CLONASLEE FLOOD RELIEF SCHEME

Appendix 9.6: Biodiversity Management and Enhancement Plan

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1 INTRODUCTION

1.1 Background

This Biodiversity Management and Enhancement Plan (BMEP) has been prepared in support of the Environmental Impact Assessment Report (EIAR) produced for the proposed Clonaslee Flood Relief Scheme (hereafter referred to as the 'Proposed Scheme'), focused on the Clodiagh River within Clonaslee village and environs, in Co. Laois.

The Proposed Scheme comprises flood defence measures along the Clodiagh River in the form of a debris trap, embankments and flood walls across three distinct areas, Area 1, Area 2 and Area 3. Refer to **Chapter 5: Project Description** of this EIAR for details on the proposed design and construction methodologies.

The aim of this Plan is to identify enhancement opportunities to increase the biodiversity value of the Scheme area post-construction. The ecological enhancements proposed in this BMEP will improve and create habitats within the channel corridor of the Clodiagh River.

The BMEP has been prepared to offset habitat loss associated with the Proposed Scheme and to set out a series of biodiversity enhancement measures that will be implemented as part of the Scheme, with the overall goal of providing a lasting biodiversity benefit to the area around Clonaslee. This proposal will be agreed with the relevant third parties should the project receive consent.

1.2 Relevant Plans

1.2.1 National Biodiversity Action Plan 2023-2030

The National Biodiversity Action Plan (NPWS, 2024) sets out actions through which a range of government, civil, and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and follows on from the work of the first and second National Biodiversity Action Plans. The objectives lay out a clear framework for Ireland's national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond.

Objective 2 under the plan is to "*Meet urgent conservation and restoration needs"*. The primary aim of this objective is to act on the most urgent national conservation and restoration challenges facing Ireland. Targets and action associated with their completion include:

- Continued support for native tree planting by Local Authorities and other State/semi-state bodies.
- By 2027, a diversified national and local native plant stock is available for tree and landscape planting schemes.
- By 2024, ensure that the impact of water quality measures on biodiversity is minimised, based on the implications of the Nitrates Action Plan shallow cultivation measure on birds in the wider countryside.
- By 2027, protection and restoration measures detailed in Ireland's third RBMP are implemented to ensure that our natural waters are sustainably managed, that freshwater resources are protected so that there is no further deterioration; and where required, Ireland's rivers, lakes and coastal water bodies are restored to at least good ecological status.

The protection and restoration of existing habitats and species are crucial to the achievement of this objective.

1.2.2 Laois County Development Plan 2021-2027

The Laois County Development Plan 2021 – 2027 (LCC, 2022) acknowledges the importance of preserving trees, woodlands, hedgerows, and waterways for the county's landscape biodiversity. The Plan includes policy objectives which will support the sustainable and environmentally sensitive development of the county, while promoting the climate change agenda. In relation to the biodiversity and natural heritage chapter the plan aims:

> "*to contribute towards the protection, conservation and management of biodiversity and natural heritage including sites designated at national and EU level and protected species and habitats outside of*

designated sites and to develop a green infrastructure network in the interests of the proper planning and sustainable development of the county."

Policy objective BNH 13 of the plan requires new developments to identify, protect and enhance ecological features by making provision for local biodiversity (for example, through the provision of bat roost boxes, green roofs, etc.) and improve the ecological coherence of wider green infrastructure.

A number of important tree groups were identified and considered for Tree Preservation Orders (TPOs) during the Plan period, which included Brittas House in Clonaslee.

As such, the BMEP complies with the overall aims and objectives of the biodiversity plan aims to enhance habitats and species of the county.

1.2.2.1 Clonaslee Local Biodiversity Action Plan

The Local Biodiversity Action Plan (LBAP) (Mac Gowan, 2015) for Clonaslee takes account of environmental issues and challenges present in Clonaslee and provides a framework to manage biodiversity in the area. This LBAP proposes a list of actions achievable through community effort in Clonaslee that include:

- Erecting bat and bird boxes in public spaces where there are trees.
- Planting native trees and shrubs in public green areas.
- Gathering and sowing local, native seed mixtures along local hedgerows and forested areas.
- Monitoring the area for invasive species and control where necessary.

The action plan lists further suggestions to improve and maintain biodiversity, therefore the BMEP for the Proposed Scheme is working towards achieving the aims of the Clonaslee LBAP. Both plans aim to increase biodiversity in the village.

2 PROPOSED VEGETATION REMOVAL

To facilitate the construction of the Proposed Scheme, habitat (agricultural grassland, hedgerows, and mixed broadleaved woodland) and tree removal will be required. Accordingly, the Proposed Scheme will result in the permanent loss, fragmentation, and alteration of these habitats. Expected loss of Important Ecological Feature (IEF) habitat (area for woodland, length for hedgerow/treeline) has been quantified below (**Table 2-1**).

