Biodiversity Management Plan

13/10/2022

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EXECUTIVE SUMMARY

1.1. Objectives have been established to enhance and maintain the biodiversity of the land at a proposed data centre building and associated development on lands within Profile Park, Clondalkin, Dublin.

1.2. Measures include: native riparian planting along the Baldonnel stream and wetland wildflower (meadow) planting, the planting of species-rich hedgerows to provide a plentiful source of food and shelter for a range of fauna species. Other enhancement measures include development of a wildflower meadow mix, native woodland, medium to large deciduous trees and native conifer trees on site. This would be in addition to creating a herptile hibernaculum and adding bird and bat boxes to the site.

1.3. A Fossitt habitat survey of the site was conducted on the 20th of July 2022 by Eiméar Rose Cunningham to assess the current baseline of the Application Site. An Ecological Impact Assessment (EcIA) was then conducted to assess the local area and its ability to support a range of wildlife, as part of the full planning application.

1.4. The enhancements and management measures set out in this document have been developed in accordance with the findings of the above habitat survey. This will enable the Proposed Development to deliver biodiversity gain.

INTRODUCTION

Background

1.6. Neo Environmental Ltd has been appointed by Ramboll on behalf of Vantage Data Centres Dub 11 Limited (the "Applicant") to undertake a Biodiversity Management Plan for a data centre building and associated development (the "Proposed Development") on lands within Profile Park, Clondalkin, Dublin (the "Application Site").

Development Description

1.7. The development includes a two-storey residential property on lands to the south of the New Nangor Road (R134), Dublin 22; and on land within the townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22 on an overall site of 3.79 hectares. The development will consist of the demolition of the two storey dwelling (207.35sqm) and associated outbuildings and farm structures (348.36sqm); and the construction of 1 no. two storey data center with plant at roof level and associated ancillary development that will have a gross floor area of 12,893sqm.

Site Description

1.13. The Application Site is centred at Irish Grid Reference (IGR) O 03894 30791.

1.14. The Application Site is located **Profile Park Business Park**, Nangor Road, Clondalkin, County Dublin, Ireland. The surrounding area is mostly commercial in nature with retail/business parks, data centres and other commercial businesses in the vicinity of the proposed site. There is one residential property within the red line boundary of the proposed development site.

1.15. The site's immediate boundaries are defined by the following:

- The land is adjacent to Nangor Road which is situated north of the Application Site boundary.
- To the east of the site is the entrance to the business park as well as the Grange Castle Golf Club.
- To the south of the site are further green fields and commercial businesses within the business park, including Digital Reality Profile Park.
- Immediately to the south of the red line boundary of the site is the Baldonnell stream which flows west.
- To the west of the site is the permitted Vantage data centre development, the continuation of the Baldonnell stream as well as Grange Castle Business Park and Bennet Construction.

1.16. Currently the site comprises mostly of amenity grassland with small areas of scrub, recolonising bare ground and buildings and other artificial surfaces. An existing residential dwelling and associated outbuildings are located in the north-west corner of the site. The site is bound by horse chestnut treeline to the south and bound by a combination of treeline and hedgerow elsewhere.

1.17. The wider context of the site is characterised by a mix of industrial and agricultural development with a fragmented mixture of commercial, industrial and residential uses.

OBJECTIVE OF THE BIODIVERSITY MANAGEMENT PLAN

1.18. The objective of this BMP is to minimise any potential negative impacts, arising from the Proposed Development, while increasing the habitat diversity. The enhancement of the land within the Application Site boundary will increase the sites capability of supporting wildlife.

1.19. This will be achieved by

- Creating and maintaining native riparian vegetation along Baldonnell stream;
- Creating and maintaining a wetland specific species-rich diverse grassland with a varied sward structure;
- Creating and maintaining a wildflower meadow;
- Creating and maintaining species-rich hedgerows;
- Planting and maintaining medium to large deciduous trees;
- Planting and maintaining coniferous trees;
- Creating and maintaining wildlife shelters for priority and locally important species; and
- Maximise the floral and faunal biodiversity of the created and retained habitats.

