Ballymore Development Limited

Biodiversity and Hedgerow Management Plan

Proposed Large-Scale Residential Development: Naas Racecourse Lands







IE002507

A01

27 April 2026

TETRA TECH

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Document status

Document status					
Version	**Purpose of document**	**Authored by**	**Reviewed by**	**Approved by**	**Date**
D01	Draft	HF	WL		20.04.26
S0 P02	Draft for Client Review	HF	WL		23.04.26
A01	Final	HF	WL	HG	27.04.26

Approval for issue		
HG	HG	27/04/2026

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Tetra Tech (formerly RPS)	Ballymore Development Limited

Table of contents

1.0 Introduction 5
1.1 Background 5
1.2 Legislative and Policy Context 5
1.3 Objectives of the BMP 7
2.0 Proposed Development 7
3.0 Existing Baseline Environment 7
4.0 Biodiversity Management Plan 7
4.1 Proposed Biodiversity Enhancement 8
4.2 Management and Monitoring 14

List of figures

Figure 1: Bat Box 2F (Source: Schwegler nature) installation on a tree 10
Figure 2: Universal Bat Summer Roost 1FTH (Source: Schwegler nature) installation on a wall, but can be mounted on trees. 10
Figure 3: Nest Box 1B (Source: NHBS) installation on tree. 12
Figure 4: Schwegler Nest Box 2M (Source: Wildcare) installation on tree. 12
Figure 5: Insect tower/hotel examples Source: CJ Wildlife, Woodland Trust). 13
Figure 6: Examples of ecological information boards and signage. 14

Appendices

Appendix A: Bat Box Information Pack

Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
BCT	Bat Conservation Trust
BMP	Biodiversity Management Plan
EU	European Union
LAP	Local Area Plan
LAWPRO	Local Authority Waters Programme
LRD	Large-Scale Residential Development
NBAP	National Biodiversity Action Plan
KCC	Kildare County Council
SuDS	Sustainable Drainage System

1.0 Introduction

1.1 Background

Tetra Tech (formerly RPS) was commissioned by Ballymore Development Limited (the Applicant) to prepare a Biodiversity and Hedgerow Management Plan (hereafter referred to as the BMP) to accompany an application to Kildare County Council (KCC) for a large-scale residential development (LRD) on lands to the west of Naas Racecourse, Kingsfurze, Naas, County Kildare.

This BMP has been prepared in response to a formal Large-scale Residential Development (LDR) Opinion issued by KCC on 30 October 2025. Both a Biodiversity Management Plan and a Hedgerow Management Plan were requested in the LDR Opinion (i.e., Items Nos. 4 and 6 within the theme 'ecology'). This document combines these elements into one concise Management Plan.

This BMP presents the opportunities for biodiversity enhancement and specific management measures for long-term biodiversity conservation. A summary description of the Proposed Development is provided in the section 2.0 of this report.

1.2 Legislative and Policy Context

Biodiversity in Ireland has declined significantly in recent decades, largely driven by human activities. Consequences include habitat degradation, species loss, and reduced wildlife abundance. With targeted enhancement measures and responsible long-term management, developments can support, improve and restore local biodiversity and ecological networks.

1.2.1 EU Nature Restoration Regulation (EU 2024/1991)

The European Union (EU) Nature Restoration Regulation establishes binding obligations for Member States to restore specific habitats and species across the EU. It identifies priority ecosystem types and requires the adoption of outcome-focused restoration measures and monitoring arrangements to enable long-term and sustained recovery of biodiversity. EU countries are expected to submit National Restoration Plans to the Commission by September 2026. This BMP supports those obligations by outlining enhancement and management measures at the site level, contributing to national restoration commitments and to broader EU biodiversity and climate objectives.

