
Ecological Impact Assessment

Proposed Development at the Wonderful
Barn, Leixlip, Co. Kildare

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Executive Summary

This Ecological Impact Assessment has been prepared by NM Ecology Ltd on behalf of the Kildare County Council in relation to a proposed development at the Wonderful Barn in Leixlip, Co. Kildare. The development would involve the conservation and conversion of existing buildings and the development of parklands in the remainder of the site. The aim of this report is to identify and evaluate the impacts of the proposed development on ecosystems and their components, including designated sites, habitats, flora and fauna.

The proposed development site (hereafter referred to as 'the Site') is not within or adjacent to any designated sites. Four designated sites were identified in the surrounding area, but none are connected by surface water (or other) pathways, so any risk of indirect impacts can be ruled out. A *Screening for Appropriate Assessment* report accompanies the application, in which it was concluded that the proposed development will not be likely to have a significant effect on any European sites.

Habitats within the Site include broadleaved woodland, treelines, hedgerow, amenity grassland, dry meadow, wet grassland and horticultural land. No legally-restricted invasive plant species (e.g. Japanese knotweed) were recorded at the site. A Landscape Concept Plan has been prepared for the proposed development, which will substantially increase the diversity and extent of woodland, meadow and wetland habitats. This will have a significant positive effect on the biodiversity value of the Site.

A small bat roost (1 – 2 common pipistrelles) was recorded in Barnhall House. Measures will be taken to avoid impacts on roosting bats during the renovation of the building, and to enhance the suitability of the building for bats in the long term. Bat-sensitive lighting along pedestrian / cycle routes will avoid or minimise effects on foraging and commuting bats.

No field signs of badgers or other large terrestrial mammals were identified at the site. Small mammals (e.g. hedgehog) are likely to use the hedgerows and related habitats, and a range of bird species nest within the buildings and woodlands. Small mammals and nesting birds could potentially be affected during the removal of vegetation, so it is recommended that the site is cleared outside the nesting / breeding season or that a pre-clearance survey is carried out.

Subject to the successful implementation of these measures, we conclude that the proposed development will not cause any significant negative impacts on designated sites, habitats, legally protected species, or any other features of ecological importance.

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1 Introduction

1.1 Assessment brief

The aim of this Ecological Impact Assessment (EclA) is to identify, quantify and evaluate the impacts of the proposed development on ecosystems and their components. This includes designated sites, habitats, flora and fauna. It has been prepared in accordance with the *Guidelines for Ecological Impact Assessment in the UK and Ireland (2018)*, which is the primary resource used by members of the Chartered Institute of Ecology and Environmental Management (CIEEM). The purpose of this document is to:

- Provide an objective and transparent assessment of the potential ecological impacts of the proposed development for all interested parties, including planning authorities and the general public,
- Facilitate objective and transparent determination of the consequences of the development in terms of national, regional and local policies relevant to ecology, and,
- Propose the steps that will be taken to adhere to legal requirements relating to designated sites and legally protected species (CIEEM 2018).

Although the above guidelines provide a framework for EclA, many processes rely on the professional judgement of an ecologist, including survey design, the valuation of ecological features, and the characterisation of impacts. An outline of the author's experience, training and accreditation is provided in the following section, which support his competency to make such judgements.

1.2 Statement of authority

All surveying and reporting was carried out by Nick Marchant, the principal ecologist of NM Ecology Ltd. He has sixteen years of professional experience, including thirteen years as an ecological consultant, one year as a local authority biodiversity officer, and two years managing an NGO in Indonesia. He provides ecological assessments for developments throughout Ireland and Northern Ireland, including wind farms, infrastructural projects (roads, water pipelines, greenways, etc.), and a range of residential and commercial developments.

He has an MSc in Ecosystem Conservation and Landscape Management from NUI Galway and a BSc in Environmental Science from Queens University Belfast. He is a member of the Chartered Institute of Ecology and Environmental Management, and operates in accordance with their code of professional conduct.