CURRENT CONSERVATION & BIODIVERSITY

National Conservation

Ireland's National Biodiversity Action Plan 2017 - 2021[1]

1.20. Ireland's 4th National Biodiversity Action Plan for the period 2023-2027 has been in development since October 2021. Is it currently in the public consultation phase. For the purpose of this report, the objectivise of the 2017-2021 plan has been considered.

1.21. The National Biodiversity Action Plan[2] sets out a vision and seven strategic objectives to halt the decline of biodiversity across Ireland.

"Objective 1 - Mainstream biodiversity into decision-making across all sectors.

[1] Department of Culture, Heritage, and the Gaeltach (2017) National Biodiversity Action Plan 2017-2021

[2] Department of Arts, Heritage and the Gaeltacht (2011) Actions for Biodiversity 2011 – 2016 Ireland's National Biodiversity Action Plan. Available at: http://www.npws.ie/sites/default/files/general/national-biodiversity-plan-english.pdf

Objective 2 - Strengthen the knowledge base for conservation, management, and sustainable use of biodiversity.

Objective 3 - Increase awareness and appreciation of biodiversity and ecosystem services.

Objective 4 - conserve and restore biodiversity and ecosystem services in the wider countryside.

Objective 5 - conserve and restore biodiversity and ecosystem services in the marine environment.

Objective 6 - Expand and improve management of protected areas and species.

Objective 7 - Strengthen international governance for biodiversity and ecosystem services."

1.22. This document outlines that special protection to sites of highest nature value and species most at risk, including designated sites should be afforded. However, effective conservation and sustainable use of biodiversity should also occur within the wider countryside, as this is where much of the biodiversity lies.

1.23. The primary threat to biodiversity both within and outside protected areas is from habitat degradation, fragmentation and loss due to changes in agricultural practices (such as intensification), commercial forestry, fisheries over exploitation, peat extraction, air and water pollution, invasive alien species, land clearance and development, tourism and recreational activities and climate change.

National Biodiversity Action Strategy 2022-2026[3]

1.24. The National Biodiversity Action Strategy was created by the Office of Public Works to identify strategic actions to help government delivery of the National Biodiversity Action Plan. The Plan outlines 48 strategic actions, each with an expected outcome and key performance indicators defined. These actions are divided into five strategic themes;

1. Strategic Theme 1 Planning for Nature
2. Strategic Theme 2 Natural Leaders
3. Strategic Theme 3 Working with Water and Wildlife
4. Strategic Theme 4 Diversity by Design
5. Strategic Theme 5 Natural Knowledge

[3] OPW (2022) Biodiversity Action Strategy 2022-2027

South Dublin Development Plan 2022–2028 [4]

1.25. The Plan sets out an overall strategy for the proper planning and sustainable development of the County and consists of a written statement and accompanying plans and maps

1.26. Chapter 3 of the Plan refers to the county's natural heritage and contains a number of key policies (outlined below), which aim to protect and enhance biodiversity and designated sites within the county:

NCBH1: Objective 1: *To protect, conserve and enhance natural, built and cultural heritage features, seeking opportunities to identify, retain, protect, and incorporate heritage assets into plans and development.*

NCBH1 Objective 2: *To support the objectives and actions of the County Heritage Plan and the County Biodiversity Action Plan in the promotion and protection of natural, built and cultural heritage, and to take full cognisance of the County's Landscape Character Assessment and the County Geological Audit in the sustainable management of development.*

NCBH1 Objective 3: *To carry out an audit and assessment, based on an initial pilot study of the County's natural and built heritage assets including Council owned protected structures and archaeological features; to identify and safeguard these assets from the potential impacts of climate change; and to explore possible uses as part of climate change mitigation.*

NCBH2 Objective 1: *To support the implementation of the National Biodiversity Action Plan (2017- 2021) and the All-Ireland Pollinator Plan (2021-2025) and to support the adoption and implementation of the South Dublin County Biodiversity Action Plan (2020-2026) and Pollinator Action Plan (2021-2025) and any superseding plans.*

