Javelin Park

Ecological Appraisal

On behalf of Urbaser Environmental Limited

MN2020031Av1

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Contents

1 Introduction

1.1 Scope

1.1.1. Wild Service was commissioned by Urbaser Environmental Ltd to undertake an Ecological Appraisal at Javelin Park, Bath Road, Haresfield, Stonehouse, GL10 3ET (hereafter referred to as the 'Site'). The survey was requested in order to provide an update on species likely to be using the Site and to inform further ecological enhancements.

1.1.2. The Ecological Appraisal comprised a Phase 1 habitat survey and protected species survey assessment.

1.1.3. This Ecological Appraisal is an update to the previous ecological surveys completed in 2010 (RPS, 2010a; RPS, 2010; RPS, 2010c) and in 2011 (Argus Ecology) for the development of an incinerator (Planning application 12/0008/STMAJW, Gloucestershire County Council). The previous surveys included a Phase 1 habitat survey, reptile surveys, great crested newt surveys, breeding bird surveys and bat transect surveys.

1.1.4. This report includes a description of methods used to identify habitats, results and recommendations for mitigation.

1.2 Site Description

1.2.1 The Site is located near Junction 12 of the M5, with the western boundary of the Site being approximately 75m east of the motorway. The land at the Site comprises mainly hardstanding, buildings and areas of ephemeral vegetation, a ditch, scattered trees and hedgerows which are mainly confined to the boundaries of the Site (Figure 1).

1.2.2 Large arable fields lie to the south and west of the Site, and there is arable land beyond the B4008 road to the east. To the north of the Site is a garden centre with a large car park.

1.2.3 The central Ordnance Survey Grid Reference for the Site is SO 79989 10418.

1.3 Legislation

1.3.1 This report has been prepared in accordance with relevant legislation and policy. Further detail is provided in Appendix 1, however the following primary documents are of relevance:

- The Wildlife and Countryside Act 1981 (as amended) (WCA 1981);
- The Countryside and Rights of Way Act 2000 (as amended) (CRoW Act 2000);
- The Natural Environment and Rural Communities Act 2006 (NERC Act 2006);
- The Conservation of Habitats and Species Regulations 2017 (as amended) (CHS Regs 2017); and
- The Protection of Badgers Act 1992 (PBA 1992).

1.3.2 No part of this report should be considered as legal advice and when dealing with individual cases, the client is advised to consult the full texts of the relevant legislation and obtain further legal advice.

2 Methods

2.1 Desk Study

2.1.1 The objectives of the desk study are to review the existing available information in order to identify the following:

- Statutory and non-statutory nature conservation sites within 1km of the Site;
- Records of protected species/notable species within 1km of the Site; and
- Records of bats within 2km of the Site.

2.1.2 Ecological data were provided by Gloucestershire Centre for Environmental Records (GCER).

2.2 Phase 1 Habitat and Protected Species Survey

2.2.1 The methods used for the Phase 1 habitat and protected species surveys are outlined in Table 1.

2.2.2 Michelle Newman of Wild Service undertook the appraisal on 7th December 2020.

2.3 Limitations and Constraints

2.3.1 While every attempt has been made to collect accurate baseline data, all ecological surveys represent a 'snapshot' of activity. Ecological features are dynamic and often transient, and it is not possible to confirm the absence of a species through survey. It may be necessary to update the ecological surveys if sufficient time elapses since the surveys and data collection presented in this report were carried out.

Table 1. Phase 1 Habitat and Protected Species Survey Methods	
Phase 1 habitat survey	The aim of the Phase 1 habitat survey is to provide a description of the semi-natural vegetation of a particular site and is made in accordance with the JNCC Phase 1 habitat survey methodology (JNCC, 2010). Where necessary, the condition of habitat is described, and full plant lists collated to provide greater detail, which helps when identifying the conservation significance of a particular habitat. The appraisal also aims to identify invasive plants listed on Schedule 9 of the Wildlife & Countryside Act that could have implications for works on site. Where appropriate, maps are provided in other formats, such as annotated aerial photographs.
Badgers	The site is assessed for suitable habitats that may support badgers *Meles meles*. Where relevant habitat occurs, evidence of badgers including setts, latrines, tracks, snuffle holes, padding or guard hairs is recorded.
Bats	The Site is assessed for suitable habitats, generally buildings and trees, that may support roosting bats. For example, buildings are assessed for holes in soffits, missing tiles and gaps in the masonry whilst trees are assessed for features such as cracks, holes, flaky bark and established ivy cover. Where possible the interior of buildings are also inspected for suitable roosting features and any evidence of bats in the form of bats, droppings, urine staining and feeding remains are noted. Potential roosting features are classed as negligible, low, moderate, or high potential in (Collins, 2016). The suitability of the habitats for foraging bats is also assessed.
Birds	The site is assessed for suitable habitats that may support birds in terms of feeding, nesting and roosting. Where relevant habitat occurs, evidence identifying the presence of birds including nests, droppings, pellets and feathers is recorded.
Dormice	The site is assessed for suitable habitats that may support dormice *Muscardinus avellanarius* including woodland and hedgerows. Where relevant habitat occurs evidence of dormice including nests and gnawed nuts is recorded.
Great crested newts	During the site visit the potential of the site to support great-crested newts *Triturus cristatus* is assessed; this includes looking for potential breeding sites such as ponds, disused swimming pools and other waterbodies. The appraisal also focuses on the potential for this species to find refuge in places such as log piles, rubble and compost heaps. Where still waterbodies occur a Habitat Suitability Index (HSI) is calculated. This is a standard appraisal method developed specifically to evaluate the habitat suitability for great crested newts (Oldham *et al*. 2000). A series of factors must be considered. Each factor is assessed along suitability guidelines and allocated a value of between 0.1 (highly unsuitable) to 1.0 (highly suitable). The geometric mean of these values provides an overall suitability value for the site. Although this is no substitute for a dedicated survey the suitability value informs the decision on whether to undertake a dedicated survey.
Otters	The area under appraisal is searched for suitable habitat along waterbodies, recording where appropriate, evidence pertaining to the presence of otters *Lutra lutra* in the form of holts, spraints, anal jelly, tracks and feeding remains.
Reptiles	The site is assessed for suitable habitats that may support reptiles including slow-worms *Anguis* fragilis, common lizards *Zootoca vivipara* grass snakes *Natrix natrix* and adder *Vipera berus*. Where relevant habitat occurs, evidence identifying the presence of reptiles, particularly tracks and sloughed skin is recorded.
Water voles	The area under appraisal is searched for suitable habitat along waterbodies, recording where appropriate, evidence pertaining to the presence of water voles *Arvicola amphibius* in the form of burrows, latrines, runs, footprints and distinctive “feeding lawns”.
White-clawed crayfish	The area under appraisal is searched for suitable habitats that may support white-clawed crayfish *Austropotamobius pallipes*. This typically includes freshwater streams and rivers but may also include still waterbodies.

