	ground flora along the hedgerow.		
Ensure fencing does not inhibit the movement of wildlife	To allow movement of badgers, small mammals and herptiles across the Proposed Development area the fence will be above ground level, with at least a 10cm gap at the base, allowing access for these species where required.	Year 1 (during construction phase)	Although badgers will not pass through a 10cm gap, they will dig a depression into the ground at the required areas.
Creating a diversity of habitats within the site	<u>Creation of hibernaculum, stone piles and log piles</u>	Year 1	See Appendix A The hibernaculum comprise log, rock and stone piles, which are aimed at providing shelter for herptile species to hibernate. However, the hibernaculum and log pile may also be used by a variety of insects and small mammals.
Creating a diversity of habitats within the site	<u>Creation of bat roosting habitat</u> Bat boxes will be placed on a few of the mature trees within the site.	Year 1	The creation of roosting habitat, along with the creation of species-rich habitat that will encourage an abundance of invertebrate life (a potential food source) will be beneficial to local bats.
Creating a diversity of habitats within the site	<u>Creation of bird nesting habitat</u> Bird boxes will be placed on a few of the mature trees within the site.	Year 1	The creation of nesting habitat, along with the creation of species rich habitat that will encourage an abundance of invertebrate life (a potential food source) and the wild bird seed mix areas will be beneficial to local birds.

			Boxes installed should include a mixture of single hole, and open fronted bird boxes.
Creating a diversity of habitats within the site	<u>Creation of invertebrate banks and insect hotels</u> Several earth banks shall be created across the site to support invertebrates.	Year 1	See Appendix B Some banks should be left bare, and south facing for insects such as solitary bees, while others should be sown with grass for beetles etc.
Maintaining the hedgerows	<u>Section of hedgerow to be cut</u>	Each year between January and February	Cutting on a rotational basis, following standard advice[7], to ensure the optimal availability of berry and blossom for wildlife throughout the year, as a potential food source. Management will also ensure a good base is maintained within the hedgerow, to provide suitable habitat for a range of wildlife.

HABITAT CREATION

1.64. The existing groundcover (currently primarily amenity grassland) will be replaced by a mix of wetland meadow mix, wildflower meadow mix, native woodland and native hedgerow. Existing hedgerows will be enhanced, with new hedgerow created within the Proposed Development boundary. Native coniferous trees and medium or large deciduous trees have been proposed to give visual screening. A riparian planting mix has been proposed to be planted along the banks of the Baldonnel stream, southwest of the Application Site.

1.65. These habitats will be in place and managed for the duration of the Proposed Development.

[7] Hedgelink UK, The Complete Hedge Good Management Guide, Available at www.hedgelink.org.uk

Riparian Planting

1.66. A riparian planting mix (**Table 1-2**) has been proposed to be planted along the banks of the Baldonnel stream, southwest of the Application Site.

1.67. They are an important source of food and shelter for aquatic species and support many terrestrial organisms, including bats and a wide range of bird species.

Table 1-2: Native Riparian Planting Mix

SCIENTIFIC NAME	ENGLISH NAME
Apium nodiflorum	Fool's watercress
Caltha paulaustris	Marsh-marigold
Iris pseudacorus	Yellow iris
Myosotis scorioides	Water forget-me-not
Myriophyllum spicatum	Watermilfoil
Sparganium spp.	Bur-reed
Luzula nivea	Snow rush
Polystichum setiferum	Soft shield fern
Dryopteris filix-mas	Common fern

Management

1.68. Within the first year the main aim is to control weeds and to reduce competition from grasses. Where appropriate, this may include hand pulling of weeds.

1.69. After the wildflower mix has established, no specific management is required for the riparian strip

Wetland Wildflower Meadow

1.70. A wetland wildflower meadow has been proposed to be planted west of the proposed development footprint near the banks of a proposed attenuation area. These species will attract a wider range of species and create a diverse habitat which benefits invertebrates, bats, amphibians, and birds.