NCBH2 Objective 2: *To ensure the protection of designated sites in compliance with relevant EU Directives and applicable national legislation.*

NCBH2 Objective 3: *To protect and conserve the natural heritage of the County, and to conserve and manage EU and nationally designated sites and non-designated locally important areas which act as 'stepping stones' for the purposes of green infrastructure and Article 10 of the Habitats Directive.*

NCBH2 Objective 4: *To protect our rivers and in particular to avoid overdevelopment which could have an adverse effect on the biodiversity and ecosystems of the river.*

NCBH3 Objective 1: *To prevent development and activities that would adversely affect the integrity of any Natura 2000 site located within or adjacent to the County and promote the favourable conservation status of the habitats and species integral to these sites.*

NCBH3 Objective 2: *To ensure that plans, including land use plans, will only be adopted, if they either individually or in combination with existing and / or proposed plans or projects, will not*

[4] Available from : https://www.sdcc.ie/en/devplan2022/adopted-plan/

have a significant adverse effect on a European Site, or where such a plan is likely or might have such a significant adverse effect (either alone or in combination), South Dublin County Council will, as required by law, carry out an appropriate assessment as per requirements of Article 6(3) of the Habitats Directive 92 / 43 / EEC of the 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as transposed into Irish legislation. Only after having ascertained that the plan will not adversely affect the integrity of any European site, will South Dublin County Council adopt the plan, incorporating any necessary mitigation measures. A plan which could adversely affect the integrity of a European site may only be adopted in exceptional circumstances, as provided for in Article 6(4) of the Habitats Directive as transposed into Irish legislation.

NCBH3 Objective 3: *To ensure that planning permission will only be granted for a development proposal that, either individually or in combination with existing and / or proposed plans or projects, will not have a significant adverse effect on a European Site, or where such a development proposal is likely or might have such a significant adverse effect (either alone or in combination), the planning authority will, as required by law, carry out an appropriate assessment as per requirements of Article 6(3) of the Habitats Directive 92 / 43 / EEC of the 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as transposed into Irish legislation. Only after having ascertained that the development proposal will not adversely affect the integrity of any European site, will the planning authority agree to the development and impose appropriate mitigation measures in the form of planning conditions. A development proposal which could adversely affect the integrity of a European site may only be permitted in exceptional circumstances, as provided for in Article 6(4) of the Habitats Directive as transposed into Irish legislation.*

NCBH4: *Protect the ecological, visual, recreational, environmental and amenity value of the County's proposed Natural Heritage Areas and associated habitats and species.*

NCBH5: *Protect and promote the conservation of biodiversity outside of designated areas and ensure that species and habitats that are protected under the Wildlife Acts 1976 to 2018, the Birds Directive 1979 and the Habitats Directive 1992, the Flora (Protection) Order 2015, and wildlife corridors are adequately protected.*

NCBH10: *Protect against and prevent the introduction and spread of invasive species within the County and require landowners and developers to adhere to best practice guidance in relation to the control of invasive species.*

NCB11: *Review Tree Preservation Orders (TPO) within the County and maintain the conservation value of trees and groups of trees that are the subject of a Tree Preservation Order while also recognising the value of and protecting trees and hedgerows which are not subject to a TPO.*

South Dublin County Council Draft Biodiversity Action Plan 2020-2026[5]

1.27. The preparation of this Biodiversity Action Plan is an objective of the South Dublin County Heritage Plan and the South Dublin County Council Development Plan 2022-2028. The South Dublin County Biodiversity Plan was prepared in the context of a range of national and international plans for biodiversity protection and enhancement

1.28. The National Biodiversity Plan lists a range of actions for biodiversity that aim to achieve this vision, arranged under a series of 7 Strategic Objectives. These objectives are:

- the mainstreaming of biodiversity issues across the decision-making in all sectors;
- the strengthening of the knowledge base for conservation, management and sustainable use of biodiversity;
- increasing public awareness and appreciation of biodiversity and ecosystem services;
- the conservation and restoration of biodiversity and ecosystem services in the wider countryside;
- the conservation and restoration of biodiversity and ecosystem services in the marine environment;
- the expansion and improved management of protected areas and species; and
- the strengthening of international governance for biodiversity and ecosystem services.