3 Results

3.1 Desk Study

3.1.1. There are no statutory or non-statutory nature conservation sites within a 1km radius of the Site. There is an unconfirmed site within 1km of the Site i.e. a site with potential to be designated as a Local Wildlife Site (LWS); Great Russell's Ground. This site supports unimproved grassland, tall ruderal herbs, marsh and pond habitats.

3.1.2. The biological data search yielded records of several protected species within 1km of the Site, but none were specific to the Site. The data are summarised in Table 2.

3.2 Phase 1 Habitat and Protected Species Survey

3.2.1 The results of the Phase 1 habitat and protected species survey assessment are outlined in Tables 2 and 3. Reference should be made to the Site Plan presented in Figure 1, and photos in Appendix 2.

Table 2. Protected Species Survey Table

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
BADGERS	The boundary features such as hedgerows and scattered scrub provide some foraging habitat for badgers, though security fencing will provide a partial barrier to badger access.	A sett was recorded within 10m of the Site in 2010 (RPA, 2010a) and very little badger activity was recorded in 2011 (Argus, 2011a). No signs of badger were found in this updated survey in 2020 and no sightings were confirmed by on-Site staff.	Three badger records were returned from the desk study, the closest being approximately 600m from the Site.	Potentially present, commuting through the Site.	Badgers are offered full protection under the PBA 1992. **No further surveys required.** The newly planted vegetation is still establishing. Once established, the boundaries, in particular the south-eastern corner of the Site, will provide additional foraging opportunities for badgers which can access the Site, however the security fencing will prevent some access.
BATS	The boundary features on the eastern, southern and western boundaries provide foraging and commuting habitat for bats, and there is some connectivity to the wider network of hedgerows and trees.	No evidence of roosting bats was found; however bat boxes have been installed on the main building as part of the enhancements/mitigation for the initial development. No signs of bats were found around the bat boxes such as urine staining and droppings.	The desk study returned five species of bat within 2km of the Site comprising; common pipistrelle *Pipistrellus pipistrellus*, noctule *Nyctalus noctula,* brown long-eared bat *Plecotus auritus*, serotine *Eptesicus serotinus* and soprano pipistrelle *Pipistrellus pygmaeus.*	Likely to be present commuting and foraging through the Site.	Bats and their resting places are protected under the WCA 1981 and the CHS Regs 2017. **No further surveys required.** Once the new planting has established this will provide further foraging opportunities for bats. Additional bat boxes should be installed along the southern boundary and in the south-east corner of the Site to provide additional roosting opportunities (see Figure 1). These will be situated away from the majority of the disturbance occurring on Site including noise and light. Boxes are to be installed 3m from the ground and face a south-easterly to south-westerly direction. Examples can be found in Appendix 3. If repair or replacement of boxes is required, a suitably qualified ecologist should be consulted to carry out a check prior to any maintenance.

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
					It is recommended that no further lighting is installed, however if further lighting is required for the ongoing functioning of the Site this should be designed sensitively in order not to deter bats using the Site (see Section 4 Discussion for further details).
BIRDS	The trees, hedgerow and scattered scrub along the boundaries will provide suitable nesting and foraging habitat for birds.	Common species were recorded during the survey including blackbird *Turdus merula*, robin *Erithacus rubecula* and magpie *Pica pica*. Old nests were noted within some of the trees on the southern and eastern boundaries. A bird box was recorded on the southern boundary of the Site. As it was situated on the other side of the ditch, access could not be gained at the time of the survey to inspect the box for previous use.	The desk study returned 17 species within 1km of the Site and include barn owl *Tyto alba*, redwing *Turdus iliacus*, fieldfare *Turdus pilaris* and hobby *Falco subbuteo.*	Birds are likely to be nesting in the trees, hedgerow and scattered scrub.	All birds are protected under Section 1 of the WCA 1981. **No further surveys required.** It is therefore generally unlawful to intentionally kill or injure a bird, damage or destroy an occupied nest or take or destroy eggs other than in exceptional prescribed circumstances. Any pruning of trees or hedgerows should be undertaken outside of the nesting bird season (generally considered to be March to August inclusive) and where this is not possible, a suitably qualified ecologist should be engaged to check for nesting birds and to provide advice on the most appropriate way to proceed. Additional nest boxes (e.g. open-fronted nest boxes) should be installed along the boundaries to the east, south and west (see Figure 1). Ideally the nest boxes are to be installed a minimum of 2m-4m from the ground and facing a northerly to easterly direction. It is recommended that a selection of different types of boxes are installed along the boundaries to provide nesting opportunities for a variety of species. Examples can be found in Appendix 3. If boxes need repair or replacement, ideally these should be undertaken outside of the bird nesting season. If this is not practical, the box must be checked prior to maintenance by a suitably qualified ecologist. If nesting birds are present, the box cannot be disturbed until all young have fledged. If this