1.2.2 Ireland's 4th National Biodiversity Action Plan 2023–2030

The National Biodiversity Action Plan (NBAP) sets out five objectives that lay out a clear framework for a national approach to biodiversity. It places biodiversity at the centre of government decision making, demonstrating Ireland's commitment to protect our biodiversity and halt against decline. The Plan emphasises improving monitoring, strengthening evidence, and regular reporting on implementation. This BMP aligns with and contributes to the objectives of the NBAP by specifying site-level enhancement and monitoring measures.

1.2.3 All Ireland Pollinator Plan 2021-2025

Irish pollinators are in decline. At its core, the Pollinator Plan is about providing food and shelter across all types of land so that our pollinators can survive and thrive. The Plan identifies objectives and targets that can be undertaken voluntarily by both private and public landowners to ensure pollinator population levels can flourish. This BMP supports pollinators by incorporating the Plans recommended on-site actions such as flower margins, reduced pesticide use, and nesting habitat provision.

1.2.4 Kildare County Development Plan 2023-2029

The Kildare County Development Plan 2023-2029 states the following biodiversity policies, objectives and actions relevant to this report:

BI P1: *"Integrate in the development management process the protection and enhancement of biodiversity and landscape features by applying the mitigation hierarchy to potential adverse impacts on important ecological features (whether designated or not), i.e. avoiding impacts where possible, minimising adverse impacts, and if significant effects are unavoidable by including mitigation and/or compensation measures, as appropriate. Opportunities for biodiversity net gain are encouraged".*

BI O3: *"Actively support the implementation of national biodiversity initiatives such as the All-Ireland Pollinator Plan 2021-2026".*

BI O18: *"Require all applications for new developments to identify, protect and sensitively enhance the most important ecological features and habitats, and incorporate these into the overall open space network, keeping free from development and to provide links to the wider Green Infrastructure network as an essential part of the design process and by making provision for local biodiversity (e.g. through provision of swift boxes or towers, bat roost sites, hedgehog highways, green roofs, etc.)".*

BI A12: *"Support the development, where appropriate and feasible, of biodiversity awareness signage in the county".*

BI P6: *"Recognise the important contribution trees and hedgerows make to the county biodiversity resource climate mitigation, resilience and adaptation".*

1.2.5 Draft Biodiversity Action Plan for County Kildare 2026-2031

The draft Biodiversity Action Plan 2026-2031 for Kildare builds upon the foundations laid out in the "Kildare Heritage Plan" 2019-2025, which emphasised the importance of natural heritage. The Plan includes key objectives and actions aimed at reversing biodiversity loss, supporting conservation and restoration efforts and tackling threats and pressures. Those relevant to this BMP are the following:

Objective 1.5: "*Support the development of Management Plans for Locally Important Biodiversity Sites, as appropriate*".

Objective 1.10: "*Actively support the implementation of national biodiversity initiatives, including the All-Ireland Pollinator Plan*".

Objective 1.11 (b): "*Promote native tree and broadleaf planting within the council and throughout the community*".

Objective 2.1: "*Contribute to the development a of communications 'toolkit', with materials, messaging and informative content on key biodiversity topic*".

Objective 1.12: "*Support the development of an Invasive Alien Species Management Plan for County Kildare*".

This BMP aligns with and contributes to the objectives of the draft Biodiversity Action Plan for County Kildare 2026-2031 by specifying site-level enhancement and monitoring measures in line with the All-Ireland Pollinator Plan, management of invasive species, native tree planting and the promotion of ecological signage.

1.2.6 Naas Local Area Plan 2021-2027

The Naas Local Area Plan (Naas LAP) 2021–2027 provides the statutory spatial framework for development and regeneration in Naas and sets out objectives to protect and enhance the town's green infrastructure, watercourses and habitat networks. The Naas LAP states the following objectives relevant to this report:

NE 2.1: "*Increase tree planting and pollinator friendly planting, in accordance with the recommendations of the All-Ireland Pollinator Plan throughout Naas and in open spaces in new developments in order to enhance local biodiversity, visual amenity and surface water management*".