2 Methods

2.1 Scoping

An Ecological Impact Assessment involves the following steps:

- Identification of designated sites within an appropriate zone of influence
- A walkover survey incorporating the following elements:
 - Classification and mapping of habitats
 - A search for rare / protected flora, and for invasive plant species
 - A search for field signs of rare or protected fauna (e.g. badgers), and habitat suitability assessments for species that are secretive, nocturnal or seasonal
 - Specialist surveys (e.g. bats, breeding birds) where appropriate
- Valuation of ecological features, review of legal considerations, and identification of important ecological features
- Assessment of impacts on important ecological features and development of appropriate mitigation strategies

2.2 Data collection and walkover survey

A desk-based scoping study was carried out using data from the following sources:

- Plans and specifications for the proposed development
- Bedrock, soil, subsoil, ground water and surface water maps from the Geological Survey of Ireland webmapping service, the National Biodiversity Data Centre, and the Environmental Protection Agency web viewer
- Maps and details of designated sites from www.npws.ie
- Biological records from the National Biodiversity Data Centre online mapping service
- The *Kildare County Development Plan 2023 - 2029*, and details of permitted or proposed developments from their online planning records

The following resources were used for the walkover surveys:

- Habitat surveys were carried out in accordance with the *Best Practice Guidance for Habitat Survey and Mapping* (Smith et al 2011), and using the classification system of *A Guide to the Habitats of Ireland* (Fossitt 2000)
- Flora were identified using *Webb's An Irish Flora* (Parnell & Curtis 2012) and *The Vegetation Key to the British Flora* (Poland & Clement 2009). Nomenclature follows the plant crib of the Botanical Society of the British Isles (BSBI 2007). The abundance and extent of species is described using the DAFOR scale (Dominant, Abundant, Frequent, Occasional, Rare), although we have chosen not to use the term 'Rare' as it can cause confusion with rare species; the term 'Occasional' is used instead.
- Fauna surveys followed the methods outlined in the *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA 2006), with reference to other species-specific methods as appropriate.

Desktop data from internet resources was accessed in May 2024. A series of surveys were carried out in 2023, as follows:

- Habitats and flora: 14 July 2022, 25 August 2022, 20 July 2023
- Bat surveys: 25 August (emergence), 16 September (re-entry), 27 September (emergence), 28 September 2022 (re-entry)
- Badger survey: 23 February 2023

Bat survey

Survey methods were developed using *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Bat Conservation Trust, 3rd edition, 2016). It is noted that the 4th edition of the guidance was published in October 2023, but the survey had already been completed by that time, so it was undertaken in accordance with the 3rd edition guidance.

A series of bat surveys were carried out in August and September 2022, comprising two emergence and two re-entry surveys. Three surveyors were present on all occasions, in order to cover all sides of the buildings. Weather conditions were ideal for bat surveys on all occasions: mild temperatures, dry, and with little or no wind.

2.3 Valuation of ecological features

Based on the information collected during desktop and walkover surveys, the ecologist assigns an ecological importance to each feature based on its conservation status at different geographical scales (Table 1). For example, a site may be of National importance for a given species if it supports a significant proportion (e.g. 5%) of the total national population of that species.

Table 1: The six-level ecological valuation scheme used in the CIEEM guidelines (2018)

Ecological value	Geographical scale of importance
International	International or European scale
National	The Republic of Ireland or the island of Ireland
Regional	Leinster, and/or the east midlands of Ireland
County	County Kildare
Local	Suburban areas around Leixlip
Negligible	None, the feature is common and widespread

It is accepted that any development will have an impact on the receiving environment, but the significance of the impact will depend on the importance of the ecological features that would be affected. The following is outlined in the CIEEM guidelines: *“one of the key challenges in an EclA is to decide which ecological features (habitats, species, ecosystems and their functions/processes) are important and should be subject to detailed assessment.*

Such ecological features will be those that are considered to be important and potentially affected by the project. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to impacts from the development, and that will remain viable and sustainable.”

For this report we have only assessed impacts on ecological features of Local importance or higher (refer to Table 1), or those that receive legal protection. These features are termed ‘important ecological features’ and are listed in Section 4.6. Impacts on features of Negligible ecological importance (e.g. amenity grasslands) that do not receive legal protection are not considered to be significant, so they are not included in the impact assessment.

2.4 Ecological Impact Assessment

Potential direct, indirect or cumulative impacts on ecological features can be described in relation to their magnitude, extent, duration, reversibility and timing/frequency, as outlined in the CIEEM (2018) guidelines. Depending on the type of impact and the sensitivities of the important ecological feature, the ecologist may determine that the impact would have a ‘significant effect’. The following definitions are provided in the CIEEM guidelines: “A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project”. “For the purpose of EclA, a ‘significant negative effect’ is an effect that undermines biodiversity conservation objectives for ‘important ecological features’, or for biodiversity in general.”. Where significant impacts are identified, measures will be taken to avoid, minimise or compensate for impacts (where possible). Subject to these measures, the EclA concludes with a summary of residual impacts.