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
					is not practical for safety reasons, a suitably qualified ecologist is to be consulted for advice.
DORMICE	The boundary features provide sub-optimal habitat for dormice. The boundary features also lack connectivity to the wider landscape, which has limited features suitable for dormice such as woodland and mature hedgerows.	No evidence of dormice was found during the survey.	No records of dormice were returned from the desk study.	Unlikely to be present.	Dormice and their resting places are protected under the WCA 1981 and the CHS Regs 2017. **No further surveys required.** It is unlikely that dormice will be present on Site and in the local area. Enhancements will not be tailored to dormice, however any additional enhancements such as additional planting of local native species will benefit dormice if present.
GREAT CRESTED NEWTS (GCN)	There are ditches in the north-east section of the Site and on the southern and western boundaries. The north-eastern ditch was not assessed at the time of survey due to access restrictions. There is also a waterbody to the south-east of the main building and Sustainable Drainage Systems (SuDS) attenuation basins along the northern boundary. There have not been significant changes since the initial GCN surveys	No signs noted of any amphibians; however they are likely to be sheltering/hibernating.	Three GCN records and eight smooth newt records were returned from the desk study. The records are separated from the Site by arable fields and the B4008 road to the east, which are likely to represent significant barriers to GCN commuting to the Site.	The initial GCN surveys (RPS, 2010c) found the waterbodies on Site to be unsuitable for GCN. Further HSI assessments were not undertaken, however the increase of marginal and emerging vegetation taking place around the waterbodies will	GCN and their resting/breeding places are protected under the WCA 1981 and CHS Regs 2017. **No further surveys required.** To further enhance the Site for common amphibians, log/ brash piles or hibernacula (see Ecological Enhancements) are to be created in close proximity to the waterbodies on Site to provide further shelter and hibernation sites.

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
	(RPS, 2010c), however the planting scheme that was part of the initial development for the incinerator is becoming established and will provide opportunities for laying eggs for newts including GCN if present.			mean the Site is more suitable for common amphibians.	
OTTERS, WATER VOLES AND WHITE-CLAWED CRAYFISH	The banks of the ditches are suitable for burrow excavation by water voles, however the ditches are lacking sufficient shelter for water voles as the bankside vegetation is still establishing. It is unlikely that otters and water voles are using the waterbodies due to their isolated nature. The ditch is unsuitable for white-clawed crayfish due to the shallowness of the water and the lack of sheltering opportunities under rocks. The isolation of the Site will also reduce the	None. A gap has been created under the boundary fence in the north-west part of the Site to allow safe passage for any wildlife using the ditch as a commuting corridor.	No records for water voles, otters or white-clawed crayfish were returned.	Unlikely for otters, water voles and white-clawed crayfish to be present.	Otter, water voles and white-clawed crayfish are protected under the WCA 1981, and otters and their resting places are protected under the CHS Regs 2017. **No further surveys required.** The planting becoming established on the bankside of the ditches and other waterbodies will provide further foraging opportunities for water voles and will likely encourage prey for otters to the Site, if otters are present.

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
	likelihood of their presence.				
REPTILES	The majority of the Site is unsuitable for reptiles. If present, they will likely be within the boundary features, however currently there are limited foraging and basking areas. The surrounding area, being arable land, further reduces the likelihood of reptiles being present. There is more suitable habitat north of the Site and reptiles may be able to commute along the hedgerow on the western boundary. Once established, the new planting will provide further foraging and sheltering habitat.	None.	No records were returned from the desk study for reptiles.	Unlikely to be present in large populations. If present, they will be individuals or a small population.	Reptiles are protected under the WCA 1981. **No further surveys required.** To further enhance the Site for reptiles, log/ brash piles, or hibernacula (see Ecological Enhancements) recommended for GCN should also be used to provide further shelter for reptiles. Areas of basking should be created by keeping areas free of scrub/tall vegetation to prevent shading, however this will need to correspond with the Landscape and Ecological Management Plan (LEMP) (Urbaser, 2018).
HEDGEHOGS	The hedgerows, scattered scrub and ephemeral vegetation will provide suitable foraging and sheltering habitat for hedgehogs.	None.	One hedgehog record was returned from the desk study. The record was located 50m south-	Likely to be foraging and sheltering within the boundaries of the Site.	Hedgehogs are listed as a Species of Principal Importance under the NERC Act 2006. **No further surveys required.** Log piles can provide additional shelter for hedgehogs, however a hedgehog house should be constructed and placed within the south-east section of the Site (see Figure 1). An example can be found in Appendix 3.

Species	Habitats/features	Evidence	Data search	Likelihood of presence	Recommendations Further survey required? (Yes/No) / Avoidance / mitigation / enhancement measures
			east of the eastern boundary.		The initial Phase 1 habitat survey (RPS, 2010a) did not consider habitat for hedgehogs. The record returned from the desk study undertaken for this report was recorded in 2014, suggesting that potentially hedgehogs have increased in the area since the initial assessment in 2010, however this is not conclusive.
INVERTEBRATES	There are installations at the entrance of the building which are for decoration, however these are likely to act as a large insect hotel (see photos in Appendix 2), although no evidence of use was found. Once established, the new planting will provide additional habitat for invertebrates. The tall herb vegetation is likely to be attractive to a range of nectar-feeding invertebrates.	None.	The desk study returned records for garden tiger moth *Arctia caja* and *Squamapion vicinum*, which is a member of the weevil family.	Common species likely to be present within the boundaries of the Site.	A small constructed insect hotel (see Appendix 3) should be installed within the south-east corner or the southern boundary of the Site (see Figure 1). This will provide further opportunities for invertebrates. An example can be found in Appendix 3.