NE 2.4: "*Seek to develop an Invasive Species Action Plan for Naas, in collaboration with key stakeholders and community organisation*".

NE 3.2: "*Enhance and promote biodiversity and amenity and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned*".

NE 4.3: "*Seek to develop habitat patches/ 'stepping stones' within the landscape, to maximise proper connectivity between urban and peri urban parks and the surrounding rural landscape*".

NE 4.5: "*Promote the use of pesticide-free and pollinator friendly fertilisers and other treatments used in gardens and public open spaces. Progress the reduction, and ultimate cessation, of use of such pesticides and treatments by Council staff on public lands*".

NE 5.4: "*Ensure new development proposals have regard to the future function and variety of open spaces with a view to making provision for new areas of biodiversity, tree planting and / or pollinator friendly planting*".

This BMP aligns site-level measures, including native planting, invasive species management, habitat diversity, and ecological connectivity, with the Naas LAP's objectives, contributing to biodiversity and ecosystem-service outcomes.

1.3 Objectives of the BMP

The objectives of this BMP are as follows:

- Demonstrate effective biodiversity management and compliance in line with relevant national and local biodiversity objectives (see section 1.2).
- Maximise the value of existing ecological features (see section 3.0).
- Outline measures to be incorporated as part of the Proposed Development to enhance the biodiversity of the site and surrounding area (see section 4.1).
- Outline measures to be incorporated as part of the Proposed Development to ensure the long-term responsible management of the site and surrounding area (see section 4.2).

2.0 Proposed Development

The Proposed Development is an LRD on lands extending to approximately 8.7 hectares located to the west of Naas Racecourse, Naas, Co. Kildare, comprising 234 residential units.

For detailed information on the description of the Proposed Development, refer to the statutory notices and suite of drawings and documents prepared by the Applicant and its design team, submitted with the planning application.

3.0 Existing Baseline Environment

For detailed information on the existing baseline environment, refer to the Ecological Impact Assessment Report prepared by Tetra Tech, submitted under separate cover with the application materials. The Ecological Impact Assessment Report identifies, describes, and presents an ecological assessment of the proposed works associated with the Proposed Development.

4.0 Biodiversity Management Plan

The following sections detail the biodiversity enhancement measures and the proposed biodiversity management and monitoring to be implemented as part of the Proposed Development.

4.1 Proposed Biodiversity Enhancement

4.1.1 Habitats

4.1.1.1 Vegetation retention

The Proposed Development will retain existing hedgerows and vegetation, e.g., trees, where possible (see the Landscape Design Report prepared by Murphy + Sheanon Horticulture and Landscape Architects (M+S), enclosed with the application materials). The retention of these key features is in accordance with Naas LAP, Policy NE1, and its objective of maintaining and enhancing the wider green infrastructure network.

4.1.1.2 Vegetation planting

The retention of hedgerows and vegetation, where possible, will also be supplemented by native hedgerow and tree planting (see the Landscape Design Report prepared by M+S, enclosed with the application materials). Planting will consist of native tree species of Irish providence, and where possible, contain a minimum of four native species.

Hedgerows and vegetation support wildlife by creating a stable environment in terms of light, shelter and temperature, and providing ecological connectivity within and outside of the Proposed Development. Species such as bats may also avail of linear features while foraging, birds are provided with food, cover and nesting, whilst insects are provided with a shelter belt and substrate for insect breeding and feeding (i.e. bats' food source).