All Ireland Pollinator Plan 2021-2025[6]

1.29. On the 17th of September 2015, Ireland joined a small number of countries in Europe who have developed a strategy to address pollinator decline and protect pollination services. In March 2021, a new Plan was released.

1.30. This new Plan has six objectives and has identified 186 actions in order to achieve its objectives. The six objectives are as follows:

- **Making farmland pollinator friendly**. Working together with the farming community, increase awareness of pollinators and the resources they need in order to survive on farmland.

[5]https://consult.sdublincoco.ie/en/consultation/draft-biodiversity-action-plan-south-dublin-county-connecting-nature-2020-2026

[6] National Biodiversity Data Centre (2015) All Ireland Pollinator Plan 2021-2025. Available at: https://pollinators.ie/wp-content/uploads/2021/03/All-Ireland-Pollinator-Plan-2021-2025-WEB.pdf

- **Making public land pollinator friendly**. Working with Councils, Transport Authorities, Local Communities and others, to strengthen links between this plan and other initiatives and to increase shelter and food resources for pollinators.
- **Making private plan pollinator friendly**. Work together with the public and community groups to create networks of biodiversity-friendly habitat across the landscape.
- **All-Ireland honeybee strategy**. Working with beekeepers, achieve healthy, sustainable populations, and for honeybees to be part of a cohesive pollinator message that balances managed and wild pollinator populations.
- **Conserving rare pollinators**. Improving our knowledge on rare pollinators, and raising awareness through dedicated initiatives, achieve a Plan that protects as much wild pollinator diversity as possible.
- **Strategic coordination of the Plan**. Continually raising awareness; addressing gaps in knowledge through research, tracking where pollinators occur and how populations are changing, work from an evidence base that enables us to coordinate a dynamic plan that is targeted and effective.

1.31. The enhancements set out within this BMP will create areas of flower-rich habitat that will support Ireland's pollinator species, including bees and flies.

Local Conservation

1.32. The Proposed Development does not lie within or directly adjacent to any statutory or non-statutory designated environmental sites. Within 15km of the Application Site boundary there are nine Natura 2000 designated sites, six Special Areas of Conservation (SACs) and three Special Protection Areas (SPA)

1.33. Please refer to the supporting Appropriate Assessment (AA) Screening report (**Appendix 8.2**) for details of all Natura 2000 sites within 15km of the Application Boundary.

1.34. From the findings of the EcIA and AA it is considered that with the implementation of design, best practice and mitigation measures the Proposed Development will not significantly impact upon any of the designated and non-designated sites located within 15km of the Proposed Development.

HABITATS & SPECIES PRESENT

1.35. An extended habitat survey of the Proposed Development was undertaken in July 2022. The following habitat types were identified:

- Building and Artificial Surfaces (BL3)
- Amenity Grassland (GA2)
- Recolonising Bare Ground (ED3)
- Scrub (WS1)
- Depositing/Lowland rivers (FW2)
- Hedgerows (WL1)
- Treelines (WL2)

(Note: Fossitt classification within brackets).

Fauna

1.36. The potential presence of protected species within the study area was assessed though a data search conducted through the NBDC. This identified records of invasive, rare, scarce and protected species within 2km of the Proposed Development location.

1.37. The Application Site is located within the 1km grid squares O03F. A database search was also carried out for adjacent grid squares to ensure a full assessment of the 2km radius.

1.38. Additional information on the suitability of habitat in the surrounding area for bats was also obtained from the NBDC in the form of a habitat suitability map. The map provided enhanced information on the recorded distribution of bats and broad-scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species.

1.39. In addition, the extended habitat survey included a species scoping survey in order to assess the potential of the site to support protected species.