Table 3. Phase 1 Habitat Survey Results

Habitat/Feature	Description	NERC[1] habitat (Y/N)	Recommendations Avoidance / mitigation / enhancement measures
DITCH, EPHEMERAL VEGETATION, TREE BOUNDARY, HEDGEROW	Since the initial surveys conducted in 2010/2011 new planting has taken place, including a variety of trees around the boundaries of the Site to provide additional wildlife corridors. For species information see the LEMP (Urbaser, 2018). The new planting is establishing well and is being maintained. Aside from the new planting there are no significant changes to the soft landscaping and ditches.	Y (hedgerow)	The maintenance of the soft landscaping should strictly adhere to the LEMP (Urbaser, 2018). There is an area west of the main building which was planted with Erman's Birch *Betula ermanii.* Two have broken under the wind as this area acts as a small wind tunnel. More robust trees should be planted as replacements, such as field maple *Acer campestre,* small-leaved lime *Tilia cordata*, common alder *Alnus glutinosa* or whitebeam *Sorbus aria*. Alternatively, a wind break such as an artificial screen, can be erected around this small area to allow the Erman's birch saplings to establish.

[1] 'Habitats of Principal Importance' under Section 41 of the NERC Act 2006.

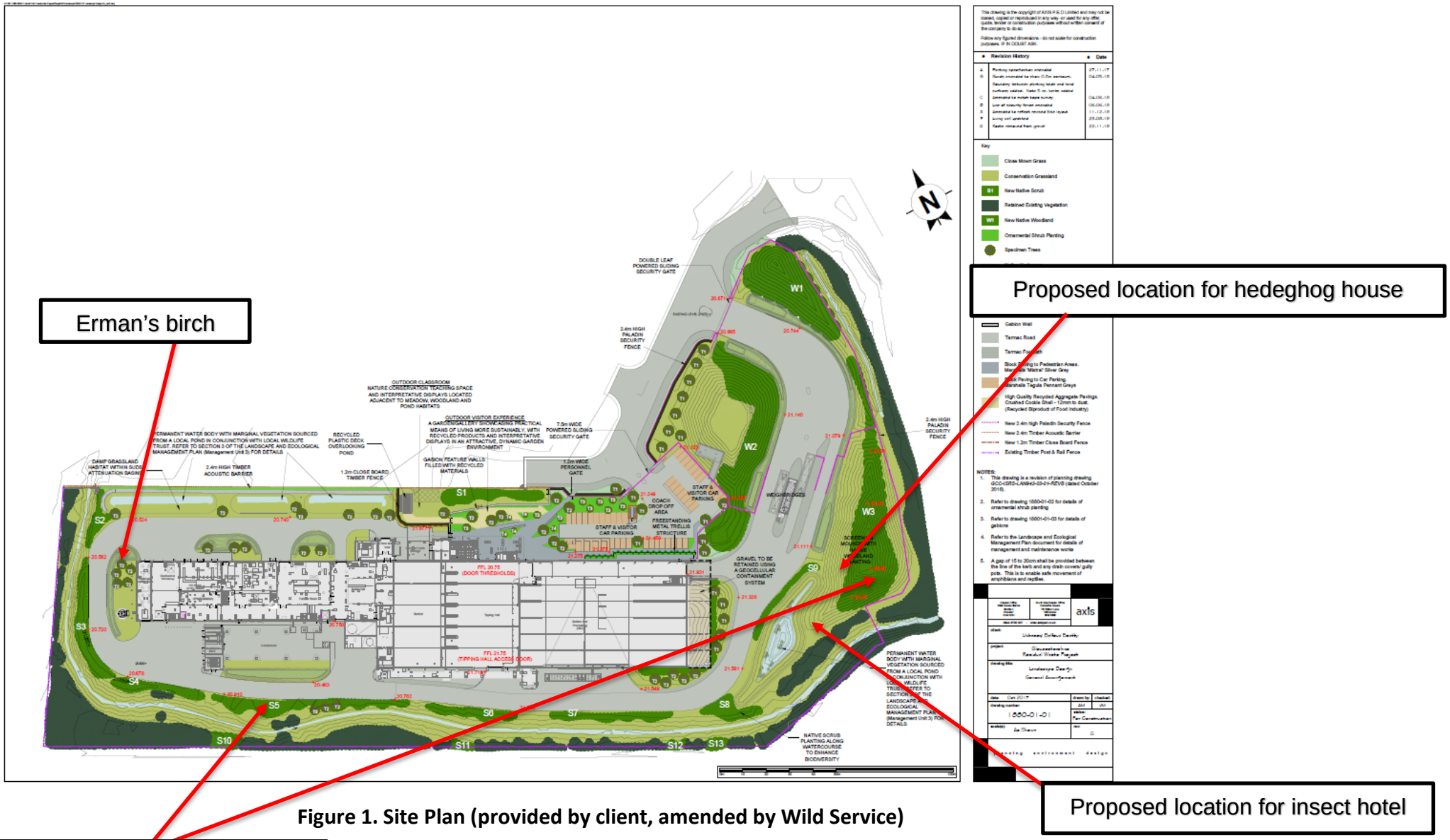

Figure 1. Site Plan (provided by client, amended by Wild Service)

4 Discussion

4.1 Habitats

4.1.1 There are currently no proposed further developments for the Site. This survey, undertaken in 2020, found that the new planting is establishing well. Management of the Site is to adhere to the management detailed within the LEMP (Urbaser, 2018).

4.2 Protected Species

4.3 The protected species and their mitigation that need consideration in relation to this development are mentioned below.

4.4 Badgers

4.4.1 The newly planted vegetation is still establishing. Once established the boundaries, in particular the south-eastern corner of the Site, will provide additional foraging opportunities for badgers which can access the Site, however the security fencing will prevent some access.

4.5 Bats

4.5.1 Once the new planting has established this will provide further foraging opportunities for bats. Additional bat boxes should be installed along the southern boundary and in the south-east corner to provide additional roosting opportunities. These will be situated away from the majority of the disturbance occurring on Site including noise and light. Boxes are to be installed 3m from the ground and face a south-easterly to south-westerly direction. Examples can be found in Appendix 3.

4.5.2 If repair or replacement of boxes is required a suitably qualified ecologist should be consulted to carry out a check prior to any maintenance.