As per the Landscape Design Report prepared by M+S, there is provision for planting of hedgerows, linear treelines, tree clusters, shrubs and ground flora. Planting will predominantly comprise native species as well as some non-native species suitable to this type of development. Key species include Lime *Tilia x vulgaris*, field maple *Acer campestre and* silver birch *Betula pendula*;. Species proposed include:

- Street trees: Turkish hazel *Corylus colurna*, hornbeam *Carpinus betulus*, Dutch elm (hybrid) *Ulmus* 'Lobel'.
- Parkland trees: Black alder *Alnus glutinosa*, sessile oak *Quercus petraea*, common beech *Fagus sylvatica*, Scots pine *Pinus sylvestris*, small-leaved lime *Tilia cordata*, dawn redwood *Metasequoia glyptostroboides*, silver birch, crab apple *Malus sylvestris*, wild cherry *Prunus avium*, field maple, Canadian serviceberry *Amelanchier canadensis*, American sweetgum *Liquidambar styraciflua.*
- Feature trees: Scots pine, pedunculate oak *Quercus robur*, black pine *Pinus nigra* and silver birch.
- Native hedgerows: Silver birch, hazel *Corylus Avellana*, hawthorn *Crataegus Monogyma*, holly *Ilex Aquifolium*, crab apple, blackthorn *Prunus Spinosa*, spindle *Euonymus Europaeus*, wild cherry, dog rose *Rosa Canina*, honeysuckle *Lonicera Periclymenum,* guelder rose *Viburnum Opulus.*

A full list of species proposed for planting is provided in the Landscape Design Report prepared by M+S and submitted with the application materials.

4.1.1.3 Detention basins and swales

Detention basins function as both stormwater management and valuable amenity spaces while swales are wide, shallow, vegetated channels designed to store and direct runoff and removed

pollutants. As part of the sustainable drainage system (SuDS) strategy for the Proposed Development, both detention basins and swales will be integrated into the landscape.

Vegetation will be allowed to naturally revegetate/colonise from existing seedbanks and local provenance where possible and will be supplemented by an appropriate seed mix to the site and soil conditions if required.

4.1.2 Fauna

4.1.2.1 Bats

As detailed in the Ecological Impact Assessment Report prepared by Tetra Tech and provided as part of the planning application provided under separate cover, habitats in the surrounding area were classified as being of low value to commuting and foraging common bats, given their urban edge context. However, bat boxes are proposed along linear features on individual retained trees to provide shelter and/or roosting habitat for bat species commuting within the surrounding habitat.

A total of 8 bat boxes should be positioned in groups of two or three on trees and should be placed at least 3 to 4 m from the ground, facing in different directions, in sheltered, sunny areas, and sheltered from strong winds.

Exactment placement of bat boxes should be guided by a suitably qualified ecologist. The following bat boxes are recommended:

- *Type 1* bat box: Schwegler Bat Box 2F[1] (see Figure 1). A universal bat box that can be installed on a tree, on buildings and may also be hung on metal fences. If the Bat Box is not occupied after several years for whatever reason, e.g. due to a non-species-appropriate biotope structure, it can be converted into a Type 2M Nest Box by replacing the front panel.
- *Type 2* bat box: Schwegler Universal Bat Summer Roost 1FTH[2] (see Figure 2), a universal bat box that can be installed on a tree or on buildings.
- *Type 3* bat box: Schwegler Flat Bat Box 1FF[3] , for installation on a tree or in the surface of exterior walls.
- *Type 4* bat box: Schwegler Bat Colony Box 1FS[4], a box readily used for forming large colonies, especially by Leisler's Bats, Daubenton's Bats and Brown Long-Eared Bats, for installation on a tree.

[1] Schwegler Bat Box 2F: https://www.schwegler-natur.de/portfolio_1395072079/fledermaushoehle-2f/?lang=en

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

[3] Schwegler Flat Bat Box 1FF: https://www.schwegler-natur.de/portfolio_1395072079/fledermausflachkasten-1ff/?lang=en

[4] Schwegler Bat Colony Box 1FS: https://www.schwegler-natur.de/portfolio_1395072079/fledermaus-grossraumhoehle-1fs/?lang=en