3 Development proposals

3.1 Description of the proposed development

The proposed redevelopment of the Wonderful Barn aims to restore the existing structures on the site, including one house, one barn (two dovecotes, a walled garden and two adjacent courtyards containing two stable buildings (all protected structures – RPS no. B11-15). The proposed works will protect and enhance the architectural heritage and amenity of the site and provide an integrated public amenity park and tourism destination at the Wonderful Barn and associated lands, informed by a detailed conservation plan. The project is aimed at fostering community engagement, provision of diverse recreational and cultural amenities and to attract tourism to the site.

The proposed redevelopment includes:

A) Conservation-led restoration and reuse of the existing building complex including:

- The barn (corkscrew-shaped conical tower), reuse of ground floor as community/cultural space, reuse of upper floors within confines of limited access for other use. Conversion of existing 'potato house' to toilets / first floor add-on general storage area.
- The house, including demolition of small quantum of existing fabric to reinstate integrity of protected structures, provision of improved access at rear of the house for community reuse,
- Reuse of existing stable buildings to facilitate re-use as cafe and multipurpose community/meeting rooms, other community activities, including events, classes, and gatherings. Provision of a 115sqm extension to former stable buildings to provide a commercial kitchen and café with a southern outlook into the historic walled working vegetable garden amenity including external vents.
- Dedicated space within Barnhall House to highlight the context of the structure's past, key historic events, architectural features.
- Restoration of both dovecotes (conical towers) and adjacent courtyards.
- Walled garden restoration, including small scale intervention to facilitate proposed cafe, relocation of existing temporary roadway to be outside of the garden,
- provision of security, including CCTV.
- exterior lighting to the Barn to highlight the structure.

B) Upgrade works at existing site entrance from R404 including.

- Provision of new carpark with 65 no. of carparking spaces and 28 no. of bike parking spaces and 4 bus parking spaces.
- Accommodation works to provide access to existing Uisce Eireann water services pumphouse, to include landscape screening works.

C) Redevelopment of existing parkland to include

- Redevelopment of the current 55 no. allotments to realign the plots within the restored historical landscape axes and provide new and improved facilities for the local allotment users.
- Provision of a new 174sqm building to the East of the existing building complex which will provide a storage facility to replace an existing container on site, new toilets, kitchenette, and workshop facilities for the local allotment user group as well as short term workplace facilities for the KCC Parks Department. Provision of water and power outlet market facilities adjacent to the new building to accommodate weekly / monthly local markets.
- Installation of children's play-area, fitness stations, sport areas and other ancillary open space facilities. Upgrade of existing/ addition of new combined footpath/cycle-paths throughout the site with associated new street furniture, seating, and public lighting throughout the parkland., new wayfinding and signage throughout the parkland, facilities for existing park user groups, eg dog walking facilities.
- The proposed internal route will link to the Celbridge/Backweston to Leixlip cycle route proposed (by others) to the south via the Kildare Innovation Campus (formerly the Hewlett Packard site) and via the M4 pedestrian/cycle overpass. The proposed internal route within the Wonderful Barn site allows for future connections to planned cycle infrastructure

improvements along the R404 Celbridge Road towards Leixlip Town Centre, to be delivered by Kildare County Council.

- Protection and reinstatement of the axial views within the site boundary between Castletown House and the Wonderful Barn and undergrounding of overhead cables.
- Protection and reinstatement of the integrity of the historic landscape including the Southern and South-Western formal tree lined avenues and forecourt to Barnhall House, formal planting of the walled garden, formal planting of the historic orchard to the Northwest of the building complex and an historic tree line and hedgerow to the Northern boundary of the courtyards.
- Improve overall park accessibility for residents of all ages and abilities throughout the park.
- soft and hard landscaping, including sustainable landscaping practices to enhance biodiversity and environmental sustainability. New conservation-led woodland planting and motorway screening planting.
- Sensitive design and mitigation measures to minimize environmental impact on native habitat preservation.

D) other works

- Realignment and improvements to pedestrian, cycle and vehicular access to site including all necessary infrastructure works required to integrate the site with a proposed M4 Cycle/Walkway bridge.
- Proposed noise barrier to protect the site from adjacent motorway noise nuisance.
- Provision of all utilities, necessary services, drainage works and associated site works.

3.2 Other nearby developments (potential in-combination effects)

Live and recently-approved planning applications in the vicinity of the Site were reviewed on the online planning records of Kildare County Council.