1.40. The Application Site and adjacent areas offer suitable habitat for badger, hedgehog, otter, shrew, squirrel, bat, bird and herptile species which are known to be present in the local area.

POTENTIAL IMPACTS

1.41. Potential impacts which could arise from a Development include:

- Potential habitat loss and fragmentation;
- Disturbance during construction and decommissioning; and
- Potential contamination of surface waters.

1.42. Each of these potential impacts have been considered below in relation to the Proposed Development.

Potential Habitat Loss and Fragmentation

1.43. The overall ground-level Proposed Development footprint take up 12,893m^2.

1.44. Currently the habitat present under the Proposed Development footprint is primarily amenity grassland, considered to be of low ecological value. As the surrounding landscape is of a similar nature, the loss of these small areas will not be significant and the alteration of this habitat will not result in fragmentation.

1.45. Post-construction, with the implementation of this BMP, existing habitats are to be enhanced, with new habitats created. This document sets out how the habitats including hedgerows, trees, wildflower meadow and wetland meadow within the Application Site will be sensitively managed to ensure the maximum potential of these habitats are maintained throughout the lifetime of the development.

1.46. It is therefore demonstrated that the Proposed Development will have a positive significant impact on local habitats and will indeed deliver biodiversity enhancements to the benefit of the site and wider area.

Disturbance During Construction and Operation

1.47. The construction and decommissioning phases of the Proposed Development have the greatest potential to impact upon local wildlife.

1.48. Measures will be implemented prior to construction and decommission work taking place to minimise any potential disturbance to wildlife. Mitigation measures recommended within the Ecological Impact Assessment (**Appendix 8.1**) include:

- Pre-construction bird surveys, if works commence between March and August inclusive;
- Pre-construction badger survey;
- Pre-construction otter survey;

- Securely covering all excavations at the end of each working day to prevent accidental trapping of badger, otter or other small mammals.

1.49. With the creation of the wildflower meadow, wetland meadow, native hedgerow and native woodland/trees along with the introduction of hibernacula, bat and bird boxes and the enhancement of existing hedgerows and riparian habitat combined with sensitive management, the sites potential for supporting local wildlife could be greatly increased post-construction.

Potential Disturbance and Contamination of Surface Waters

1.50. The construction phase of a development has the potential for contamination of surface waters, if appropriate measures are not implemented.

1.51. A **Demolition and Construction Environmental Management Plan** (DCEMP) – **Chapter 5** of the accompanying **Environmental Impact Assessment Report** (EIAR) has been produced by Pinnacle Consulting Engineers. This DCEMP report outlines measures to be implemented during demolition and construction works to prevent contamination of the stream through contaminated surface waters.

1.52. The Baldonnell stream was assessed in the adjacent lands (in support of planning reference: **SD20A/0283**). Low species diversity of freshwater invertebrates were recorded, samples were dominated by freshwater shrimp and stone clingers.

1.53. Through following measures outlined in the DCEMP it is envisaged that no contaminants will enter the Baldonnell stream as a result of construction and demolition involved for the proposed development.

1.54. A small section (approx.1.4m) of the Baldonnell stream is proposed to be culverted, via two pipes, under the road in the south of the site. With the implementation of riparian planting and enhancements along the banks of the Baldonnell stream the Proposed Development will have a positive significant impact on local habitats (i.e. providing structure for invertebrate species, and thus, enhancing feeding for aquatic species such as frog) and will indeed deliver biodiversity enhancements to the benefit of the site and wider area.

MANAGEMENT & RECOMMENDATIONS

1.55. The following management recommendations have been made:

- to maintain and improve the biodiversity of species within the site;
- to enhance the quality of habitats present;
- increase the sites potential for supporting wildlife; and
- to avoid any potential negative impacts arising from the Proposed Development of the site.

1.56. It is proposed that the implementation of biodiversity and landscaping enhancements, will be undertaken early within the construction programme. This will enable habitats to establish before the operational phase of the development.

Recommended Management

1.57. Currently the amenity grassland of which the majority of the Application Site comprises offers limited benefit to wildlife. The potential of the site to support wildlife will be significantly increased by the habitat creation measures set out below.