Improved agricultural grassland was a dominant habitat within the study area. This habitat is considered to have lower carrying capacity for wildlife than the more successive / developed habitats such as scrub and woodland. There will be no creation of this habitat, and compensation will be in the form of natural regeneration. The measures described in this management plan aim to enhance the biodiversity potential of the available lands within or adjacent to the Scheme's footprint, in habitats of higher biodiversity value locally. The trees to be removed within the private garden in Area 2 and the small planted ornamental trees on Chapel Street are not considered IEFs.

Table 2-1: Tree removal within IEF habitats

Location	Habitat	Vegetation removed	Effect
Area 1 (Debris trap and culvert in Brittas Wood)	WD1	Approx. 666 m^2, inclusive of canopy spread (9 no. trees)	Permanent and irreversible
Area 1 (Proposed embankment in Brittas Wood)	WD1	Approx. 28 m^2, inclusive of canopy spread (1 no. tree)	Permanent and irreversible
Area 2	WL1	Approx. 30 m (garden fields and boundaries) [1]	Permanent but reversible
Area 2	WL2	Approx. 10 m (4 no. trees)	Permanent and irreversible
Area 3	WD1	Approx. 253 m^2; (1 no. tree and surrounds)	Permanent and irreversible where tree removal is required for the proposed embankment. Permanent but reversible where tree removal is required to facilitate sight lines.

[1] It may be possible to retain these trees, unless the roots extend underneath the proposed wall. Wall excavation shall be witnessed by a Construction Stage Arborist. For the purposes of assessment, it is assumed that these trees will be removed.

3 BIODIVERSITY ENHANCEMENT

Biodiversity enhancement measures proposed for Areas 1 to 3 are described below.

3.1 Bankside Vegetation and Tree Planting

The ecological benefits of replanting and restoring bankside vegetation include re-establishing native vegetation. Other benefits include compensation for the loss of ecologically significant habitat, the restoration of wildlife corridors, and the prevention of erosion and protection of water quality in water catchments. By reintroducing native plants into an area, habitats are created for various species that may have been displaced by human disturbance.

Many types of wildlife will benefit from bankside vegetation which is varied in structure and species. Bankside trees, shrubs and tall vegetation which create shade and help make a diverse bank structure are important in the overall balance of the aquatic environment. Trees also create a relatively stable environment in terms of light, shelter, and temperature, which is important for many organisms. Tree roots stabilise banks against slippage and allow undercut features to develop which are valuable for wildlife.

Bats avail of linear features while foraging, mammals such as otters utilise the cover, birds are provided with food, cover, and nesting, whilst a better shelter belt for the clustering of insects provides greater substrate for insect breeding and feeding (i.e., bats food source). The replanting of bankside vegetation outlined below has taken this into account.

The applicant will endeavour to replace the trees and hedgerows removed with species of similar or greater ecological value. These species of Irish providence have been chosen to replicate the native species being removed, or to provide a like-for-like alternative to non-native species being felled. For mature trees that require removal during the construction works, replacements with semi-mature trees of the same species or an appropriate species of Irish provenance is recommended. The suggested replacement and enhancement options are discussed in the sections below.

‘Replacement’ refers to the creation of a habitat or planting of a species that is an acceptable substitute for the habitat / species that has been lost. Any replacement should be similar in terms of biological features and ecological functions that have been lost (CIEEM, 2018). ‘Enhancement’ is the improved management of ecological features or provision of new ecological features which result in a net benefit to biodiversity. This is greater than what is required to mitigate for an impact (CIRIA, 2019).

3.2 Area 1

3.2.1 Tree Replanting

Tree removal will be required on the western bank of the River Clodiagh to facilitate the construction of the debris trap and slipway. Replacement planting at this location will be on third party lands (Coillte) and therefore must be decided in agreement with Coillte. The following is recommended:

- Where non-native trees are to be removed (e.g., sycamore), replacement planting should comprise an appropriate native alternative suited to the environmental context, that can be found locally. It is recommended that non-native trees to be felled on the banks of the River Clodiagh are replaced with alder or willow. These are typical riparian species that are adapted and thrive in wet riparian habitats. These species were also found growing along the banks of the River Clodiagh during habitat surveys. It is recommended that non-native trees to be felled that are set back from the River Clodiagh are replaced with native species that have been found within this habitat such as sessile oak, birch, or hazel.
- Where native trees are to be removed (e.g., willow), replacement planting should comprise like-for-like replacement.
- The location of replacement planting shall be agreed with Coillte. It is recommended that replacement planting along the River Clodiagh is in scattered aggregations, where possible, to achieve dappled shade and prevent tunnelling associated with linear, strip planting of river bank.

All native species planted must be of Irish provenance.

3.2.2 Grass and Wildflower Regeneration

Based on guidance from the All-Ireland Pollinator Plan (AIPP; NBDC, 2021), reseeding will not take place for vegetation establishment on the side slopes of the proposed embankment. For the woodland areas within Coillte sites, if maintenance is required it should be undertaken as per AIPP recommendations.

To allow reestablishment on native vegetation through the soil seed bank, topsoil, and subsoil from the earthworks in Brittas Wood will be reinstated on the proposed embankment (see **Figure 3-1**). Details on soil management is provided in **Section 1.1**.