Permission was granted in 2023 for a large-scale development at the Kildare Innovation Campus (Kildare County Council planning reference 2360047), which is located to the south of the Site on the far side of the M4 motorway. The proposed development will involve the demolition of some buildings, the construction of new 'deep tech' buildings and data centre, and a range of ancillary works within the Site. Of particular note is a new pedestrian / cycle bridge across the M4 motorway, which will connect to the R404 Celbridge Road at the eastern end of the Site. The proposed development at the Wonderful Barn will provide an additional pedestrian / cycle route through the parkland to the Barnhall Meadows housing estate. The application was accompanied by a Biodiversity chapter (part of an Environmental Impact Assessment Report) and an Appropriate Assessment Screening Report prepared by Ecology Ireland Wildlife Consultants Ltd. It was concluded that the residual impacts of the

proposed development would be positive in the long term. Therefore, there is not considered to be a risk of cumulative impacts with the development.

The Barnhall Meadows development was a strategic housing development approved in 2018 (planning reference ABP-300606-18) and constructed between 2019 and 2023. The application was accompanied by a Biodiversity chapter and Appropriate Assessment Screening report. As the construction of the development is now complete, there is not considered to be any further risk of cumulative impacts.

All other recent applications in the surrounding area were for small-scale works associated with existing buildings, which pose no risk of in-combination effects.

4 The Receiving Environment

4.1 Environmental setting

Site location and surroundings

The proposed development site (hereafter referred to as 'the Site') is located in the south of Leixlip Town, and is associated with the Castletown Estate. It includes the 'Wonderful Barn' (a spiral-shaped tower originally used for grain storage), two smaller dovecotes of similar design, a two-storey dwelling (Barnhall House) and former stables. The buildings are set in extensive parklands, which include woodlands, grasslands and community allotments.

The southern boundary of the Site is formed by the M4 motorway, and the northern, eastern and western boundaries by the Barnhall Meadows housing estate.

Geology and soils

The underlying bedrock is 'dark limestone & shale', which is a locally-important aquifer. Subsoils are limestone gravels, and soils are fine loamy drifts.

Hydrology

The closest major watercourse is the River Liffey, which is located approx. 650 m south-east of the Site. A minor tributary of the River Liffey (referred to as the 'Upper Kilmacredock' stream) arises within the Site and flows south-east to meet the River Liffey approx. 1 km downstream. A major tributary of the River Liffey (the 'Rye Water') is located approx. 1.1 km north of the Site. It flows east and meets the River Liffey approx. 1 km to the east of the site.

The River Liffey is currently of Poor status (Water Framework Directive Status Assessments 2016-2021), and the Rye Water is of Moderate status.

4.2 Designated sites

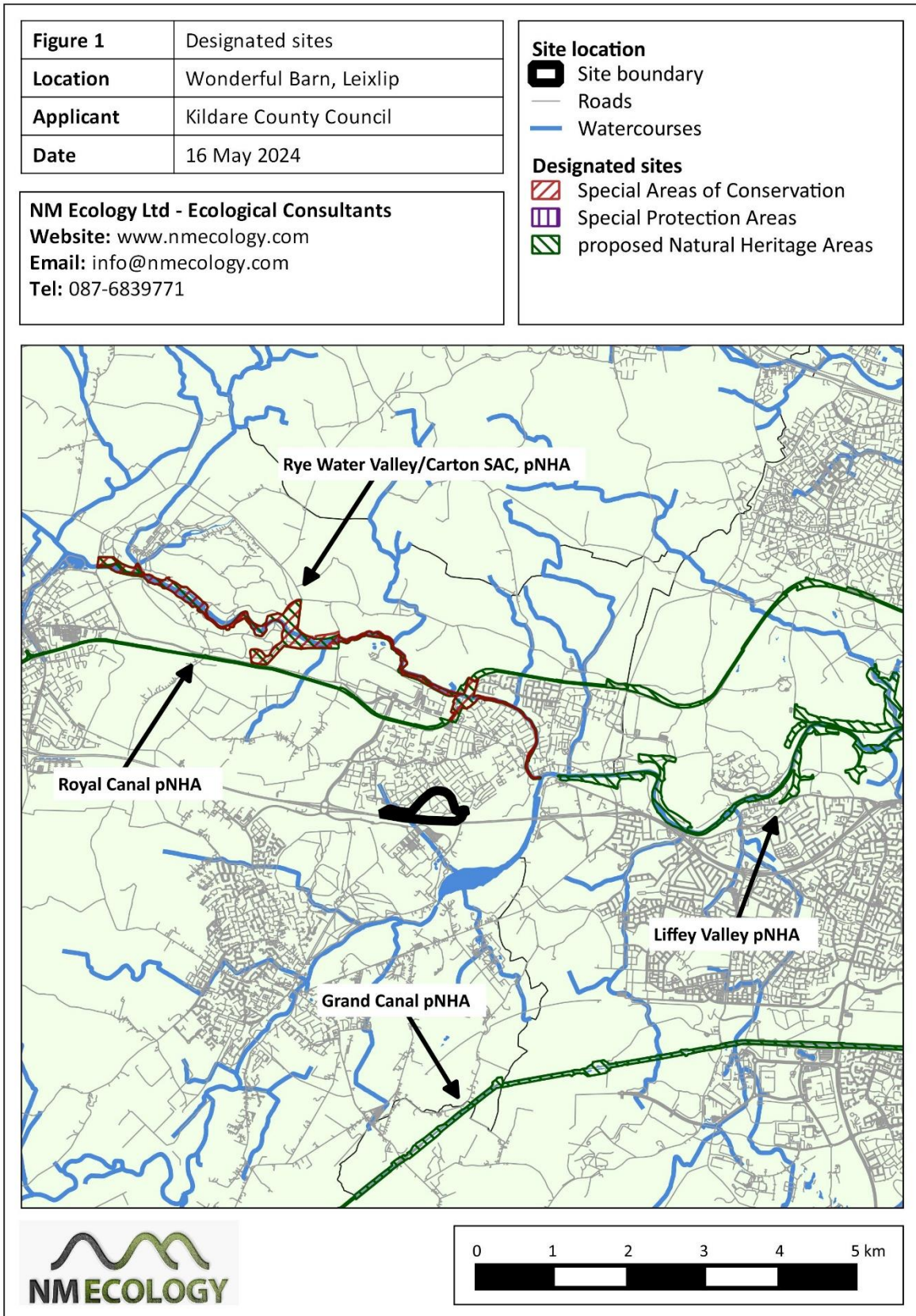
A map of European sites in the surrounding area is provided in Figure 1, and details of the designated sites shown in the image are provided in Table 2.