Habitat Enhancement

1.58. Various options exist to enhance the biodiversity value of a site, including the creation of different habitats, such as: hedgerows, woodland, riparian zones, wildflower meadows and individual conifer and deciduous tree planting.

1.59. Habitats that will be created at the development site will include:

- Native woodland;
- Native hedgerow;
- Riparian zones;
- Wetland wildflower meadow;
- Standard wildflower meadow;
- Hibernaculum;
- Bird and bat boxes;
- Bee and beetle banks.

1.60. These habitats individually offer shelter and a food source for supporting a variety of wildlife. The mosaic of these new habitats combined with the existing hedgerows and existing trees, will support the existing wildlife within the site. They also have excellent potential to allow the biodiversity of the site to increase, by offering a wider range of habitats that benefit local wildlife.

General Considerations

Obligations

1.61. During each of the Proposed Development phases there are a number of legal obligations that should be considered by all those involved in site work:

- Ensure obligations of the European Communities (Birds and Natural Habitats) Regulations 2011 are met by all involved with the site.
- Ensure obligations of the Wildlife Act 1976 and Wildlife (Amendment) Act 2000 are met by all involved with the site.
- Ensure all relevant Health & Safety at Work Act obligations.

Good Ecological Practice

1.62. Whilst management practices should only be altered if there is a good ecological reason for doing so, they should not be rigidly adhered to if they are obviously detrimental.

Invasive Non-Native Species

1.63. During the extended habitat survey no field signs or evidence of invasive non-native species were observed.

MANAGEMENT OBJECTIVES AND ACTION PLAN

Table 1-1: Recommended Management

Objective	Action Plan Task	Timescale	Notes
Creating a diversity of habitats within the site	Wetland wildflower mix to contain: Devils Bit (*Scabious Succisa pratensis*), Common Sorrel (*Rumex acetosa*), Cuckoo Flower (*Cardamine pratensis*), Cowslip (*Primula veris*), Fleabane* (*Erigeron*), Greater Trefoil* (Lotus *pedunculatus*), Hemp Agrimony (*Eupatorium cannabinum*), Lesser Knapweed (*Centaurea nigra*), Marsh Cinquefoil (*Comarum palustre*), Marsh Marigold (*Caltha palustris*), Meadow Buttercup (*Ranunculus acris*), Meadowsweet (*Filipendula ulmaria*), Meadow Rue (*Thalictrum*), Oxeye Daisy (*Leucanthemum vulgare*), Purple Loosestrife (*Lythrum salicaria*), Ragged Robin (*Lychnis flos-cuculi*) and Red Clover (*Trifolium pratense*) Standard Wildflower Meadow mix to contain: Perennials at 15% - Birdsfoot Trefoil (Lotus Corniculatus), Common Cat's Ear (Hypochaeris Radicata), Cowslip (Primula Veris), Field Scabious (Knautia Arvensis), Lady's Bedstraw (Galium Verum), Lesser knapweed (Centaurea Nigra)	Year 1 (early within the construction phase)	Wetland Wildflower mix and Standard Wildflower Meadow will also provide habitat for small mammals and larvae of pollinating insects, including butterflies and moths.