Annual monitoring of grassland establishment is proposed. This should take place within the months of June and July to identify the species colonising the areas. For any areas that establishment is not as expected on the embankments, seed mixtures harvested from the local area can be scattered by the contractor or scheme operator during the establishment period. Seeds can be collected in late summer from any of the native wildflowers growing in the locality of the Proposed Scheme.

The contractor shall control and remove from all grass areas, any pernicious weeds including their root systems by physical or chemical means as necessary in the establishment period. Such control and removal shall be undertaken in a method consented to in writing by Laois County Council. Pernicious weeds shall be removed before they are allowed to flower and set seed.

Figure 3-1: Replacement and Enhancement Proposal Area 1.

3.3 Area 2

3.3.1 Tree Replanting

The removal of WL2 treeline habitat on the left bank of the River Clodiagh will also be required to facilitate works to the flood wall on Chapel Street. Replacement of the treeline on the western bank of the River Clodiagh is possible in some areas north of Clonaslee bridge (see **Figure 3-2**). Replacement planting at this location will be on third party lands and therefore must be decided in agreement with landowners. The following is recommended:

- Where non-native trees are to be removed (e.g., cypress), replacement planting should comprise an appropriate native alternative suited to the environmental context, that can be found locally. It is recommended that non-native trees to be felled on the banks of the River Clodiagh are replaced with alder, a species found growing along the banks of the River Clodiagh during habitat surveys. It is recommended that non-native trees to be felled that are set back from the River Clodiagh are replaced with native species that have been found within this habitat such as sessile birch, hawthorn, hazel, and oak.
- Where native trees are to be removed (e.g., Irish yew), replacement planting should comprise like-for-like replacement.
- The location of replacement planting shall be agreed with landowners. It is recommended that replacement planting along the River Clodiagh is in scattered aggregations to achieve dappled shade and prevent tunnelling associated with linear, strip planting of river bank.

All native species planted must be of Irish provenance.

3.3.2 Hedgerow Replacement

Within Area 2, the removal of hedgerow habitat which forms garden and field boundaries will be required to facilitate access between the compound location and the flood wall works area. This effect is reversible as replacement planting at these locations is possible. While replacement on private lands cannot be dictated, replanting will take place in discussion with property owners. The following is recommended:

- Where non-native species are to be removed (e.g., garden plum), replacement planting should comprise an appropriate native alternative suited to the environmental context, that can be found locally. As the non-native species to be removed are set back from the River Clodiagh, they should be replaced with native species which can include fruit trees[2],[3] such as native crab apple, strawberry, bird cherry, along with native roses and blackthorn.
- Where native plant species are to be removed (e.g., honeysuckle), replacement planting should comprise like-for-like replacement.
- The location of replacement planting shall be agreed with landowners. It is recommended that replacement planting leaves sufficient width for the established hedge (2 m) on a herringbone or zigzag line[4].

All native species planted must be of Irish provenance.

[2] Planting Trees for Pollinators: https://pollinators.ie/wp-content/uploads/2023/01/AIPP-Tree-Planting-flyer-WEB.pdf.

[3] How-to-Guide Traditional Orchards and Fruit Trees for Pollinators on the Farm: https://pollinators.ie/wp-content/uploads/2023/09/AIPP-Farmland-Orchards-2023-WEB.pdf.

[4] Conserving Hedgerows, The Heritage Council: https://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf.

Figure 3-2: Replacement and Enhancement Proposal Area 2.

3.4 Area 3

3.4.1 Tree Replanting

Tree and hedgerow removal in the woodland on the southern side of the access road to the ICW is required to construct the proposed embankment. In some areas this effect is considered to be permanent as the flood defences will be replacing this habitat. Replacement planting is possible where trees are removed to facilitate sight lines towards the west of this section of woodland. Replacement planting at this location will be on third party lands and therefore must be decided in agreement with Laois County Council. The following is recommended:

- Where non-native trees/shrubs are to be removed (e.g., sycamore), replacement planting should comprise an appropriate native alternative suited to the environmental context, that can be found locally. It is recommended that non-native trees to be felled which are set back from the River Clodiagh are replaced with native species that have been found within this habitat such as alder, hazel, or holly.
- Where native trees/shrubs are to be removed, replacement planting should comprise like-for-like replacement.
- The location of replacement planting shall be agreed with Laois County Council. It is recommended that replacement planting requires minimum tree planting spacing of 2 m x 1.5 m in line with the '*Forestry Standards and Procedures Manual*'[5].

3.4.2 Grass and Wildflower Regeneration

Within Area 3, topsoil is proposed to be stripped from the working area and stored onsite to be reinstated upon completion of the proposed embankment. The embankment in Area 3 is proposed to be grass seeded and fenced off on its western side to prevent livestock erosion (see **Figure 3-3**).

[5] Forestry Standards and Procedures Manual (2015): https://forestryservices.ie/wp-content/uploads/2019/05/Forestry_Standards_and_Procedures_Manual_2015.pdf.

Figure 3-3: Replacement and Enhancement Proposal Area 3.