1.71. The species mixture is set out in **Table 1-2** below.

Table 2-2: Wetland wildflower meadow mix

SCIENTIFIC NAME	ENGLISH NAME
Succisa pratensis	Devils Bit Scabious
Rumex acetosa	Common Sorrel
Cardamine pratensis	Cuckoo Flower
Primula veris	Cowslip
Erigeron	Fleabane*
Lotus pedunculatus	Greater Trefoil*
Eupatorium cannabinum	Hemp Agrimony
Centaurea nigra	Lesser Knapweed
Comarum palustre	Marsh Cinquefoil
Caltha palustris	Marsh Marigold
Ranunculus acris	Meadow Buttercup
Filipendula ulmaria	Meadowsweet
Thalictrum	Meadow Rue
Leucanthemum vulgare	Oxeye Daisy
Lythrum salicaria	Purple Loosestrife
Lychnis flos-cuculi	Ragged Robin
Trifolium pratense	Red Clover

Wildflower Meadow

1.72. The wildflower meadow, as shown within the landscape masterplan (by KFLA Architects) accompanying the application, is a species-rich grassland comprised of 85% grass species and 15% perennial species. This will create an insect-rich habitat and support a range of birds, mammals and invertebrates.

1.73. The species mixture is set out in **Table 1-3** below.

Table 1-3: Wildflower meadow mix

SCIENTIFIC NAME	ENGLISH NAME
Lotus Corniculatus	Birdsfoot Trefoil
Hypochaeris Radicata	Common Cat's Ear
Primula Veris	Cowslip
Knautia Arvensis	Field Scabious
Galium Verum	Lady's Bedstraw
Centaurea Nigra	Lesser knapweed
Ranunculus Acris	Meadow Buttercup
Lathyrus pratensis	Meadow Vetchling
Malva Moschata	Musk Mallow
Leucanthemum Vulgare	Ox Eye Daisy
Lychnis Flos Cuculi	Ragged Robin

Silene Dioica	Red Campion
Planatago Lanceolata	Ribwort Plantain
Leontodon hispidus	Rough Hawkbit
Leontodon hispidus	Rough Hawkbit
Sanguisorba Minor	Salad Burnet
Prunella Vulgaris	Self Heal
Scabiosa columbaria	Small Scabious
Rumex Acetosa	Common Sorrel
Silene Alba	White Campion
Daucus carota	Wild Carrot
Torilis Japonica	Upright Hedge Parsley
Achillea millefolium	Yarrow
Rhinanathus Minor	Yellow Rattle
Salvia Verbenaca	Wild Clary
Agrostis capillaris	Browntop Bent
Cynosurus cristatus	Crested Dogstail
Festuca ovina	Sheeps Fescue
Festuca rubra subsp. Commutate	Chewings Fescue
Festuca Rubra Litoralis	Slender Creeping Red Fescue
Trisetum flavescens	Yellow Oat Grass
Anthoxanthum odoratum	Sweet Vernal Grass

Management

1.74. The wildflower mix will be sown in September or March/April, after the completion of the construction phase.

1.75. Within the first year the main aim is to control weeds and to reduce competition from grasses. The sward will be kept short in the first year until the end of June to reduce competition and then allowed to grow in July and August to permit any wildflowers to seed. All cuttings should be removed from site several days after cutting to avoid smothering the sward, but allowing any seeds to disperse.

1.76. After the wildflower mix has established, this area should only require one cutting in late summer (August – September), allowing flowering species to seed with an additional cut in October. Cuttings should be left on site for several days to disperse any seeds, then removed from site.

Hedgerow

1.77. Existing hedgerow boundaries will be enhanced in line with the arborist report. Native species hedgerow will also be created.

1.78. Enhancement and creation of native hedgerows will benefit a range of local species including BAP Priority Species such as badgers, herptiles, invertebrates and birds. If the correct species are planted and maintained correctly, a hedgerow's potential can be maximised, providing food and shelter throughout the year, as well as connecting corridors.

Table 1-4: Hedgerow Species Mix

SCIENTIFIC NAME	ENGLISH NAME
Crataegus monogyna	Common hawthorn
Corylus avellana	Hazel
Euonymus europaeus	European Spindleberry
Ilex aquifolium	Holly
Loinicera perclymenum	Common Honeysuckle
Prunus spinosa	Blackthorn
Rosa canina	Dog rose
Viburnum opulus	Guelder rose

1.79. It is also important to plant and maintain ground flora along the hedgerow to provide suitable commuting corridors for small mammals and herptiles.

Management

1.80. New hedgerows will be planted within the first available planting season (November – March).

1.81. Any pruning or cutting should be done outside of the breeding bird season (March to August inclusive) to minimise disturbance to nesting birds.

Native woodland/tree planting

1.82. Triple staggered rows of native trees have been proposed to screen the Proposed Development from the surrounding area, the mix of trees proposed can be seen in **Table 1-5**. A woodland planting mix (**Table 1-6**) has been proposed to enhance habitats around the perimeter and throughout the site. A tree planting mix

1.83. Planting trees will provide potential new habitat for roosting bats and birds, providing food and shelter for other BAP Priority Species.