Table 2: Designated sites shown in Figure 1

Site Name	Distance	Reasons for designation
Royal Canal pNHA (site code 2103)	0.8 km north	Diversity of habitats, ecological connectivity, and protected aquatic plant species (Opposite-leaved Pondweed <i>Groenlandia densa</i>)
Rye Water Valley / Carton SAC (1398)	0.9 km north-east km north	Annex I habitats: Petrifying springs with tufa formation Annex II species: Narrow-mouthed Whorl Snail <i>Vertigo angustior</i> , Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i>
Liffey Valley pNHA (128)	1.3 km east	Deciduous woodland, wetlands and rare plant species
Grand Canal pNHA (2104)	3.4 km south	Diversity of habitats, ecological connectivity, and protected aquatic plant species (Opposite-leaved Pondweed <i>Groenlandia densa</i>)

The Site is not within or adjacent to any designated sites, so there is no possibility of direct impacts.

Potential indirect impacts were considered using the *source-pathway-receptor* approach, which reviews *pathways* (e.g. surface water) between the *source* (the Site) and the *receptor* (a European site). The most common pathway is surface water, which typically occurs when a pollutant is washed into a river and carried downstream into a European site. Other potential pathways are groundwater, air (e.g. airborne dust or sound waves), or land (e.g. flow of liquids, vibration). The zone of effect for hydrological effects can be several kilometres, but for air and land it is rarely more than one hundred metres.



The Royal Canal and Grand Canal are self-contained hydrological units that are isolated from surrounding surface water, groundwater and overland flow, so these pathways can be ruled out. A pathway via air can be ruled out due to distance.

The qualifying interests of the *Rye Water Valley / Carton* SAC are terrestrial wetland habitats (calcareous springs with tufa formations) and species (whorl snails, which favour wet grassland / marsh habitats), all of which are located in a small area near Louisa Bridge. These wetlands are supplied by groundwater upwelling in springs, so a surface water pathway can be ruled out. The Royal Canal would intercept any groundwater seepage from the Site to the SAC, so groundwater can also be ruled out as a feasible pathway. Potential pathways via land and air can be ruled out due to distance.

The *Liffey Valley* pNHA is located approx. 1.3 km east of the Site. It was designated to protect woodlands (a terrestrial habitat) along the sides of the valley, so a surface water pathway can be ruled out. Similarly, the woodlands are not associated with groundwater, so this pathway can also be ruled out. Pathways via land and air can be ruled out due to distance.

In summary, no feasible pathways were identified between the Site and any designated sites.

4.3 Habitats and flora

Habitats were classified using *A Guide to Habitats in Ireland* (Fossitt, 2000). The abundance of individual species was recorded using the DAFOR scale: Dominant, Abundant, Frequent and Occasional.