3.5 Soil Management

Where possible the removal of topsoil will be avoided. Where needed (embankment footprints, debris trap access slipway and stockpiles) the topsoil will be stripped and assessed for reuse within the Proposed Scheme, ensuring appropriate handling, processing, and segregation of material. It is unlikely that excavated material from embankments and walls will be used elsewhere as part of the works due to the requirement for non-porous embankment material.

Topsoil stripping will be carefully undertaken and stored in stockpiles of a height not exceeding 1.5m and located as close as possible to the locations where it was removed. Topsoil will be reinstated to the locations where it was removed on completion of the engineering works. These operations will apply to the proposed path / flood relief embankment at Brittas Wood and the flood relief embankment in the field on Tullamore Road.

In Brittas Wood, topsoil previously stripped to facilitate construction, will be reinstated and allowed to regenerate naturally, thus developing a natural sward. Within the field adjacent to the Clodiagh River on Tullamore Road, topsoil previously stripped to facilitate construction will be reinstated and seeded to develop a grass sward in order to be consistent with the existing field.

A sediment control plan will be developed by the contractor prior to the commencement of work. This plan will identify actions on site to minimise the loss of topsoils and soils and its potential for erosion such as stabilising side surfaces to prevent erosion through appropriate slope angles. Soils removed during excavations will be reinstated as soon as possible and backfilled and compacted to replicate the conditions prior to the works. Excess soil will be disposed of at a licenced waste disposal facility.

Any contaminated soil shall be removed from the Site and disposed of properly in accordance with the provisions of the Waste Management Acts, 1996 (as amended), and associated regulations.

3.6 Invasive Alien Plant Species

The following Third Schedule non-native Invasive Alien Plant Species were identified during field surveys. These include:

- Japanese Knotweed (*Reynoutria japonica*); and
- Hybrid knotweed (*R. x bohemica*).

As noted in Chapter 9: Biodiversity of the EIAR, the Local Authority shall appoint a suitably qualified contractor to deal with any Third Schedule Invasive Alien Plant Species within the proposed works areas prior to any works commencing. This specialist will prepare an Invasive Alien Species Management Plan (IASMP) that will be followed during the treatment of the IAS identified across the Proposed Scheme. The Plan will include any measures to manage, control or eradicate any IAPS identified prior to and during the construction phase of the Proposed Scheme. The Plan will also identify any licensing or approvals necessary from NPWS, EPA or other to enable the implementation of the plan.

3.7 Fauna

3.7.1 Bats

3.7.1.1 Bat boxes

The installation of bat boxes within the Proposed Scheme will provide suitable roosting habitats for bats within the local area. Bat boxes will be installed on the retained treelines to provide new shelter and/or roosting habitat for bat species commuting within surrounding habitat and along the watercourse. Schwegler Universal Bat Summer Roost 1FTH[6], or similar equivalent (i.e., self-cleaning and made of long-lasting material such as woodcrete) shall be used.

[6] Schwegler Universal Bat Summer Roost 1FTH: https://www.schwegler-natur.de/portfolio_1395072079/fledermaus-universal-sommerquartier-1fth/?lang=en

Bat boxes should be positioned on trees in groups of two or three and should be placed at least 4 m from the ground, facing in different directions, along suitable linear features. Bat boxes will be placed adjacent to vegetation features such as treelines and hedgerows to ensure they are close to existing flight paths and can avoid wide open spaces (Collins, 2023). The boxes should also be placed in sheltered, sunny areas, protected from strong winds and artificial lighting. The Bat Conservation Trust (BCT) Bat Box Information Pack (see **Appendix A**) should also be consulted. Recommended bat box locations are shown in **Figure 3-4,** and exact placement will be guided by a bat specialist.

3.7.1.2 Recommended bat box locations for Area 1

Two groups of bats boxes (BB01 and BB02) will be positioned on existing trees within Brittas Wood on the left riverbank. These will provide suitable resting and roosting sites for bat species. The bat boxes will be positioned within the treelines to ensure that a clear horizontal approach is provided for access. A bat specialist will assess the appropriate location for these features. Permission for the installation of these bat boxes within Brittas Wood shall be sought from Coillte in advance.

3.7.1.3 Recommended bat box locations for Area 2

Bat boxes (BB03) will be positioned on existing trees within the treeline on the right riverbank of the River Clodiagh. These will provide suitable resting and roosting sites for bat species away from the build land around Chapel Street and the vegetation removal required to facilitate the works. A bat specialist will assess the appropriate location for these features. Installation of the bat boxes at this location will only occur following landowner permission as this area overlays third party lands, and therefore must be decided in agreement with the landowner.

3.7.1.4 Recommended bat box locations for Area 3

For Area 3, two groups of bat boxes (BB04 and BB05) are proposed to be positioned on existing trees on the left bank of the River Clodiagh subject to agreement with the third party landowner.

Figure 3-4: Biodiversity enhancement measures within the Proposed Scheme.