Table 1-5: Tree planting mix

SCIENTIFIC NAME	ENGLISH NAME
Alnus glutinosa	Alder
Betula pendula	Silver birch
Corylus avellana	Hazel

Pinus sylvestris	Scots pine
Quercus petraea	Sessile Oak

1.84. Native woodland planting is proposed around the perimeter and throughout the site to create a biodiverse native habitat as shown within the landscape masterplan (by KFLA Architects).

Table 1-6: Woodland planting mix

SCIENTIFIC NAME	ENGLISH NAME
Alnus glutinosa	Alder
Betula pendula	Silver birch
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Ilex aquifolium	Holly
Larix decidua	Larch
Pinus sylvestris	Scots pine
Prunus padus	Bird Cherry
Prunus avium	Wild cherry
Quercus petraea	Sessile Oak

Wildlife Shelters

1.85. The creation of wildlife shelters strategically placed throughout the Application Site, will provide shelter to a wide range of species.

Bat boxes

1.86. Providing bat boxes will increase opportunities for roosting bats within the local area. Bat boxes should be erected in suitable locations throughout the site. It can however take bats a long time to make use of artificial roosts, therefore a number of factors must be considered when installing a new bat box.

1.87. Microclimate within a new roost is a very important factor in terms of increasing the chance of successful uptake by bats. In line with Bat Conservation Trust guidelines[8] bat boxes should be draught-proof and made from a thermally stable material. They should be located where

[8] Bat Conservation Trust – Bat Box Information Pack – Available at: http://www.bats.org.uk/data/files/publications/Bat_Box_Information_Pack_FINAL.pdf

Table 1-8: Details of Bird Boxes

BIRD BOX	DETAILS	IMAGE
1B Schwegler Nest Box[12]	This nest box will attract a wide range of species and is available with different entrance hole sizes to prevent birds from competing with each other for the boxes. The 32mm entrance hole will attract Great, Blue, Marsh, Coal and Crested Tit, Redstart, Nuthatch, Collared and Pied Flycatcher, Wryneck, Tree and House Sparrow and bats. The 26mm entrance hole suits Blue, Marsh, Coal and Crested Tit and possibly Wren. All other species are prevented from using the nest box due to the smaller entrance hole.	
2H Schwegler Robin Box[13]	This traditional design has proved to be highly effective in attracting robins, as well as other small species such as black redstart, spotted flycatcher and wren.	

1.94. It is recommended that 1B Schwegler nest boxes (three 32mm and three 26mm holes) and 2H Schwegler robin boxes are installed.

Hibernacula

1.95. The hibernacula comprise of log, rock and stone piles and is aimed at providing shelter for reptile and amphibians to hibernate. It may also be used by a variety of insects and small mammals. The hibernacula will follow the instructions laid out within Appendix B below.