4.3.1 Habitat descriptions

Broadleaved woodland (WD1)

The parkland includes large areas of native woodland. Some is mature, but the majority is semi-mature, planted approx. 20 years ago. Several patches of woodland in the west of the Site are planted in straight lines and consist of only a single species; it is possible that they were originally intended for forestry. One patch consists only of pedunculate oak *Quercus robur* and another is only small-leaved lime *Tilia cordata*. Others have varying mixes of small-leaved lime, non-native alder (*Alnus incana* and some *Alnus rubra*), elm *Ulmus procera* and pedunculate oak.

A long, narrow arc of woodland around the northern boundary has a higher diversity of trees and is planted in a more natural style. It has frequent pedunculate oak, Scots pine *Pinus sylvestris*, small-leaved lime, elder *Sambucus nigra*, dog-rose *Rosa canina*, and occasional wild cherry *Prunus avium*, ash *Fraxinus excelsior* and sweet chestnut *Castanea sativa*.

The underlying ground flora consists of grassland species, and it not yet characteristic of woodland. False oat-grass *Arrhenatherum elatius* and cleavers *Galium aparine* are abundant

and nettle *Urtica dioica* is frequent, with occasional wood avens *Geum urbanum*, cock's-foot *Dactylis glomerata* and meadow buttercup *Ranunculus acris*.

The arc of woodland around the northern boundary of the Site contains a diverse mixture of trees and shrubs, most of which are native to Ireland. It is unfortunate that many of the other woodlands are dominated by 1 – 2 species, most of which are not native to Ireland (i.e. non-native alders, small-leaved lime). These woodlands have amenity and forestry value, but their biodiversity value is less than a native, species-rich woodland. Nonetheless, there is little woodland in the south-west of Leixlip, so all woodland areas within the Site are considered to be of Local importance.

Treelines (WL2)

There are lines of planted trees at a number of locations within the Site. Some are visible on 1st Edition Ordnance Survey Maps (created in 1829 – 1841), which means that they have been present at this location for at least 180 years.

Of particular note is a line of very large beech trees *Fagus sylvatica* to the north-east of Barnhall (arranged in a north-west to south-east orientation), which may once have been the formal approach to the buildings.

Separately, a treeline has been planted along the side of the M4 motorway, including at the location of the pedestrian / cycle bridge connecting to Castletown Estate. Trees include abundant field maple *Acer campestre*, frequent sycamore *Acer pseudoplatanus* and ash *Fraxinus excelsior* and occasional Italian alder *Alnus cordata*. The shrub layer is dominated by hawthorn, blackthorn and bramble, with some occasional hazel *Corylus avellana*.

There are also two treelines dominated by ash in the south-western corner of the Site.

The network of treelines and hedgerows (see below) are of considerable age, and provide habitat for a range of biodiversity, so they are of Local importance.

Hedgerow (WL1)

A number of former agricultural hedgerows traverse the Site. As above, most are visible on 1st Edition Ordnance Survey Maps (created in 1829 – 1841), which means that they have been present at this location for at least 180 years. Many are associated with earth banks and / or field drains, and some consist of two parallel lines of shrubs.

Hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus* are abundant, and blackthorn *Prunus spinosa* is locally abundant. Ash is frequent as an emergent tree. Other shrubs include frequent dog-rose and elder *Sambucus nigra*, and occasional crab-apple *Malus sylvestris*, wild cherry and holly *Ilex aquifolium*. The hedgerow to the east of the allotments is dominated by plum *Prunus domestica*, and was likely planted for as a food source for the estate. Ivy *Hedera hibernica* is dominant as a climber and in the ground layer. Other ground

flora is impoverished due to shading, but some Lords-and-Ladies *Arum maculatum*, cow parsley *Anthriscus sylvestris* and hart's-tongue *Phyllitis scolopendrium* were recorded.

The network of treelines and hedgerows are of considerable age, provide habitat connectivity across the Site, and support a range of biodiversity. Many would be meet the criteria for 'Heritage Hedgerows' under the *Hedgerow Appraisal System* (Foulkes et al., 2013), particularly due to their historical, structural and connectivity values. Therefore, all hedgerows are considered to be of Local importance.

Amenity grassland (GA2)

There are amenity grasslands to the south-west of the the buildings, which are regularly mowed in summer months. Former silage fields / pastures in the north and west of the Site are also mowed for public use.