Figure 1: Bat Box 2F (Source: Schwegler nature) installation on a tree

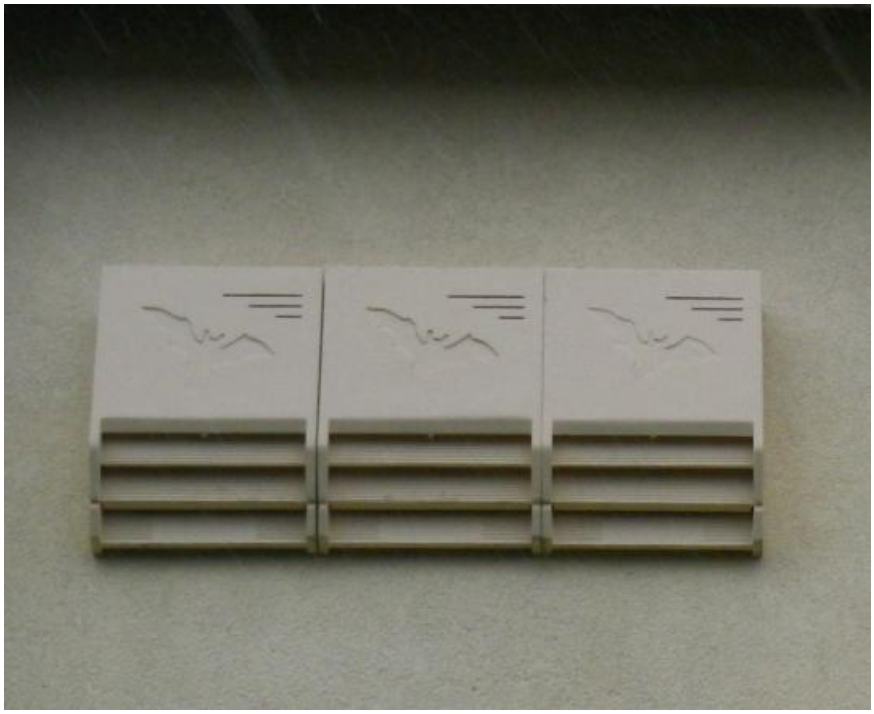


Figure 2: Universal Bat Summer Roost 1FTH (Source: Schwegler nature) installation on a wall, but can be mounted on trees.

4.1.2.2 Birds

Bird boxes are proposed along hedgerows/treelines. A total of 8 bird boxes are proposed to be installed within appropriate retained vegetation corridors on semi-mature to mature trees. Bird boxes should be placed at 2-4 m high, facing between north and east, thus avoiding strong sunlight and the wettest winds. The birds must have a clear flight path to the nest without any clutter directly in front of the entrance. Tilt the box forward slightly so that any driving rain will hit the roof and bounce clear.

Exactment placement of bird boxes should be guided by a suitably qualified ecologist. The following bird boxes are recommended:

- 4 Schwegler Nest Box 1B (2 of each entrance hole 26 mm and 32 mm size proposed)[5] (see Figure 3), ideal for attachment to trees and can be hung from branches.
- 4 Schwegler Nest Box 2M (2 of each entrance hole 26 mm and 32 mm size proposed)[6] (see Figure 4). Free hanging and ideal for protection against cats and martens.

[5] Schwegler Nest Box 1B (Entrance hole 32 mm): https://www.schwegler-natur.de/portfolio_1408366639/nisthoehle-1b/?lang=en

[6] Schwegler Nest Box 2m (Entrance hole 32 mm): https://www.schwegler-natur.de/portfolio_1408366639/nisthoehle-2m/?lang=en



Figure 3: Nest Box 1B (Source: NHBS) installation on tree.



Figure 4: Schwegler Nest Box 2M (Source: Wildcare) installation on tree.

4.1.2.3 Invertebrates and small mammals

Insect towers/hotels

An increase in insect population will provide more food for bat, bird and other species. Providing vegetation is replanted, water quality is suitable, and light and shelter and available, invertebrate species should naturally integrate into the residential environment. To further encourage invertebrates, insect towers and hotels are proposed, providing suitable habitat for a range of invertebrates, including Hymenoptera such as wild bees and wasps. Placing these towers along hedgerows and treelines will provide shelter and commuting corridors.

