plywood to provide adequate flight room with a minimum thickness of 6.5mm plywood. To provide roosting opportunities for lesser horseshoes batten ladders will be provided on the underside of the felt between the rafters. This will be set either side of the ridge board with the felt cut along the ridge to allow crevice dwelling species to access underneath the ridge tiles.

The porch area will be a lean-to structure adjoining the chapel and covering the entry point. The porch will be constructed of breezeblock with stone cladding to fit into the character of the chapel building. The ridgeline of the lean-to roof will be a minimum of 2m in height and will not be used by the occupants of the building. This will also be lined with bitumen felt (F1) with a slated roof, again with battens to provide roosting locations. To avoid predation grilles will be fitted on the entrance of the porch to allow access through by bats but to avoid predators such as cats from entering. Within this all timbers will be untreated, and rough timbers used to provide perching points (if treated timbers are required these will again need to be listed on the NRW list of timber treatment suitable for use in a bat roost). A baffle will be present in the doorway to provide access into a dark draught free area of the building, the porch must be a minimum of 2m x 2m – the doorway will be on the western side.

Full details of this structure will be provided in the licence application.

A loft access hatch into the lesser horseshoe roost will be created, this will be locked with only a bat worker having hold of the key. Access must be made available during survey times, and also over winter if cleaning out is required. Only licenced bat workers will be allowed into this loft space.

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Figure 19 – Hot box
© Vincent Wildlife Trust (2013)

As the roost is a maternity roost, the roost cannot be lost over a summer season (May – September). All destructive building works and the rebuilding of the property need to take place between 15th September – 15th April, destructive works (ie roof stripping, which must be by hand) should take place during the first 6 weeks of this period so if any bats are found, they are unlikely to be in hibernation. Ongoing work internally can take place, however the loft must be sound insulated.

Works should also take into consideration nesting birds, one old bird nest was found during the survey, bird nesting season is April – September, work should avoid this season *– this fits in to the timescale of works for bats. Work cannot take place within the nesting bird season as bats would be present*. It is an offence to intentionally take, damage or destroy the nest of any wild bird whilst it is in use or being built with fines of up to £5,000 and/or up to 6-month imprisonment. If during the demolition works, a nesting bird is found on site, works in that area must cease until all chicks have fledged.

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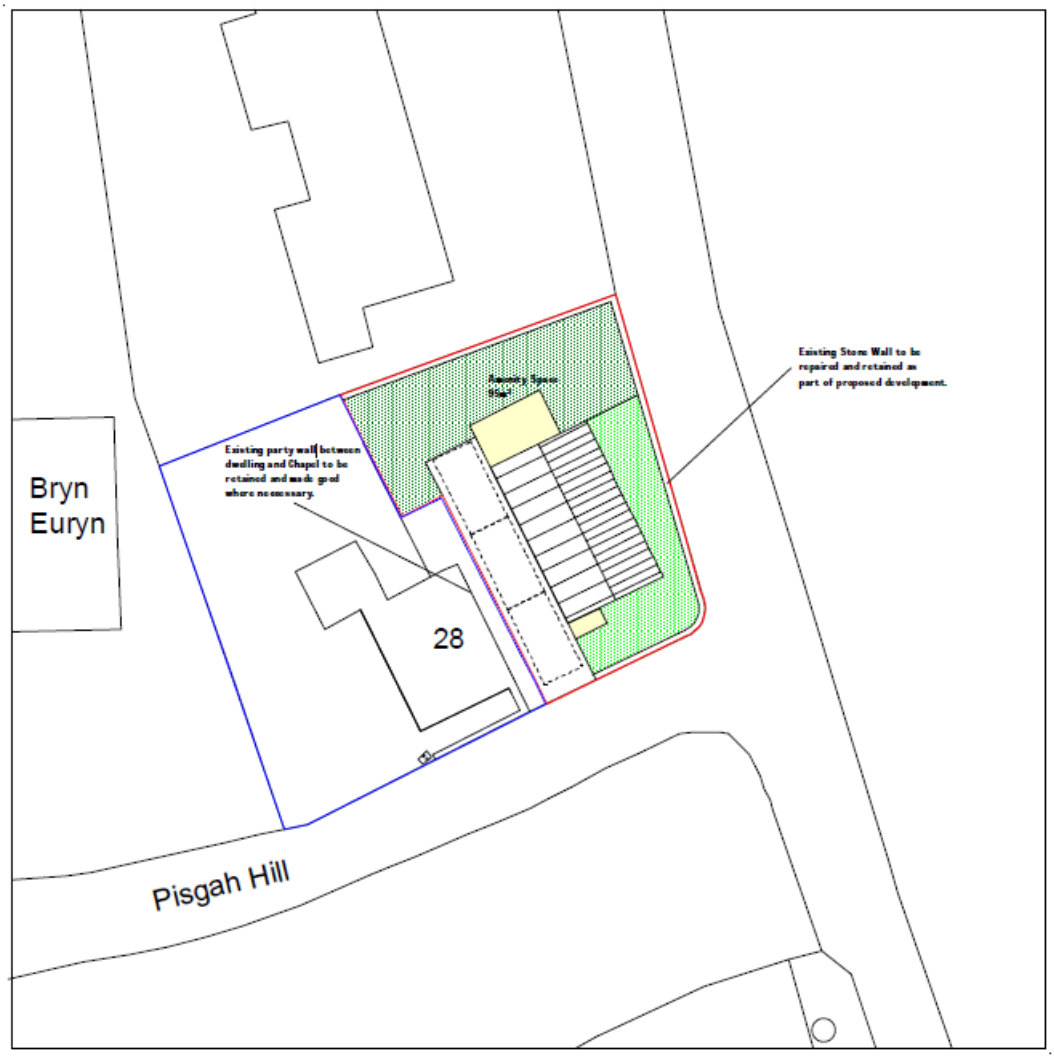

Figure 20 – Proposed plan for former Chapel

8.0 Legislation

The Wildlife and Countryside Act (WCA) 1981 (as amended) forms the key legislation protecting habitats and species in the UK. All UK bat species are fully protected under the 1981 Act through inclusion on schedule 5. All bats are also listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2010 which transcribes the EC Habitats Directive into UK law. In combination, this legislation makes it an offence to:

- Deliberately or recklessly take, injure or kill a bat;
- Deliberately or recklessly damage or destroy a place or structure used by bats for shelter or protection;
- Deliberately or recklessly obstruct access to a bat roost; or
- Deliberately or recklessly disturb bats while occupying a roost.

Bat roosts are protected under these laws whether the animals are present at the time of survey or not. Under both laws the Welsh Government and D.E.F.R.A. are empowered to issue licences to carry out work to bat roosts for reasons of overriding public interest. It is not illegal to tend to a disabled bat pending recovery.

In addition, under the Wildlife and Countryside Act all birds, their nests and eggs are protected during the breeding season (typically March to August inclusive) from killing/destruction, damage and disturbance.

Birds

In addition, under the Wildlife and Countryside Act all birds, their nests and eggs are protected during the breeding season (typically March to August inclusive) from killing/destruction, damage and disturbance.

9.0 References and Useful Information Sources

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