3.7.2 Birds

3.7.2.1 Recommended nest box locations for Dipper (*Cinclus cinclus*) and Grey Wagtail (*Motacilla cinerea*)

One group consisting of two nest boxes (NB01) is proposed under an existing bridge near the ICW on Tullamore Road. The recommended location for the nest boxes is shown in **Figure 3-4** and exact placement should be guided by a bird specialist. Grey wagtails and Dipper nest by or over running water, nesting on ledges, amongst tree roots or beneath man-made structures such as bridges or culverts.

In the case of boxes, there are many designs of artificial nests suitable for both species. These can range from full nest boxes to platforms. In general, dippers need a sufficiently large platform or hole to build upon, on riverbanks, overhanging branches, or under bridges. Both species nest and roost in holes and on open ledges of bridges, in the masonry joints or where stones have been eroded or are missing. Clonaslee bridge was previously reported to be unsuitable for dipper as the bridge span was very low, and no evidence of breeding bird species was noted[7]. This was confirmed during RPS surveys, and as a result of the insufficient room for these features, Eco Dipper Wagtail Nest Box[8] or Vivara Pro WoodStone Grey Wagtail or Dipper Nest Box[9] will be installed at the bridge to the ICW in Area 3. The two nest boxes can be installed on the underside of the deck or one on each of the abutments as there is sufficient head room, and birds must have a clear flight path to the nest without any clutter directly in front of the entrance. The boxes should also be tilted forward slightly so that any driving rain will hit the roof and bounce clear[10]. The nest-sites can be installed at any time of the year, but the non-breeding period is recommended to avoid any interference (Copland, 2007). These boxes can also be mounted on walls within the works area, once they area at least 0.5 m above the high-water line. Installation of the nest boxes at this location will be on third party lands and therefore must be decided in agreement with the bridge owner.

3.8 Monitoring and Maintenance

Monitoring is a fundamental component of biodiversity management and is a continuing process which helps to identify changes over time. This helps determine if biodiversity goals are being met and management plans are working effectively.

3.8.1 Tree and Hedgerow replanting

The revegetation should be monitored by a qualified ecologist annually, for a period of five years from the completion of the works. Monitoring should be undertaken by the ecologist using standardised methods that are repeated at the same time each year. Hedgerows and replanted trees should be inspected following the main growing season (i.e. in September).

It is recommended that an adaptive management approach is used, where the results of monitoring feed back into the management of Clonaslee FRS. This allows appropriate management action to be taken if any problems are identified during monitoring. Likewise, if positive results are returned, consideration should be given as to how to maximise this success.

Maintenance of the proposed woodland planting will be followed up as per the Native Woodland Establishment GPC9 & GPC10 Silvicultural Standards (DAFM, 2015). At the end of the 5-year monitoring plan, the ecologist should assess the need for and frequency of further monitoring of the tree replanting areas. The collected information would inform the success of the Scheme to determine if intervention is necessary e.g. if any trees are dead or damaged these should be replaced using the same species within

[7] Laois Birds in Bridges: https://www.heritagemaps.ie/WebApps/HeritageMaps/index.html.

[8] Eco Dipper Wagtail Nest Box: https://www.nestbox.co.uk/products/dipper-wagtail-nest-box

[9] Vivara Pro WoodStone Grey Wagtail and Dipper Nest Box: https://www.nhbs.com/vivara-pro-woodstone-grey-wagtail-and-dipper-nest-box

[10] Helping birds near you: https://www.rspb.org.uk/birds-and-wildlife/helping-birds-and-wildlife

the next planting season. Monitoring should be undertaken in partnership between Laois County Council, the Ecologist and third-party landowners.

New hedgerows should be checked twice a year in the first three years for weeds and signs of damage or disease. Once established (generally after 3-4 years) shrubs can be managed as per existing hedgerows. Reducing hedgerow trimming to once every two to three years will also improve the structure and promote blossom and fruit production. Recommendations for ongoing or remedial management required will be specified within an Environmental and Ecological Report.

3.8.2 Bat boxes

The 1FTH is self-cleaning, and therefore does not require a licenced individual to clean out the bat boxes. For the first three years of the operational life of the Scheme, and on an annual basis - a licenced ecologist should carry out bat box monitoring. The ecologist will confirm and flag if bat boxes are in use by bats, including evidence of bats such as droppings, urine splashing, bat fur oil stains and/or dead bats. During the summer (May to September) 'chattering' may also be heard, and either side of sunset the bat box can be observed for any bats leaving to forage. Monitoring should be carried out at a suitable time of year to ensure no disturbance to any roosting bats, particularly in the case of a maternity roost. The best time of year for bat box monitoring to be carried out is September/October. If not being used, the location of the bat box may be moved to a different tree/aspect/height. Any evidence or presence of nesting birds will be flagged, and the nest removed outside the bird nesting season. If a bird nest is found, a secondary bat roosting source should be erected to replace the bat roosting source lost. The results of the first three years of monitoring would then inform the need for and frequency of further monitoring of the bat boxes. The results should be reviewed by an ecologist and agreed with the relevant operating authority. Finally, monitoring results should be reported by the ecologist within a short report on an annual basis for the first three years of the operational life of the development with any bat box failures identified and corrective actions outlined and implemented. Monitoring results should include any suggestions for amendments to the Biodiversity Management and Enhancement Plan.