4.5.3 It is recommended that no further lighting is installed, however if further lighting is required for the ongoing functioning of the Site this should be designed sensitively in order not to deter bats using the Site and avoid light spill onto boundary habitats. The lighting recommendations below are in in accordance with best practice, as outlined in Bats and Lighting in the UK (Stone, 2013). This includes:

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin or >550nm) should be adopted to reduce blue light component, as redder light is preferable for bats.
- <0.2 lux on horizontal plane good, hedgerow lighting natural tends to be <1lux.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Blue/white light should be avoided, or if mercury lamps are installed, these should be fitted with UV filters.
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it below horizontal plane.
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered.
- Column heights should be carefully considered to minimise light spill.
- Reducing the height of light units to keep the light as close to the ground as possible and reduce the volume of illuminated space.
- Only luminaires with an upward light ratio of 0% should be used.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt. Ideally the angle of the luminaire should be less than 70 degrees to avoid upward light spill.
- Any external security lighting should be set on people-activated motion-sensors and short (1min) timers.

4.6 Birds

4.6.1 Any pruning of trees or hedgerows should be undertaken outside of the nesting bird season (generally considered to be March to August inclusive) and where this is not possible, a suitably qualified ecologist should be engaged to check for nesting birds and to provide advice on the most appropriate way to proceed.

4.6.2 Additional nest boxes (e.g. open fronted nest boxes) should be installed along the boundaries to the east, south and west. Ideally the nest boxes are to be installed a minimum of 2m-4m from the ground and facing a northerly to easterly direction. It is recommended that a selection of different types of boxes are installed along the boundaries to provide nesting opportunities for a variety of species. Examples can be found in Appendix 3.

4.6.3 If boxes need repair or replacement, ideally these should be undertaken outside of bird nesting season and if this is not practical the box must be checked prior to maintenance by a suitably qualified ecologist. If nesting birds are present, the box cannot be disturbed until all young have fledged. If this is not practical for safety reasons, a suitably qualified ecologist is to be consulted for advice.

4.7 GCN

4.7.1 There have not been significant changes since the initial GCN surveys (RPS, 2010c), however the planting scheme that was part of the initial development for the incinerator is becoming established and will provide opportunities for laying eggs for newts including GCN if present.

4.7.2 To further enhance the Site for common amphibians, log/ brash piles or hibernacula (see Ecological Enhancements) are to be created in close proximity to the waterbodies to provide further shelter and hibernation sites.

4.8 Otter, Water Vole and White-clawed Crayfish

4.8.1 It is unlikely that otters and water voles are using the waterbodies on Site due to the isolated nature of these features.

4.8.2 The planting becoming established on the bankside of the ditches and other waterbodies will provide further foraging opportunities for water voles and will likely encourage prey for otters to the Site, if otters are present.

4.9 Reptiles

4.9.1 The majority of the Site is unsuitable for reptiles. If present, they will likely be within the boundary features, however currently there are limited foraging and basking areas. Once established, the new planting will provide further foraging and sheltering habitat.

4.9.2 To further enhance the Site for reptiles, log/ brash piles or hibernacula (See Ecological Enhancements) recommended for GCN should also be used to provide further shelter.

4.9.3 Areas of basking should be created by keeping areas free of scrub/tall vegetation to prevent shading, however this will need to correspond with the LEMP (Urbaser, 2018).

4.10 Hedgehogs

4.10.1 The hedgerows, scattered scrub and ephemeral vegetation provide suitable foraging and sheltering habitat for hedgehogs.

4.10.2 Log piles can provide additional shelter for hedgehogs, however a hedgehog house should be constructed and placed within the south-east section of the Site. An example can be found in Appendix 3.

4.11 Invertebrates

4.11.1 Once established, the new planting will provide additional habitat for invertebrates. The tall herb vegetation is likely to be attractive to a range of nectar-feeding invertebrates.

4.11.2 A small constructed insect hotel (see Appendix 3) should be installed within the south-east corner or the southern boundary of the Site. This will provide further opportunities for invertebrates. An example can be found in Appendix 3.

4.12 General Protected Species

4.12.1 There appear to be no other obvious and immediate issues with regard to any other species protected under the WCA 1981 and the CHS Regs 2017, and no further dedicated surveys for any other species are recommended.

4.13 General Recommendations

4.13.1 The ecological value of the Site can be enhanced through planting native species and/or those of value to wildlife, i.e. those producing fruits, seeds, nuts or single-flowers. Leaving patches of unmown grass and tall herb, as well as creating compost heaps/log piles, creates valuable wildlife habitat, particularly for invertebrates, reptiles, amphibians and small mammals including hedgehogs[2]. The Site can be made more permeable to wildlife, such as hedgehogs, through leaving small gaps of 13x13cm under fences. Ideally only pesticides branded as 'wildlife friendly' should be used. Wildlife planting tips and advice can be found here: https://www.gloucestershirewildlifetrust.co.uk/wildlife/wildlife-gardening. Further information is provided in Appendix 3.

[2] The State of Britain's Hedgehogs 2015, publicised at a special UK summit on hedgehogs: since 2000, records of the species have declined by half in rural areas and by a third in urban ones. Hedgehogs are also a 'Species of Principal Importance' under Section 41 of the NERC Act 2006 and therefore need to be taken into consideration by a public body when performing any of its functions with a view to conservation.

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Appendix 1: Policy and Legal Considerations

Statutory nature conservation sites and protected species are a 'material consideration' in the UK planning process (DCLG, March 2012). Where planning permission is not required, for example on proposals for external repair to structures, consideration of protected species remains necessary given their protection under UK law.

The **Conservation of Habitats and Species Regulations 2017** transpose the requirements of European Directives such as the Habitats Directive and Birds Directive[3] into UK law, enabling the designation of protected sites and species at a European level.