	Meadow Buttercup (Ranunculus Acris), Meadow Vetchling (Lathyrus pratensis), Musk Mallow (Malva Moschata), Ox Eye Daisy (Leucanthemum Vulgare), Ragged Robin (Lychnis Flos Cuculi), Red Campion (Silene Dioica), Ribwort Plantain (Planatago Lanceolata), Rough Hawkbit (Leontodon hispidus), Salad Burnet (Sanguisorba Minor), Self Heal (Prunella Vulgaris), Small Scabious (Scabiosa columbaria), Common Sorrel (Rumex Acetosa), White Campion (Silene Alba), Wild Carrot (Daucus carota), Upright Hedge Parsley (Torilis Japonica), Yarrow (Achillea millefolium), Yellow Rattle (Rhinanathus Minor) and Wild Clary (Salvia Verbenaca). Grass Species 85% - Browntop Bent (*Agrostis capillaris*), Crested Dogstail (*Cynosurus cristatus*), Sheeps Fescue (*Festuca ovina*), Chewings Fescue (*Festuca rubra subsp. Commutate*), Slender Creeping Red Fescue (*Festuca Rubra Litoralis*), Yellow Oat Grass (*Trisetum flavescens*), Sweet Vernal Grass (*Anthoxanthum odoratum*).		
Creating a diversity of habitats within the site	<u>Riparian mix</u> to contain: Fool's watercress (*Apium nodiflorum*), Marsh-marigold (*Caltha paulaustris*), Yellow iris (*Iris pseudacorus*), Water forget-me-not (*Myosotis scorioides*), Watermilfoil (*Myriophyllum spicatum*), Bur-reed	Year 1 (early within the construction phase)	Riparian mix will also provide an important source of food and shelter for aquatic species and support many terrestrial organisms, including bats and a wide range of bird species.

	(*Sparganium spp.*), Snow rush (*Luzula nivea*), Soft shield fern (*Polystichum setiferum*), Common fern (*Dryopteris filix-mas*) Riparian mix can be supplemented with species from Wetland Wildflower mix.		
Creating a diversity of habitats within the site	Tree planting mix to contain: Alder (*Alnus glutinosa*), Silver birch (*Betula pendula*), Scots pine (*Pinus sylvestris*) and Sessile Oak (*Quercus petraea*). Native woodland mix to contain: Alder (*Alnus glutinosa*), Silver birch (*Betula pendula*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), Larch (*Larix decidua*), Scots pine (*Pinus sylvestris*), Bird Cherry (*Prunus padus*), Wild cherry (*Prunus avium*) and Sessile Oak (*Quercus petraea*).	Year 1 (early within the construction phase)	A patch of woodland/trees provides shelter and a source of food for a variety of species including birds, small mammals, amphibians, reptiles and butterflies. If the correct species are planted and maintained correctly, a woodland's potential can be maximised, providing food and shelter throughout the year.
To enhance the quality of habitats present & Creating a diversity of habitats within the site	Enhance existing hedgerow boundary Gap existing hedgerows and create new hedgerows with species such as blackthorn (*Prunus spinosa)*, hawthorn (*Crataegus monogyna)* and holly (*Ilex aquifolium*) as listed in **Table 1-4.** These corridors will allow the movement of small mammals and herptile species. To ensure a diverse hedgerow with a good structure it is important to plant and maintain	Year 1 (early within the construction phase)	A hedgerow provides shelter and a source of food for a variety of species including birds, small mammals, amphibians, reptiles and butterflies. If the correct species are planted and maintained correctly, a hedgerow's potential can be maximised, providing food and shelter throughout the year.

	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	Creation of hibernaculum, stone piles and log piles	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	Creation of bat roosting habitat 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	Creation of bird nesting habitat 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	Creation of invertebrate banks and insect hotels 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	Section of hedgerow to be cut	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

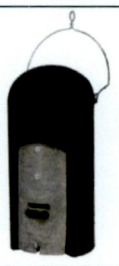
[8] Bat Conservation Trust – Bat Box Information Pack – Available at: http://www.bats.org.uk/data/files/publications/Bat_Box_Information_Pack_FINAL.pdf

they will receive full/partial sunlight (southerly orientation). The boxes should also be positioned a minimum of 2m above the ground. Access points should also be clear of any obstructions.

1.88. To allow a choice of roosting, bat boxes should be installed in more than one aspect. Bat boxes located on a shady side will be cooler and may be suitable as a hibernation roost or used by male bats throughout the entire year.

1.89. There is a wide range of bat boxes currently available, some which are more suitable for certain species. A variety of bat boxes are recommended in **Table 1-7**. It is recommended that three of each box detailed below be installed on site.