3.8.3 Nest boxes

Bird nest boxes require little maintenance and monitoring. However, it is advisable that at the end of each breeding season (from August onwards), that nest boxes should be taken down, and scalded with boiling water to remove any parasites. Any repairs or modifications of nest boxes can also be undertaken at this stage and set up again for the following season.

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Appendix A Bat Box Information Pack

Bat Conservation Trust

www.bats.org.uk

Bat Box Information Pack


© Andrew Dumbleton

Bats are amazing animals that are important to ecosystems in the UK and worldwide. We have 18 species of bat in the UK, all of which are protected under European law. Bat populations in the UK have declined dramatically over the past century due to persecution and habitat loss. However, some UK bat species have recently shown some signs of increasing so there is hope.

Bat boxes are artificial roosts designed to provide bats with alternative resting places or to encourage bats into areas where there are few existing suitable roost sites. There are various designs of bat box; wooden boxes that you can make yourself, ready-assembled external boxes for buildings and trees, and even integrated bat boxes that can be built into walls.

Providing bat boxes can increase opportunities for roosting bats but it can take a while for bat boxes to be used regularly, particularly where a number of suitable alternative roost sites exist. Bat boxes can have an important additional function in encouraging interest and educating members of the public about bat conservation. The correct design and placement of boxes will help increase the likelihood of their uptake by bats.

Bat roost preferences

Bat boxes are now available from many outlets, and in a range of shapes and sizes, so some knowledge of what bat species are in your local area and their preferences will help you choose the best possible box. Some species such as horseshoe bats and grey long-eared bats do not use bat boxes.

Microclimate within a new roost is a very important factor in terms of increasing the chance of successful uptake by bats. In general, they prefer warm spaces in the summer for rearing young and cooler spaces in the winter for hibernation. The box should be draught proof and made from a thermally stable material such as untreated wood, ecostyrocrete, woodcrete, brick or stone. If possible, it's better to provide several internal chambers so that the bats can move around.


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Orientation and location

Structures for summer roosting should be positioned where they are sheltered from the wind but unshaded for most of the day. Summer maternity roosts (in the northern hemisphere) should be on a south-easterly to south-westerly aspect. It is always best to provide a number of different options for bats so that they can choose the most appropriate temperature based on their needs. This can be achieved by grouping a number of bat boxes each with a different aspect; two or three boxes is preferable to one, although a single box still has a chance of being used depending on the bat species that use the local area. Three boxes can be arranged around the trunk of larger trees – see below for details about putting up bat boxes.


© Fern Alder

Bat boxes are more likely to succeed in areas where there is a good mixture of foraging habitat, including trees, and a source of water (most maternity roosts are located within a short distance of permanent fresh water such as a stream, pond, river or lake). Bat boxes in areas with few other roosting opportunities are also likely to be more successful.

Bat boxes should also be located close to unlit linear features, such as lines of trees or hedgerows. Bat species use these features for navigation between their roosting sites and feeding grounds and to avoid flying in open and exposed areas. Ensure the bats approach to the box is not impeded, for example by branches – clear away underneath the box so the bats can land easily before crawling up into the box.

Size of the bat box

The most frequently used bat boxes are small and only suitable for crevice-dwelling bat species.

Access

Crevice dwelling bats crawl into their roosts via small gaps around 15-20mm high. Roughened vertical surfaces or landing areas allow better access (by landing and crawling), although horizontal landing perches should be avoided as these are not necessary, may even deter bats and encourage birds to nest within the bat box.


© John Altringham

Other considerations

Bats are nocturnal and adapted to low light conditions. Artificial light sources should not be directed onto bat boxes or flight paths as most bat species find artificial lighting very disturbing.

If possible, make or purchase bat boxes with an entrance slit along the bottom so that accumulated bat waste can drop out of the box or be pushed out as bats emerge. This will also help stop birds nesting in the box and blocking the entrance, which can happen with bat boxes that have entrance holes in the middle.

Boxes that may accumulate bat droppings will also need to be cleaned regularly by a licensed bat worker. It is important to remember that bat boxes must not be opened by anyone except a licensed bat worker (see 'monitoring bat boxes' below for more details on licences). In addition, nesting birds must not be disturbed so leave the area immediately upon finding an active nest in a box, and there is the potential for dormice to be found in some woodland boxes, in which case the box must only be checked by a licensed ecologist

Types of bat boxes

Bat boxes come in many forms depending on their materials, function and location. Simple bat boxes are available commercially or can even be home-made. Bat boxes can be divided into the following categories: self-made external bat boxes, ready-made external bat boxes, integrated bat boxes and free standing bat boxes. Advanced forms of artificial roost creation include bat houses, bat barns and internal bat lofts (if you are interested in these please refer to the websites and publications listed at the end of this document).

Self-made external bat boxes

Self-made wooden bat boxes are usually located on trees or the outside walls of buildings. These boxes are usually cubic or rectangular, with a grooved 'bat ladder' and a narrow entrance slit at the bottom. These will last for approximately ten years and can either be bought in kit form, or you can make your own from scratch (there are instructions for the 'The Kent bat box' pictured below in the Appendix at the end of this document – these boxes are also available commercially).