The **Wildlife and Countryside Act 1981** (as amended) forms the key piece of UK legislation relating to the protection of habitats and species. The **Countryside and Rights of Way Act 2000** provides additional support to the 1981 Act, for example, increasing the protection of certain reptile species. Specific protection for badger is provided by the **Protection of Badger Act 1992**. The **Wild Mammals (Protection) Act 1996** sets out the welfare framework with respect to wild mammals prohibiting a range of activities which may cause unnecessary suffering.

The Government has a duty to ensure that parties take reasonable practicable steps to further the conservation of habitats and species of Principal Importance for Conservation in England listed under Section 41 of the **Natural Environment and Rural Communities Bill 2006**[4]. In addition, the 2006 Act places a Biodiversity Duty on public authorities who 'must, in exercising [their] functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity' (Section 40 (1)). Criteria for selection of priority habitats and species include, for example, international threat (such that species may be protected in their strong holds) and marked national decline.

The **National Planning Policy Framework 2019** states that the planning system should minimise impacts on biodiversity, providing net gains in biodiversity, wherever possible. Section 15 states that when determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons[5] and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

[3]Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, and Council Directive 79/409/EEC on the Conservation of Wild Birds, respectively.

[4]**The NERC Act** refers to "*species of principle importance for the conservation of biodiversity*", which translates to BAP habitats and species occurring in England.

[5] For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.

Appendix 2: Photographs

No	Photo	Description
1		Entrance to main building which could support invertebrates.
2		Bat box installed on main building.
3		Waterbody in south-east area.

No	Photo	Description
4		Southern boundary ditch.
5		Erman's birch, adjacent to western elevation of main building.
6		Western boundary ditch.
7		Gap under fence in north-west corner of Site over ditch.

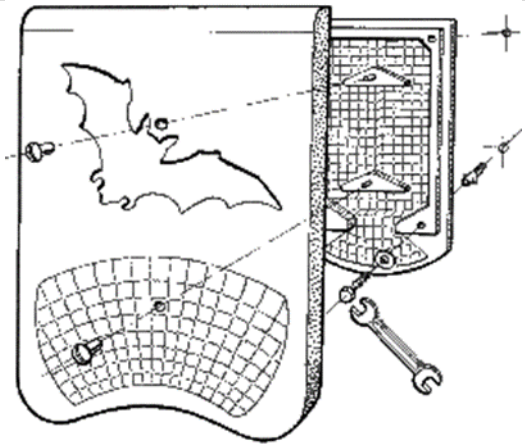
No	Photo	Description
8		SuDS along the northern boundary.