The insect towers should be under tree cover and south facing where possible. They should be 1.5 m from the ground and distanced from any bat or bird boxes in the vicinity. They should also be spaced apart from the bird and bat boxes to avoid easy predation on the insect species. A wide range of insect towers may be used, some which can be easily hung against a tree using a nail and/or some wire and others that are more complex mimicking small outdoor hotels. Insect towers and hotels can also be easily built with left over construction materials such as wooden pallets, old bricks, roof tiles and pieces of bark. Log stacks are also an excellent and cheap option of attracting beetles, centipedes and woodlice (including frogs and hedgehogs) (refer also to section **Error! Reference source not found.**). Examples are shown in Figure 5. Exact placement along hedgerows, treelines and in wildflower meadows should be guided by a suitably qualified ecologist.



Figure 5: Insect tower/hotel examples
Source: CJ Wildlife, Woodland Trust).

4.1.2.4 Ecological Signage

Ecological information boards play a crucial role in biodiversity enhancement and management by providing clear and accessible information about ecosystems to local communities and residents. They can display biodiversity messages and explain information about local projects (see Figure 6

Figure 6: Examples of ecological information boards and signage.
for examples). The overall aim of information boards is education, engagement and promotion of biodiversity.

Proposed topics on the information boards include descriptions of flora and fauna including native plant species, bats, birds, invertebrates and small mammals. Local artists could be commissioned to produce illustrations for the boards, of the enhancement measures and the expected local species. Boards should be constructed of waterproof sustainable materials, such as recycled plastic or treated wood. Exact placement should be guided by a suitably qualified ecologist.



Figure 6: Examples of ecological information boards and signage.

4.2 Management and Monitoring

4.2.1 Hedgerows

Native hedgerow planting is proposed to bolster the retained hedgerows. The establishment maintenance regime will ensure the successful establishment of the new hedgerow planting. These comprise:

- The principal maintenance required in the early years will be the control of competing vegetation at the base of the hedgerow. In this regard a strip of ground 500 mm either side of each hedge, shall be kept free of grass and weed growth, and kept tidy. This shall be carried out either by hand or mechanical means, avoiding the use of chemicals in order to protect pollinators and flowering plants such as clovers, vetches and knapweed. The vegetation clearance will take place between September and March for the first 3 years following planting;
- Hedgerows will be regularly watered in the first summer and thereafter as required during dry periods, where practical and safe to do so;
- The leading shoots of hedgerow plants shall be pruned after the first growing season to a uniform height and the side shoots shall be pruned to two parallel lines to form the beginning of the hedge. Thereafter hedges shall be trimmed so as to leave them wider at the base than at the top. Hawthorn shall be cut at least once within the first 3-4 years after planting to encourage bushy growth;
- The first hedgerow cut will take place two years post planting ideally in January / February outside the bird nesting season to encourage bushy growth. At year 4, hedgerows can be subject to a harder pruning.
- New hedgerow planting will link with existing retained hedgerows to form a continuous planting line. Hedgerows will be maintained to avoid gaps in planting;
- Standard trees within the hedgerow will be pruned in accordance with arboricultural practice such as BS 3998:2010; and
- Inspections will take place annually to replace dead plants and to close out any gaps in planting;

Once the establishment maintenance period is complete, these recently planted hedgerows will have become an established element in the road landscape for which the long term maintenance regime will apply for both retained hedgerows and planted hedgerows for the remainder of the BMP as follows:

- Over the longer term maintenance period, cutting will take place every 2 – 3 years to maintain hedgerow height at 3-4m (apart from individual standard trees within the hedge). The hedge will be maintained to be wider at the base than the top; and
- Proposed new hedgerows will provide additional linking habitat and reinforce the existing green network. Any gaps in existing hedgerows will be gapped up with new hedgerow and hedgerow tree planting.