They come in a variety of shapes but key requirements are:


Kent Bat Box

- The wood should be rough sawn for grip and untreated.
- Bats do not like draughts; the entrance slit should be no more than 15-20mm wide and there should be no gaps where the sides and top join - the box should be well put together.
- A box that cannot be opened is best - it will lessen the chances of the bats being harmed through becoming trapped under the opened lid, or disturbed by people opening the top.
- To increase longevity of the box, use screws rather than nails.
- Any screws, hardware or staples used must be exterior grade (galvanized, coated, stainless, etc).

Ready-made external bat boxes

There are a number of ready made external bat boxes suitable for buildings and trees that can be purchased. These boxes can be made from wood, however there are an increasing number of more durable options, such as ecostyrocrete (pictured right). These types of boxes can come in a range of finishes to blend into the buildings façade or indeed to highlight their presence!

Integrated bat boxes

Integral or integrated bat boxes can be built into the walls or masonry of houses and other buildings. The boxes can be embedded such that they do not impair the air-tightness of the building. Many designs are available including some that have bespoke coverings that can match the building façade and / or highlight the boxes presence (see boxes left and below from **Habibat**). The same principles for size, location and access apply.

Ready-made free standing boxes

American style bat houses (larger, multi-chambered boxes) have been successfully used for bat conservation in North America and elsewhere. These large multi-chambered boxes are increasingly being used in the UK for sites where there are few suitable features (such as trees or buildings) for boxes to be attached to, as they can be put up on poles:

http://www.batcon.org/files/RocketBoxPlans.pdf

Commercial designs are now available, such as the 'rocket box' from Habibat (pictured right).

Habibat

Habibat is a partnership between the Bat Conservation Trust, Ecosurv, their partnership bat box companies and Habibats customers. Their aim is to provide bat boxes that work for bats and buildings. A portion of the profits from each Habibat partner company bat box sold is reinvested into the Habibat scheme to improve accommodation for bats in the long run with an aim to implement monitoring and research. The scheme aims to improve knowledge of integrated bat box use and design,and give customers guidance on installation.

If you would like further information on the products and partnership companies, visit the Habibat website: www.habibat.co.uk.

Putting up bat boxes

Most bat species will use higher positioned boxes (around 4m up); assess the risk of working at height when undertaking the installation, then place the box as high as it is safe to do so. This will also help protect bats from vandalism and falling prey to cats. If working in the public realm, try to locate boxes so they are not above public walkways.

Ensure the boxes are appropriately fitted, to avoid the risk of them falling off. The boxes should be checked at least annually and after high winds to ensure they are still securely in place.


© Sue Burchett

On buildings

Place the boxes high up by the eaves on a building, which can also help shelter the box from the weather. As detailed above, the aspect of the box should capture sun for part of the day if the intention is to attract maternity colonies.

Gazebos, garden walls and sheds have been suggested as sites for bat boxes. However, the main danger is that the boxes are not high enough above the ground, the structures may not be robust enough to support the box in high winds and the boxes are too visible to predators or vandals.

On trees

Consideration should be given to tree growth and boxes may need rehanging over time, regularly check boxes to assess this. Use headless or domed nails not fully hammered home to allow the tree growth, again regular checks will ensure that this allowance can be made while still being securely fitted. Iron nails can be used on trees with no commercial value. Copper nails can be used on conifers, but aluminium alloy nails are less likely to damage saws and chipping machinery.

Monitoring bat boxes

Making and putting up bat boxes is a great conservation action but what is even more useful is to know whether they are being used, when and by which species.

How long before bats will use the box?

Sometimes it can take several years for bats to find a new box. Be patient! Slow (or no) uptake may be due to the availability of other roosts locally. Sometimes, however, bats move in within months or even weeks!

How will I know if the box has been successful?

To check if the box is being used, look out for droppings and urine-staining on the vertical 'bat ladder' below the box and listen for 'chattering' during the day, especially during the summer months. You can also watch the box for an hour either side of sunset to observe any bats leaving to feed, or around dawn to see any bats returning to their roost. Bats may be observed by looking up into the box from below, however no light should be used as this may disturbany bats that are present.

Licensing and the law

You can undertake the non-invasive checks above without needing a licence. However, if the box needs to be opened to check it then there must be a suitably licensed bat worker present. Anyone wishing to undertake bat box checks should obtain training in bat handling and identification before applying for a licence. You can find out more about licensing and bats on the Bat Conservation Trust website at: www.bats.org.uk/pages/licensing.html

All bats and their roosts are protected by law and it is an offence to deliberately disturb, handle or kill bats. The relevant legislation in England & Wales is the Wildlife and Countryside Act 1981 and Conservation of Habitats & Species Regulations 2010 (as amended). In Scotland it is the Conservation (Natural Habitats, etc.) Regulations 1994 and in Northern Ireland the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995.

A bed without breakfast?

