

## **WORKS TO BE UNDERTAKEN BY THE CLIENT**

### **1.1 IN-SITU RETENTION OF BREEDING SITES/ RESTING PLACES**

The bat roosting areas subject to this EPS licence application will be demolished and therefore lost.

As a result, new mitigation is proposed.

### **1.2 MODIFICATION OF EXISTING ROOSTS**

The bat roosting areas subject to this EPS licence application will be demolished and therefore lost.

As a result, new mitigation is proposed.

### **1.3 NEW ROOST CREATION – THE BAT BARN**

To mitigate for the loss of the roost area for the maternity colony of brown long-eared bats and for the loss of the individual roosting features for the pipistrelle bats a ‘Bat Barn’ is to be constructed in an ideal habitat location. The purpose of the new ‘Bat Barn’ is to provide alternative habitat for the bats. However the ground floor area will be utilised as a car barn. The attic space of the barn will be utilised only for bats and not for storage.

*Photograph 1 – Example of finished Bat Barn*



#### **The design of the ‘Bat Barn’**

The bat mitigation guidelines state that indications suggest that a replacement roost with the footprint of less than 5 m x 4 m and a total height of less than 5 m seems unlikely to be successful. The new ‘Bat Barn’ proposed measures 8.5 metres long and 6 metres wide. It has a height of 2.8 metres and the garage overall is 5.5 metres tall.

These dimensions give a combined alternative roost resource of 51 square metres, compared to the existing roost area in the attic of Section 1 of 38.5 square metres and the interior of the current roost location, the machinery barn of 78 square metres, although not all of the open area was in use by the roost here.

The 'Bat Barn' is proposed to be located close to the existing barns. The location has been chosen in order to combine to positive characteristics in the design of the maternity building. Firstly it will be placed closely to the existing bat roost in order to increase the abundance of its discovery during normal bat foraging, particularly for gleaning species such as the brown long-eared bat. Secondly it will be placed away from any shading effect from any woodland canopy to allow the roof materials to receive the maximum possible sunlight, and as such warmth during the important maternity period. Further detail is provided in Section D1, Habitat/Site Management and Maintenance.

The Bat Barn is proposed to be ready and in use as soon as the mitigation proposal can be agreed by the planning authorities' senior ecologist and then immediately following this Natural England via a pre-submission.

In summary the construction fabric of the building will be a timber framed and clad building in order to utilise natural materials favoured by roosting bats. The roof will be covered with Swithland slate laid upon timber sarking boards.

It is important that the timber utilised as the sarking underlining should be a rough sawn specification. To ensure that it is adequate to allow bats to grip and roost the actual timber to be used must be approved by the bat ecologist before installation.

To provide suitable roosting habitat at the apex of the roof a further addition will be a double ridgeboard. An example of the double ridgeboard design is shown in the photograph below. The gap between the ridgeboard should be approximately 20mm.

Figure 3- Photographic example of the double ridgeboard detail installed within the 'Bat Barn' and example of the open flight area under the roof covering required between the roof frames and gables internally



The proposed roof of the 'Bat Barn' will be laid on a traditional rafter and purlin, with queen or king post frame and not using any modern pre-trussed rafter design. This is to provide the internal flight area required by long-eared bats within their roost, see Figure 3 above.

The attic space created in the bat barn will be orientated to place the largest extent of roof elevation to as southerly a direction as possible, in practice this will be a south-easterly aspect, to ensure sunlight heats the roof void. The accurate placement of the building will be achieved by ensuring it is set out under the advisement on-site of the bat ecologist.

To further provide a suitable thermal regime within the attic there will be a segregated area, a heated shroud, installed at the roof apex at the northern end of the attic. The specification for this heater has been put together with reference to the designs created and developed by Bat Pro Ltd. The designs have been adapted to attempt to better suit the requirements of bats such as the brown long-eared bat. In accordance with this recognised successful bat mitigation method the following applies:

- The shroud shall be faced using the same rough-faced timber sarking boards approved by the bat ecologist.
- The two sides of the shroud measure 2400 mm long by 1200 mm deep.
- The shroud is finished at the end with a triangular infill to create a trough in which to trap the heat.
- The roost heater is fitted to the one side of the shroud away from droppings falling from the ridgeboard, see sketch on Appendix 2. A solid mesh is set around the heater to keep bats away from roosting against it.
- The heater is approximately 600 mm long x 50 mm wide, it is a tubular heater clamped to the side of the shroud. The heater to be utilised shall be a low energy unit.