Management

1.96. Final location and number of bird nest boxes and bat boxes to be determined on site by an ecologist.

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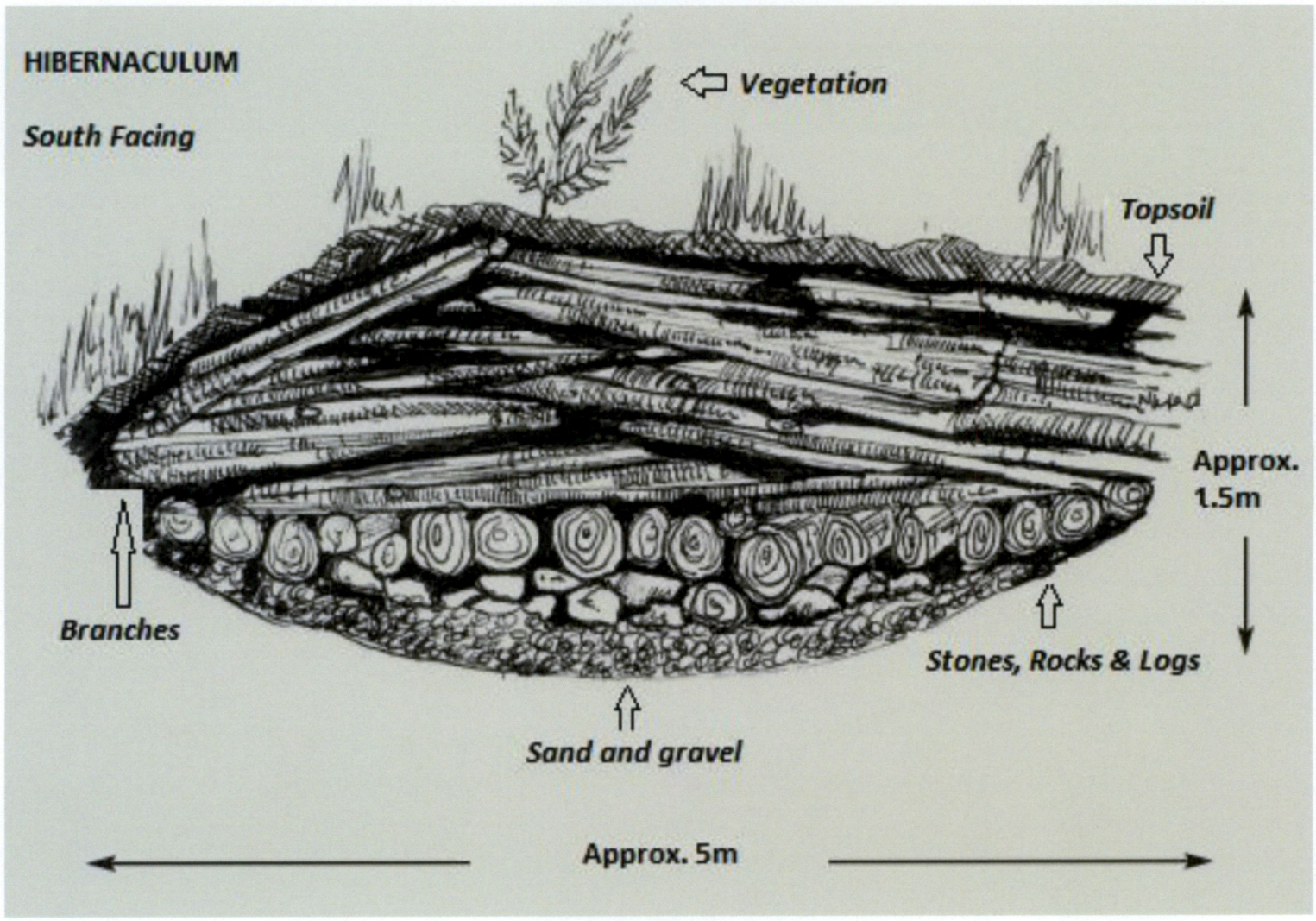
[12] Full specification available at: http://www.nhbs.com/title/158587/1b-schwegler-nest-box

[13] Full specification available at: http://www.nhbs.com/title/161277/2h-schwegler-robin-box

APPENDICES

Appendix A - Hibernaculum Construction

1.97. The hibernaculum will follow the basic construction set out below, with the log and stone piles situated to the north of the hibernaculum.



- A 5m long east-west running ditch 1m deep and 1m wide will be dug.
- The base will be lined with sand and gravel.
- This will be followed with layers of stones, rocks and logs.
- Smaller branches will then be placed on top, and covered soil from the excavation will be placed over the pile, leaving gaps for access.
- The soil will be shaped into a mound.
- North facing side of the mound will be seeded / planted with species that will attract insects and will also provide extra shelter.
- South facing side will be maintained with a sparse vegetation cover to provide an area to bask.
- A log pile of approximately 2m by 1m will be placed to the north of the hibernaculum.

Appendix B – Invertebrate Bank Creation

Beetle Bank

- September is the best month to establish the grass sward that forms a beetle bank.
- Create a raised bank of about 0.4 metres.
- The grass mix should include up to 60% of tussock-forming species such as cocksfoot or Scots timothy grass. For the rest of the mix choose native species and include fescues.
- Up to three cuts may be needed in the first summer (when the sward reaches 10 cm in height) to encourage the grasses to tiller and to help control invasive annual weeds.
- Once established, the grass strips should be cut typically no more than once every three years.

Bee Bank

- Material (such as aggregate and sand) will be shaped into a mound with various slopes, hollows and angles that may be utilised and favoured by different species.
- Vertical banks created on bee banks take much longer to vegetate and this makes them attractive to many species. Over time a bee bank will be vegetated over through succession.
- Planting vegetation in an open structure in front of a bee bank will provide extra habitat for invertebrates that are attracted to the bee bank.
- These banks should be created close to flower-rich areas which will provide important foraging areas for pollinators.

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Technical Appendix 12.1: Ground Investigation & Geotechnical Report