These areas are dominated by perennial rye-grass *Lolium perenne*, and are likely to have been re-seeded in the last 10 - 20 years. The lawns to the south and west of Barnhall House also include common bent *Agrostis capillaris*, smooth meadow-grass *Poa pratensis*, annual meadow-grass *Poa annua* and Yorkshire-fog *Holcus lanatus*. Grassland forbs include frequent creeping buttercup *Ranunculus repens* and common sorrel *Rumex acetosa*, and occasional dandelion *Taraxacum officinale* ag. and broad-leaved dock *Rumex obtusifolius*.

During the construction of the Barnhall Meadows housing estate (approx. 2019 – 2023) a temporary road was constructed through the south of the Site, as well as temporary compounds / working areas in the south-east and south-west of the Site. These areas were re-instated in 2023 using perennial rye-grass and white clover *Trifolium repens*. Other species have recolonised these areas by self-seeding, notably creeping bent *Agrostis stolonifera* and red bartsia *Odontites vernus*. It is likely that these areas will revert to dry meadow (see below), as they are not mowed.

Amenity grasslands are common and widespread in suburban areas and are considered to be of Negligible importance.

Dry meadow (GS2)

Most other grasslands within the Site are not mowed and have become dominated by coarse grasses. These areas are dominated by false oat-grass *Arrhenatherum elatius*, with frequent Yorkshire-fog *Holcus lanatus*, common bent, dandelion and red bartsia. Occasional species include cock's-foot, meadow foxtail *Alopecurus pratensis*, white clover, creeping thistle *Cirsium repens*, perennial rye-grass, *creeping buttercup*, silverweed *Potentilla anserina*, common mouse-ear *Cerastium fontanum* and bush vetch *Vicia sepium*.

A larger area of unmown grassland to the east of the allotments is dominated by the same species, but has a greater diversity of native flowers, including hogweed *Heracleum*

sphondylium, lesser stitchwort *Stellaria graminea*, meadow buttercup *Ranunculus acris*, common ragwort *Jacobaea vulgaris*, hard-rush *Juncus inflexus* and oxeye daisy *Leucanthemum vulgare*. The higher species diversity is likely to be due to recent disturbance during the construction of Barnhall Meadows.

Dry meadows are semi-natural habitats, and when managed appropriately (mowed once per year in autumn) they develop into species-rich habitats of importance for a range of fauna, particularly pollinators, seed-eating birds and small mammals. Historically many hay meadows were managed in this manner in Ireland, but due to changes in farming practice they are now very rare. At present the habitat is of Local importance, but if managed appropriately it could potentially be of County importance.

Wet grassland (GS4) and other wetland habitats

This habitat is found in swales along the northern boundary of the Site that were constructed as part of the surface water management infrastructure for the Barnhall Meadows estate. These areas are low-lying and periodically inundated with surface water run off, which creates conditions suitable for some wetland plants. The grass does not appear to be mowed.

The abundant species are similar to those in the dry meadow described above, but additional species are locally-abundant in low-lying areas: hard-rush, carnation sedge *Carex panicea*, common centaury *Centaureum erythraea*, broad-leaved willowherb *Epilobium montanum* and great willowherb *Epilobium hirsutum*.

A detention basin was constructed in the south of the Site to provide attenuation of surface water from hard-surfaced areas in Barnhall Meadows. There is dry meadow vegetation around the upper edges of the basin in areas that are rarely inundated and wet grassland in the periodically-flooded areas. The wettest areas in the base of the pond have locally-abundant patches of bulrush *Typha latifolia*, grey willow *Salix cinerea*, soft-rush *Juncus effusus* and sweet-grass *Glyceria* sp.

These habitats are all of anthropogenic origin, but they support a number of wetland plants that are uncommon in the surrounding area, so they are considered to be of Local importance.

Horticultural land (BC2)

This category applies to the community allotments in the south-east of the Site. Common fruit and vegetables are grown, and the ground is regularly cultivated. Unused plots consist of dry meadow vegetation, and paths between plots are amenity grassland.

This habitat may provide transient habitat for pollinators and ground mammals, but otherwise is of Negligible ecological importance.

4.3.2 *Rare or protected flora*

No rare or protected plants were encountered.

4.3.3 *Invasive plant species*

No Japanese Knotweed *Fallopia japonica* or any other invasive plant species listed on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011* were recorded within the Site.

4.4 **Protected fauna**

4.4.1 *Terrestrial mammals*

Rabbits were observed on a few occasions during surveys, and rabbit warrens were found in some of the hedgerows. This species is not native to Ireland and is not protected.

A badger survey was carried out in February 2023, and no badger setts were found anywhere within the Site. Some characteristic feeding signs of badgers (overturned clumps of earth) were observed in the dry meadows in the south of the Site, but no other field signs.