4.2.2 Treelines and Shrubs

Where planting is proposed:

- All proposed planting will be maintained for 15 years post-construction, with seasonal checks by a suitably qualified arboriculturalist/ecologist for the first two years and yearly checks for the subsequent years. A rate of 90% living individuals after four years and 80% living individuals at eight years will be retained, with replacement planting as required. Any gaps greater than 1m will be replanted with native tree species of similar size to those adjacent.
- Depending on the progression of vegetation establishment, yearly checks may extend beyond a five-year period. This will be determined by a suitably qualified ecologist.
- Tree and shrub planting will be kept weed and litter free until new plants are established. Any tree, hedge or shrub that is removed, uprooted, destroyed or that becomes seriously damaged, defective diseased or dead shall be replaced in the same location with another plant of the same species and size. All such replacements shall be carried out within the first planting season following the loss.

4.2.3 Species Diverse Grassland

Where there are provisions for green space seed mixes and bulbs, the establishment of species diversity is key to provide an important food source to a range of wildlife throughout the year. For example, the management of seeds is important for small mammals and birds during the Autumn and Winter months, while the management of flowering plants is important to attract insects and pollinators during the summer months. Additionally, the management of grassland to include long grass particularly along the boundary of the site where hedgerow and treeline shelter is available can promote small mammals such as rabbits.

Management of grassland will include the following:

- Maintained for two years post-construction, with seasonal checks by a suitably qualified ecologist.
- Depending on the progression of vegetation generation, maintenance of vegetation may extend beyond this two-year period. This will be determined by a suitably qualified ecologist.
- Grassland areas should receive reduced mowing management (e.g. once a year, or early spring and late summer cuts only with cuttings removed after mowing).
- During the growing season, if mowing more than once a year (typical with this type of development), it is recommended to mow only the fringes of footpaths, car parks and roads to maintain a neat and tidy appearance whilst simultaneously promoting wildflower meadows beyond the mown strip.

4.2.4 Pesticide use

Where suitable native grass-wildflower seed mixes are proposed, pesticide use will be prohibited. This will promote pesticide-free habitat and pollinator friendly open spaces. Pollinator friendly herbicides may be used where grasslands are maintained for amenity purposes.

4.2.5 Detention basins and swales

Detention basins and swales will be maintained in accordance with the All-Ireland Pollinator Plan 2021-2025 evidence-based habitat management principles. These measures include:

- Reducing mowing management (e.g. once a year, or early spring and late summer cuts only with cuttings removed after mowing).
- Retaining wetland and marginal planting structures (e.g., reed/sedge strips at detention basin edges, tussocky habitat and vegetated swale margins) as pollinator habitat.
- Avoiding use of pesticides/herbicides on pollinator habitat and manage invasive/pernicious weeds through targeted control.
- Maintaining engineered hydrological function (sediment removal, inlet/outlet inspections) and scheduling of any major disturbance outside the flowering (April to September) and nesting season (March to July) where possible.

4.2.6 Invasive species

Within the boundary of the Proposed Development, one species (Spanish bluebell *Hyacinthoides hispanica*) is listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011; and on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. No 374 of 2024).

As a result, there is a legal requirement that treatment measures are prepared and enacted in advance of works commencing. Species-specific treatment (a combination of chemical and physical treatment) and disposal recommendations outlined below should be carried out by professionals that specialise in the control and removal of highly invasive plants.

- Chemical control: A suitable herbicide (e.g. glyphosate) can be applied as foliar spray, wipe applicator or spot treatment during the active growth period in late spring or summer.
- Physical control: remove small and scattered plants first and then target outer edges of larger infestations by digging. Best results for removal are achieved prior to seed when plants are fully grown and parent bulb exhausted.
- Disposal: Spanish Bluebell and their containing soil are classified as controlled waste. As a result, disposal off-site is the preferred option. It is a requirement to dispose of this material to a fully licenced wasted facility, capable of accepting such contaminated material. Where any infested material (soil containing Spanish Bluebell) is to be taken off site, a licence to transport the material will be required from the National Parks and Wildlife Service (NPWS). A suitable landfill, which is licensed to accept such material, should identified to dispose of the excavated material.