Table 1-7: Details of Bat Boxes

BAT BOX	DETAILS	IMAGE
Schwegler 1FF[9]	Can be used as a summer roost or nursery site. Is open at the bottom and does not require cleaning.	
Schwegler 2F[10]	Standard box and most popular. Simple entrance role. Used as summer roosting space.	
Schwegler 1FD[11]	Specific for smaller bats such as common pipistrelle, nathusius pipistrlle, daubenton's bat and brown long-eared.	

Bird boxes

1.90. In order to enhance the site for nesting birds, a number of bird boxes shall be placed throughout the site. Several types of nest boxes will be installed at suitable locations to favour a variety of bird species.

1.91. Open-fronted boxes will provide enhanced nesting opportunities for species such as robins, pied wagtails and spotted flycatchers. Boxes with entrance holes are suitable for tits, wren and tree sparrows.

1.92. Bird boxes should be mounted so that they face between the south-east and north to avoid direct sunlight. They should be tilted forwards so that rain is directed away from the entrance.

1.93. A variety of bird boxes are recommended in the table below.

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[9] Full specification available at: http://www.nhbs.com/title/158636/1ff-schwegler-bat-box-with-built-in-wooden-rear-panel

[10] Full specification available at: http://www.nhbs.com/title/158629

[11] Full specification available at: http://www.nhbs.com/title/177076/1fd-schwegler-bat-box

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

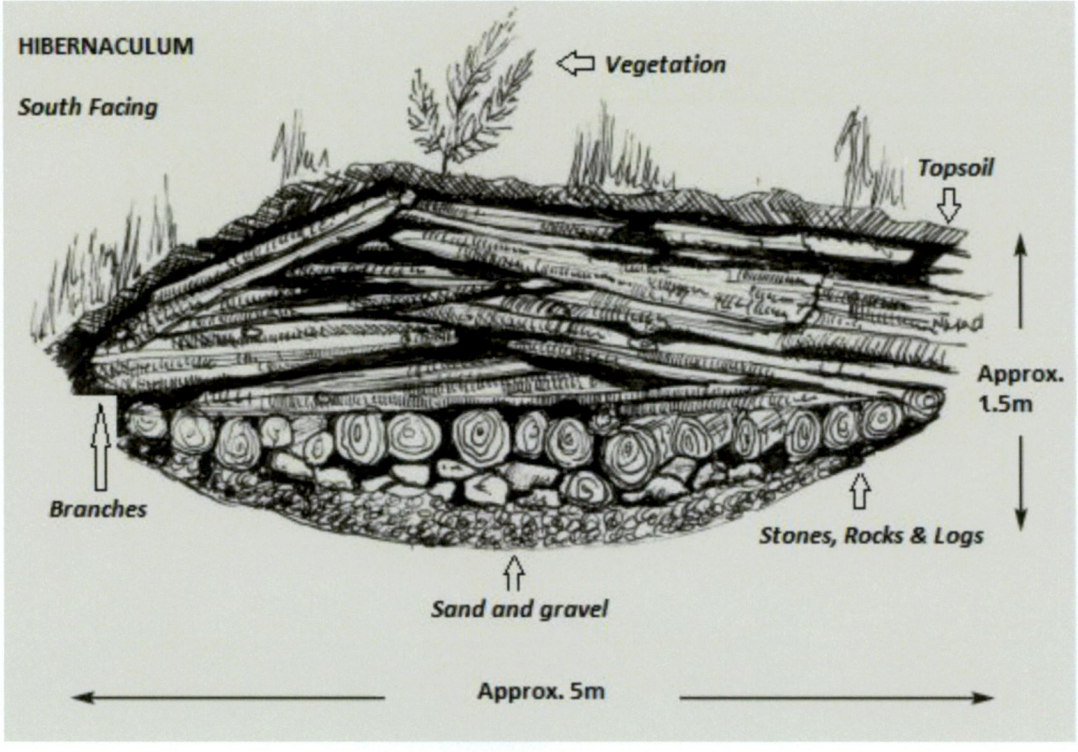
1.96. Final location and number of bird nest boxes and bat boxes to be determined on site by an ecologist.

[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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