Appendix 3: Ecological Enhancements

BAT ROOSTING FEATURES

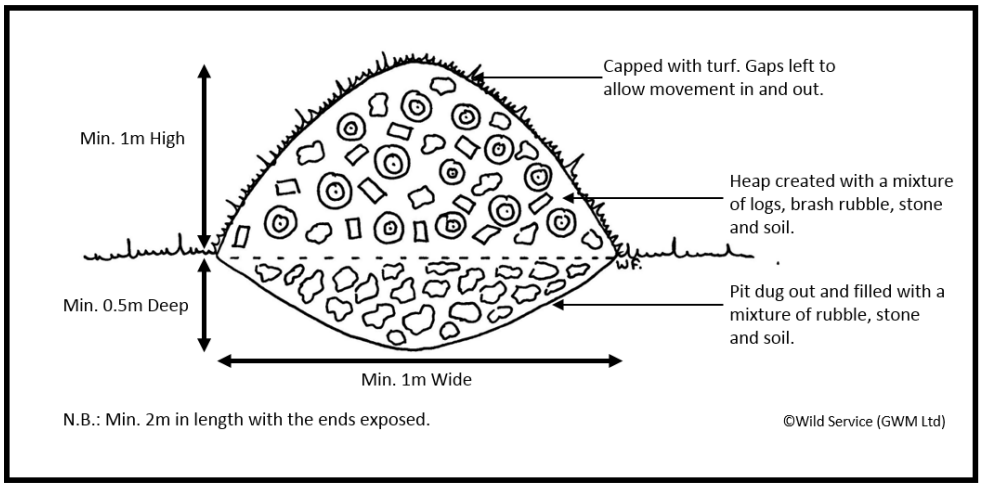
Schwegler 1FF bat box

Schwegler 1WQ Summer and Winter bat box

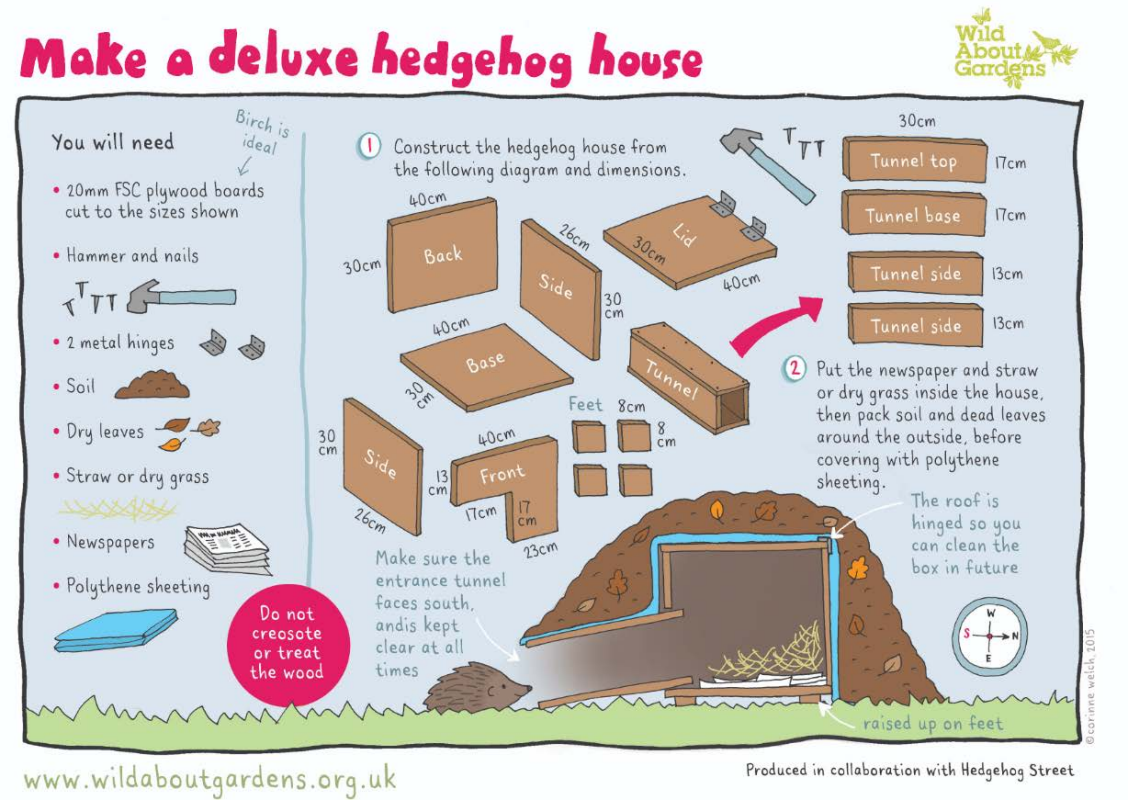


Schwegler 2FN bat box for installation in trees

REPTILE and AMPHIBIAN HIBERNACULUM



HEDGEHOG HOUSE



INSECT HOTEL

BIRD BOXES

Two designs of swift boxes

House sparrow terrace box

Swallow cup

Hole-fronted bird box (for trees)

Open-fronted bird box (for trees)

House martin terrace box

Planting for Wildlife

Many wildlife species benefit greatly from considerate planting choices that still meet our practical and aesthetic needs. Plants and trees provide food for wildlife as well as places to nest and rest. Vegetation providing a variety of these functions creates an environment more beneficial for wildlife.

Non native species

Native species provide the best habitat for UK wildlife but there are also many non-native species, which are single flowering and/or provide fruits/nuts/seeds that can be used as food sources for insects, birds and small mammals. When using these non-native species in planting schemes, care should be taken to avoid invasive species such as Cotoneaster and Rhododendron. This is especially important when sites are adjacent to open countryside particularly nature reserves.


Butterfly bush

Uses of Wildlife Planting

Wildlife value can be easily incorporated into visually pleasing and useful green areas and amenity spaces, such as borders, grass verges and tree screens.

Attractive Borders: Well selected decorative borders can be valuable for many insects and birds. Native plants can be mixed with single flowering ornamental species to add aesthetic interest and increase the flowering period of a planting scheme.

Shrubs and hedges: Native spiky species like blackthorn and hawthorn are effective barriers when used in hedges. They also provide an attractive feature at all times of year especially when in blossom and fruit. Bushy areas of foliage provide useful nesting and feeding areas for birds and small mammals, as well as foraging/commuting corridors for bats.

Grasses mixes and verges: Leaving uncut areas of suitable grasses provides great wildlife value and is economical to manage. Diverse grassy areas and verges also create an attractive human environment with different flowers and colours. There are a range of native grass and flower mixes for various soil types available on the market.


Wild flower grass mix

Wild Service

Selecting Suitable Species

There are wildlife friendly species suitable for all situations, from fields, verges, shady corners or small gardens. Listed below are native wildlife friendly plant species organised by type and suitability for different locations.

Large Trees

Ash *Fraxinus excelsior*
Beech *Fagus sylvatica*
English Elm *Ulmus procera*
Oak *Quercus robur* or *Q. petraea*
Small-leaved lime *Tilia cordata*
White willow *Salix alba*
Wild cherry *Prunus avium*


White willow

Medium/small trees

Alder *Alnus glutinosa*
Aspen *Populus tremula*
Crab apple *Malus sylvestris*
Field maple *Acer campestre*
Holly *Ilex aquifolium*
Rowan *Sorbus aucuparia*
Silver birch *Betula pendula*
Yew *Taxus baccata*


Tussocky grassland

Native shrubs

Blackthorn *Prunus spinosa*
Dogwood *Cornus sanguinea*
Elder *Sambucus nigra*
Guelder rose *Viburnum opulus*
Hawthorn *Crataegus monogyna*
Hazel *Corylus avellana*


Blackthorn

Plants for shady areas

Archangel *Lamiastrum galeobdolon*
Betony *Stachys officinalis*
Bluebell *Hyacinthoides non-scriptus*
Bugle *Ajuga reptans*
Foxglove *Digitalis purpurea*
Ground ivy *Glechoma hederacea*
Lily of the valley *Convallaria majalis*
Lords-and ladies/cuckoopint *Arum maculatum*
Nettle-leaved bellflower *Campanula trachelium*
Primrose *Primula vulgaris*
Sweet violet *Viola odorata*
Wild daffodil *Narcissus pseudonarcissus*

Plants for marshy areas & pond edges

Bugle *Ajuga reptans*
Hemp agrimony *Eupatorium cannabinum*
Marsh marigold *Caltha palustris*
Marsh woundwort *Stachys palustris*
Meadowsweet *Filipendula ulmaria*
Purple loosestrife *Lythrum salicaria*
Ragged robin *Lychnis flos-cuculi*
Water avens *Geum rivale*
Water forget-me-not *Myosotis scorpoides*
Water mint *Mentha aquatica*
Water violet *Hottonia palustris*
Yellow flag *Iris pseudacorus*

Beneficial cultivated plants
(generally non-natives)