Following the removal of these species, ongoing due diligence will be required to prevent their re-occurrence. This due diligence will be required for both terrestrial and aquatic invasive species (noting the presence of swales and attenuation basins proposed as part of the Proposed Development) and will be undertaken by the management team for the site. Should any invasive species be identified, management and treatment options may be guided by a suitably qualified ecologist.

4.2.7 Bats

The management of bat boxes involves several key practices to ensure their effectiveness and the well-being of local bat populations. Management will include the following:

- To ensure optimum accommodation, bat boxes should be cleaned once or twice a year, or the bat droppings should be removed (excluding bat boxes which maintenance free e.g. open bottom). This will be undertaken by a licensed ecologist during the winter months once the ecologist has ensured the bat box is not occupied.

- For this first three years of the operational life of the Proposed Development, and on an annual basis - a licenced ecologist will carry out bat box management and 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. Management will be carried out 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 management and monitoring to be carried out is September/October. If not being used, the location of the bat box may be moved to a different location/aspect/height.
- Evidence or presence of nesting birds will be flagged and removed outside the bird nesting season. If a bird nest is found, a secondary bat roosting source must be erected to replace the bat roosting source lost.
- The results of the first three years of management will inform the need for and frequency of further monitoring of the bat boxes. The results will be reviewed by a suitably qualified ecologist and agreed with the relevant operating authority.
- Results will be detailed by the ecologist within a short report on an annual basis for this first three years of the operational life of the Proposed Development with any bat box failures identified and corrective actions outlined and implemented. Results will include any suggestions for amendments to the BMP.

4.2.8 Birds

Bird boxes require little maintenance and monitoring. However, nest boxes can typically get infested with parasites. It is advisable that at the end of each breeding season (i.e. from August onwards), that nest boxes 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.

4.2.9 Invertebrates and small mammals

4.2.9.1 Insect towers/hotels

Insect towers/hotels are maintenance free however, degraded towers/hotels may require replacing after 2-3 years.

4.2.9.2 Ecological signage

To ensure the maintenance of ecological signage, routine visual inspections will be carried out to ensure signage remains in optimal condition, reducing the need for premature replacements and/or repairs.

Appendix A: Bat Box Information Pack

Bat Conservation Trust

www.bats.org.uk

Bat Box Information Pack

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.


© Andrew Dumbleton

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.


©Hugh Clark

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

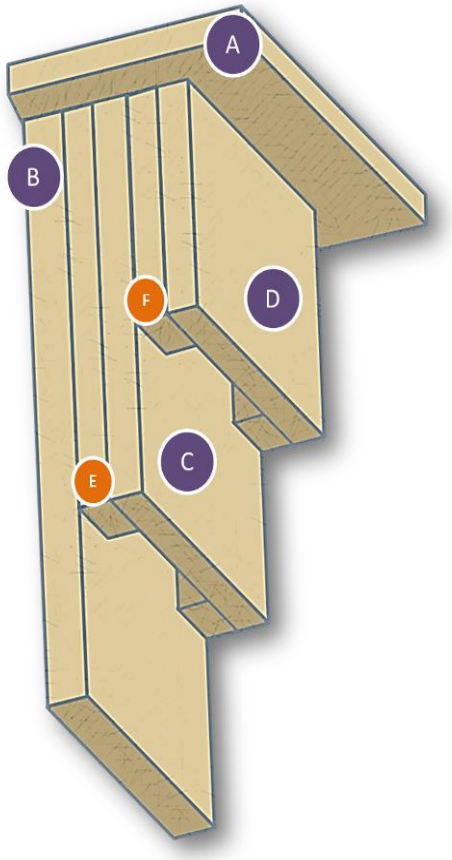
Mitchell-Jones, A.J (2004) Bat mitigation guidelines

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.