- An accurate thermostat will be used that ensures temperatures are maintained whilst offering maximum energy efficiency.
- The space between the shroud and the underside of the roof tiles should be filled with insulation to allow heat to be retained.
- There is a second section of sarking boards added to the side of the shroud that does not support the heater. This is separated from the side of the shroud by a 25 mm batten to create a “thin bat box” detail inside the shroud.
- The opposite side of the shroud, above the heater but away from the risk of falling droppings touching the heater, shall have roofing battens fitted at centres to allow for a 20 mm gap between.
- There will be an extended ridgeboard hanging down into the shroud by some 150mm to allow roosting against

Figure 3b – Sketch plan of heater and shroud

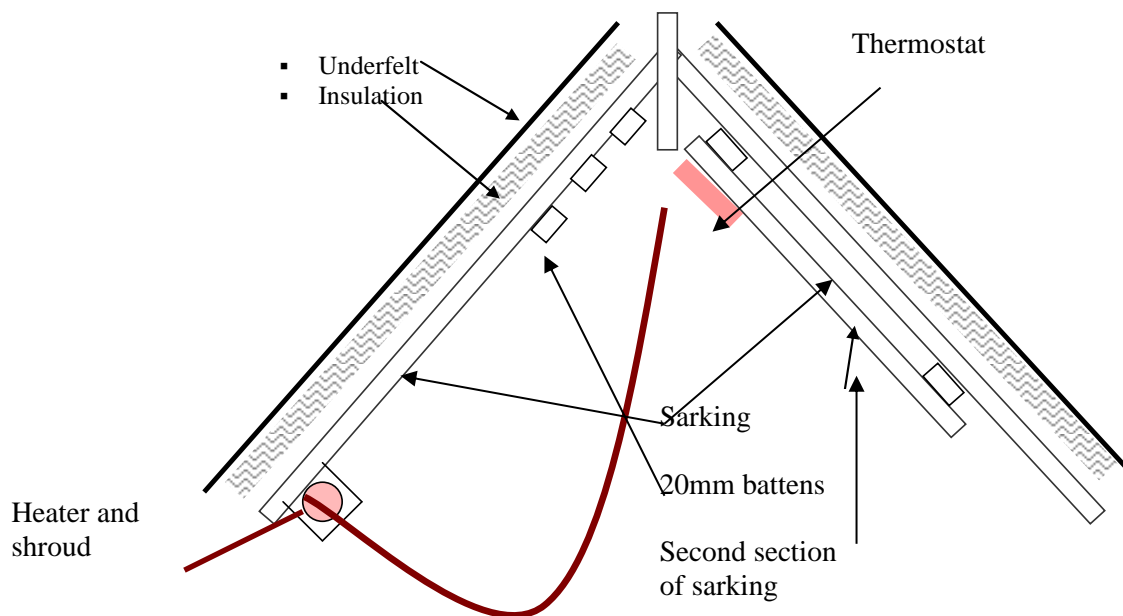
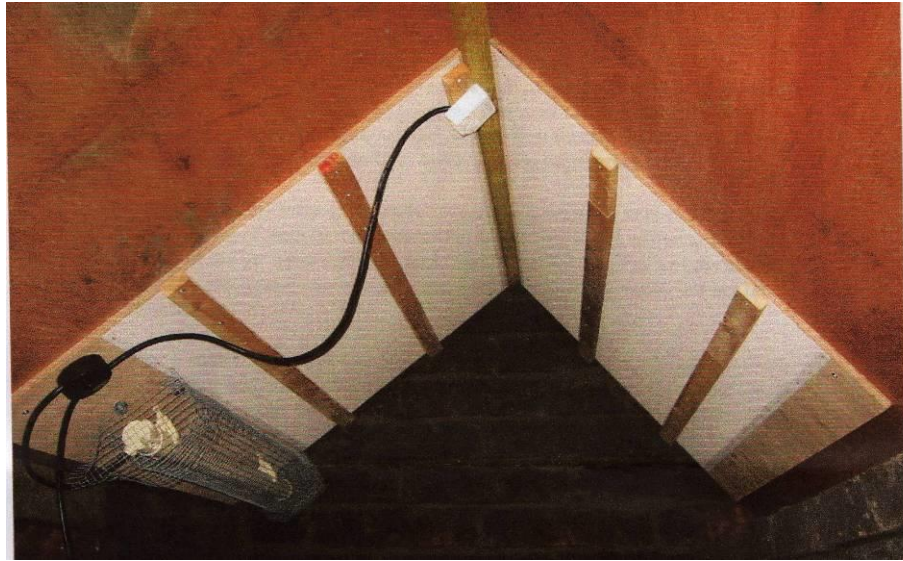


Figure 3c – Example photo.

Note that the photograph below is the Bat Pro version designed for horseshoe bats. Note that the photograph is taken before the ends of the shroud are fitted. The right hand side of the photo shows the battens that the extra sheet of timber will be fixed to create a narrow bat void. It also shows the positioning of the thermostat and the condensation loop on the flex. The battens shown on the left hand side do not match the design in figure 3b. The mesh surround detail to the heater is the ideal.





The thermostat and heater are to be set to operate automatically across the year to a constant 28° Celsius.

It is fundamental to the success of the new 'Bat Barn' that the brown long-eared bats can discover and access the attic space with ease. To achieve this there are two access features proposed. These are to be fitted into the end gables. In both of these areas an access slit measuring approximately 150 mm wide and 300 mm high will be installed at least 1000 mm below the ridge line, to ensure it does not allow warm air to escape from the building. This access hole is fitted with a timber louver constructed from rough sawn timber. The actual timber to be used has been approved by the bat ecologist before the access features constructed to ensure the optimum grip to allow bats to crawl through. The louvers are set such that bats can land and crawl up and into the attic space (with a gap of 20mm between) but that ventilation is reduced, by setting louvers overlapping at an angle greater than 60 degrees and long enough to create a draught shield. Figure 4 overleaf shows this access.