Grecian windflower *Anemone blanda*
Angelica *Angelica archangelica*
Aubretia *Aubretia deltoidea*
California poppy *Eschscholtzia californica*
Candytuft *Iberis sempervirens*
Christmas rose *Helleborus niger*
Cosmos *Cosmos bipinnatus*
Evening primrose *Oenothera biennis*
Fleabane *Erigeron spp.*
Forget-me-not *Myosotis spp.*
French marigold *Tagetes patula*
Globe thistle *Echinops ritro*
Grape hyacinth *Muscari botryodes*
Hollyhock *Althaea rosea*
Honesty *Lunaria rediviva*
Ice plant *Sedum spectabile*
Lenten rose *Helleborus orientalis*
Tree mallow *Lavatera spp.*
Michaelmas daisy *Aster nova-belgii*
Mint *Mentha x rotundifolia*
Perennial cornflower *Centaurea montana*
Perennial sunflower *Helianthus decapetalus*
Phlox *Phlox paniculata*
Poached-egg plant *Limnanthes douglasii*
Red valerian *Centranthus ruber*
Snapdragon *Antirrhinum majus*
Spring crocus *Crocus chrysanthus* and hybrids
Sweet alyssum *Lobularia maritima*
Sweet bergamot *Monarda didyma*
Sweet William *Dianthus barbatus*
Tobacco plant *Nicotiana affinis*
Wallflower *Cheiranthus cheiri*
Alpine rock-cress *Arabis alpina*
Winter aconite *Eranthis hyemalis*
Yellow alyssum *Alyssum saxatile*

Native wildflowers for borders

Agrimony *Agrimonia eupatoria*
Betony *Stachys officinalis*
Bluebell *Hyacinthoides non-scriptus*
Chicory *Cichorium intybus*
Chives *Allium schoenoprasum*
Common poppy *Papaver rhoeas*
Corncockle *Agrostemma githago*
Cornflower *Centaurea cyanus*
Corn marigold *Chrysanthemum segetum*
Cowslip *Primula veris*
Cuckooflower *Cardamine pratensis*
Dame's-violet *Hesperis matronalis*
Devil's-bit scabious *Succisa pratensis*
Field scabious *Knautia arvensis*
Foxglove *Digitalis purpurea*
Goldenrod *Solidago virgaurea*
Great mullein *Verbascum thapsus*
Greater knapweed *Centaurea scabiosa*
Harebell *Campanula rotundifolia*
Herb-robert *Geranium robertianum*
Lady's bedstraw *Galium verum*
Marjoram *Origanum vulgare*
Meadow cranesbill *Geranium pratense*
Common mallow *Malva sylvestris*
Oxeye daisy *Leucanthemum vulgare*
Primrose *Primula vulgaris*
Red campion *Silene dioica*
Snowdrop *Galanthus nivalis*
Spiked speedwell *Veronica spicata*
Tansy *Tanacetum vulgare*
Teasel *Dipsacus fullonum*
Toadflax *Linaria vulgaris*
White campion *Silene alba*
Wild thyme *Thymus drucei*
Yellow loosestrife *Lysimachia vulgaris*


Marjoram


Cornflower


Perennial sunflower

Appendix 4: Ecological Experience

Michelle Newman: Ecologist, BSc (Hons)

Michelle has worked in ecological consultancy for several years and has also volunteered for a number of nature conservation organisations over the years. She is experienced in undertaking Phase 1 habitat surveys and protected species surveys including those for bats, birds, otters, water voles, badgers, great crested newts and reptiles (including adder handling experience). She has also undertaken a variety of invertebrate surveys, specialising in bumble bee surveys. She holds a CSCS card and has worked as an Ecological Clerk of Works (ECoW) on a wide variety of sites. Michelle has prepared preliminary ecological appraisals and protected species reports for a range of projects. In addition to project delivery, she is also involved with the management of Wild Service projects and advises clients on the ecological aspects of the planning process. She is experienced in analysing bat call data using a variety of software packages. She is currently working towards personal Natural England licences for great crested newts, bats and white-clawed crayfish.

Elizabeth Pimley: Principal Ecologist/Head of Ecology, BSc (Hons) PhD CEnv MCIEEM

Elizabeth has worked in both the academic and consultancy ecology sectors since 2000 with a focus on mammalian ecology, particularly badgers, dormice, bats, water voles and otters. Elizabeth manages the consultancy as well as being involved in project delivery. She has managed ecological projects, ranging in size and type, both in the UK and abroad. She regularly advises clients on the planning process in relation to ecology. Elizabeth has expertise in a wide variety of ecological survey techniques including Preliminary Ecological Appraisals/Phase 1 habitat assessments and a variety of protected species surveys (e.g. the aforementioned mammal species as well as reptiles and great crested newts).

Elizabeth also devises ecological mitigation schemes, both as part of protected species mitigation licences (e.g. bats, great crested newts, badgers, dormice) and for projects not

requiring licensing (e.g. reptiles). She has produced a wide variety of preliminary ecological appraisals, BREEAM/CSH Ecology Assessments, mitigation licences for protected species (including Bat Mitigation Class Licences), Ecological Impact Assessments (EcIA), Construction Ecological Management Plans, Habitat Regulations Assessments, Biodiversity Enhancement Schemes and Ecological Design Strategies, as well as writing for scientific journals, books and magazines.

Elizabeth offers a scientific approach to projects with additional skills in radiotracking, bat call analysis, statistical analysis, home range and compositional habitat analysis and Geographical Information Systems (GIS) mapping. Elizabeth holds Natural England and Natural Resources Wales licences for bats and dormice, as well as Natural England licences for great crested newts and water voles. She is also a Registered Consultant of the Bat Mitigation Class Licence (BMCL) and holds a CSCS card.

Benjamin Goodger: Principal Ecologist, MA (Oxon) MSc CEnv MCIEEM

Ben has 20 years' experience as a professional ecologist, five in nature conservation and 15 in consultancy. As a consultant he has worked on a wide range of development projects at sites across the UK. These have ranged from housing and employment developments, land reclamation projects, road schemes and major infrastructure projects. He has undertaken numerous site assessments, using information obtained from habitat and protected species surveys and desk-based studies. He is particularly skilled in EcIA and the design of mitigation solutions, and has written ecology chapters for a number of ESs. He has also undertaken several HRAs. Ben is a skilled botanist and has undertaken many plant and habitat surveys in his career, including Phase 1 habitat surveys, National Vegetation Classification (NVC) surveys and targeted plant surveys.