Bats often use features such as hedgerows, tree lines and watercourses as commuting pathways between roosts and foraging areas. This type of habitat also provides shelter, allowing insects to gather and therefore supports foraging bats. The highest densities of bats occur where insects are most plentiful.

Make sure you maintain or create good foraging habitats for bats by planting a wide range of plants such as flowers that vary not only in colour and fragrance, but also in shape. See BCT's 'Encouraging Bats' leaflet for more information (www.bats.org.uk\publications).

Other useful websites

Bat Conservation Trust www.bats.org.uk
The Bat Conservation Trust (BCT) is working towards a world where bats and people thrive in harmony, to ensure they are around for future generations to enjoy. BCT is the only organisation solely devoted to bat conservation in the UK.

Bat Conservation International www.batcon.org
Bat Conservation International's mission is to conserve the world's bats and their ecosystems to ensure a healthy planet. Based in Austin, Texas, BCI is devoted to conservation, education and research initiatives involving bats and the ecosystems they serve.

Roost roost.bats.org.uk
Roost is a resource developed by the Bat Conservation Trust (BCT) to aid in the gathering of information on bat roost mitigation, compensation and enhancement techniques. The aim is for this site to provide accessible information to support everyone involved in bat conservation and development.

Vincent Wildlife Trust www.vwt.org.uk
The Vincent Wildlife Trust (VWT) is an independent charitable body founded by Vincent Weir in 1975 and has been supporting wildlife conservation ever since. They conserve a range of endangered mammals through management of their own reserves, undertake pioneering research and provide expert advice to others through practical demonstration.

Publications

Gunnell, K., Murphy, B. and Williams, C. (2013) Designing for biodiversity: a technical guide for new and existing buildings (2nd ed.)

Gunnell, K., Grant, G. and Williams C. (2012) Landscape and urban design for bats and biodiversity

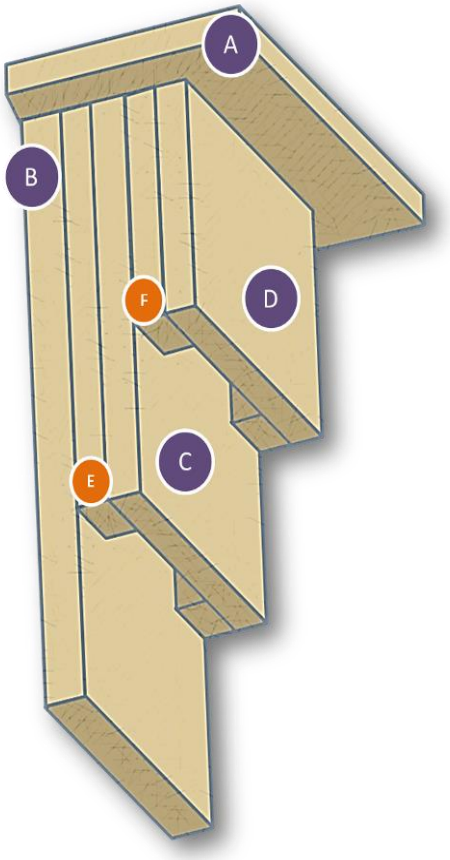
Mitchell-Jones, A.J (2004) Bat mitigation guidelines

Mitchell-Jones, A.J. and McLeish, A.P. (2004) Bat workers' manual (3rd edition)

Tuttle, M.D., Kiser M. and Kiser S (2004) The Bat House Builder's Handbook

Appendix: The Kent bat box (D.I.Y. instructions)

Design and measurements



Simple to construct, self-cleaning and low maintenance, the Kent bat box (designed by the Kent Bat Group) is a great way to encourage bats in your garden or your green space. The box should be rainproof and draught-free.

The only critical measurement is the width of the crevices: between 15-25mm. Other measurements are approximate. Timber should be approximately 20mm thick.

Measurements for one Kent bat box kit would be as follows:

Part	Quantity	Size (mm)
Roof (A)	1	250 x 160 x 20
Back (B)	1	450 x 200 x 20
Centre (C)	1	330 x 200 x 20
Front (D)	1	210 x 200 x 20
Centre Rails (E)	2	330 x 20 x 20
Front Rails (F)	2	210 x 15 x 15
Stand-offs (optional)	2	200 x 20 x 20

Material and Tools

This kit requires approximately 1.6m of rough wood and 25 screws (8 x 1 ½ inches) to assemble. You can rough it up by scraping with a suitable tool – possibly a saw blade or even a screwdriver but make sure you use untreated wood as some preservative chemicals can kill bats.

Pre-drill the holes to prevent the wood splitting. Alternatively you can assemble your bat box kit with nails although they tend to be less robust than boxes made with screws.

The hanging screws may either be at the edges of the front panel or in the side centre block (not in the rails!). Fixing may be by use of brackets, durable nylon cord or wires.

When installing the box, assess the risks of working at height, use the appropriate fittings and assess where the box will be located, in relation to any public access. Regular checks should be made to ensure the box remains securely fitted, especially after high winds.

Photos and illustrations in this document by the Bat Conservation Trust unless otherwise stated.