New and favourable roost habitat for the pipistrelle bats are to also be created within both gable ends of the new 'Bat Barn' by way of permanent bat boxes built into the structure and set behind the Oak weather boarding. There will be two boxes installed behind the timber cladding on both gables, a total of four boxes.

The bat boxes will be installed behind the oak weather boarding on the upper side of the gable walls as shown in figure 4.

Figure 4 – showing the positioning of the pipistrelle roost boxes in the proposed bat barn and the bat access louvers. The same detail in each gable



The unit installed is the Schwegler 1FE bat panel, installed with the back panel as detailed in Figures 6 to 8 below.

Figure 4a - The Schwegler 1FE bat panels to be installed behind the overlapping oak wall boards of both gables.

#### **Schwegler 1FE Bat Access Panel with Back Plate**

This is a maintenance free access panel usually designed to allow bats entry through exterior walls. The rear of the panel would be left open so bats can pass through into existing bat roosts.

However, The 1FE can be fitted with an optional back plate, which includes an attached wooden panel to create a cavity wall inside the box. The roughened surfaces of the plate, and the inside of the 1FE itself, are very suitable for roosting bats.

Installation of the complete box is straightforward. It can be screwed to a wall or fixed within insulation. No painting is required, but if painting is necessary a natural breathable paint is used.

Materials: Woodcrete - 75% wood, 25% sawdust, concrete and clay mixture.

Dimensions: Width 30cm; Height 30cm; Depth 8cm; Weight 7.8kg.



Figure 4b -Installation method for the bat box to be installed behind the overlapping oak panelling.

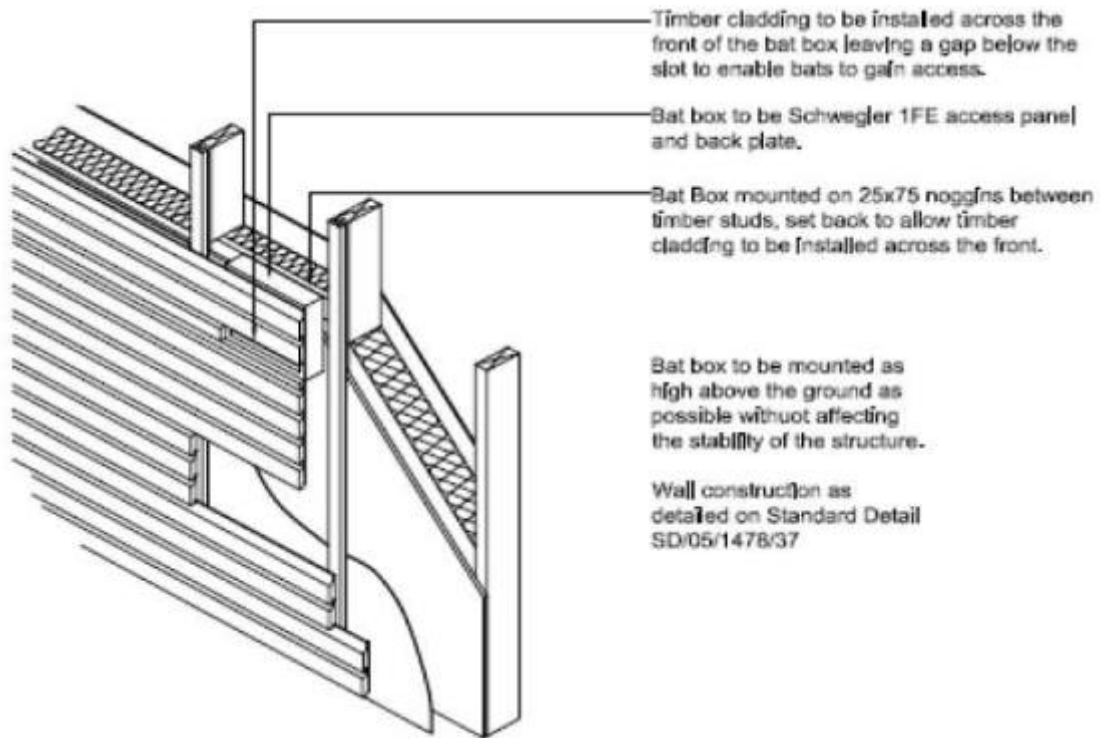


Figure 4c: example photograph of the Batbox when set behind oak panelling, with the slot provided for access.



Restrictions will apply to the nature and level of illumination of the external areas of the new 'Bat Barn'. External lighting for either decorative or security purposes will not be installed that shines light onto any gable or indeed the treeline immediately adjacent. This requirement should be framed within a planning condition.

Further to this there will be no internal lighting placed within the attic space of the barn.