No field signs of otters were recorded. The only waterbody within the Site is the Kilmacredock stream, a minor tributary of the River Liffey. It is too small to support fish or other aquatic fauna that could sustain an otter.

Woodland species such as red squirrel, pine marten and deer are considered unlikely to use the Site at present due to the immature nature of the woodland and the lack of connectivity to any larger expanses of woodland nearby. However, as the woodland matures and connections to the Castletown Estate are improved it is likely that the some of these species will recolonise the Site in the future.

The hedgerows and scrub could provide habitat for small mammals such as hedgehog, pygmy shrew and / or stoat. These species shy, primarily nocturnal, and do not leave distinctive field signs, so it is very difficult to confirm their presence or absence. Therefore, based solely on the suitability of habitats within the Site, we consider it likely to be of Local importance for at least one of the species listed above. All species are protected under the *Wildlife Act 1976* (as amended).

4.4.2 *Bats*

Bats are common and widespread in Ireland. During the day they roost in buildings, bridges and mature trees. At night they forage around woodlands, hedgerows and wetlands (lakes, rivers, swamps). They typically avoid urban areas with artificial lighting, and open habitats such as grasslands.

Potential roost features

The Wonderful Barn is a grain store constructed in the mid-18th century. It has five stages, each of which consists of a circular room with a domed masonry roof. The overall height of the structure is approx. 20 m. The lowest level has gabled projecting bays, also constructed of masonry. Grain was moved from one level to another through wooden hatches in the centre of the floor, but all hatches have now been sealed. The exterior of the structure is rendered with slates at lower levels and lime mortar at upper levels. An external staircase leads up the exterior of the structure in a corkscrew arrangement. The upper four stages have large triangular ventilation holes that provide constant air movement, but the lowest level is enclosed and has only small ventilation panels. The structure was restored in recent decades and is currently in good condition, with almost all masonry and mortar intact, and only some minor weathering to the external render. No substantial crevices suitable for bats were observed in the brickwork on the interior or exterior of the building, and there are very few potential roosting opportunities. There is an ornamental uplighter casting blue light on the southern side of the structure. Overall the structure was considered to have Low suitability for roosting bats.

Barnhall House is a two-storey former dwelling house that is also thought to have been constructed in the mid-18th century. Most walls are constructed of masonry (rendered with pebble dash), but there have been a number of extensions and other modifications to the structure using other building materials. All windows and doors are currently blocked with concrete blocks or metal / wooden panels to prevent vandalism. The roof is approx. 10 years old, and constructed of slate over a timber frame and white felt. The previous roof was destroyed in a large fire in around 2010. Some signs of bats were recorded inside this building (see following section), and it was considered to have High suitability for roosting bats.

The former stables to the east of Barnhall House are of similar age to the house and barn. They are single storey with storage areas in attic spaces; the total height of the structures is approx. 6 – 7 m. The walls are constructed of masonry (rendered with pebble dash), and the original roof framework consists of robust wooden beams and red clay tiles. In places the roof has been replaced by modern concrete slabs. As with Barnhall House, most of the original doors and windows have been blocked with concrete blocks or metal panels to prevent vandalism. There is extensive fire damage in at least four locations, and some sections of the roof have collapsed. These structures would formerly have been of high suitability for roosting bats, but due to the repeated fire damage and poor condition of the roof we now consider them to have Low suitability for roosting bats.

There are two dovecotes to the north and east of Barnhall House, which are of similar age to the house and barn. They are of similar conical design to the Wonderful Barn, but of approx. 10 m height. They were originally used for the housing of doves and chickens for

food production. The walls are constructed of stone, with many ledges or compartments at lower levels for nesting birds. The door openings are secured with metal gates and there are large openings in the upper levels of the structures, so they are well ventilated. There are some shallow crevices in the structures, and they have Moderate suitability for roosting bats.

Most of the trees within the Site are semi-mature, and are too small to be suitable for roosting bats. There are some mature beech trees that have shallow crevices suitable for individual bats, but no cavities suitable for larger numbers of bats. On this basis, all trees within the Site have Negligible suitability for roosting bats.

Internal inspections of buildings

No signs of bats were recorded within the Wonderful Barn. The lowest floor appears inaccessible to bats, and the upper storeys are breezy and lack crevices, so the structure appears to be broadly unsuitable as a day roost. However, the chambers may be used as night roosts, i.e. temporary perches used during feeding, resting or during periods of unfavourable weather.

Within Barnhall House, a dead common pipistrelle bat was found in one of the ground-floor rooms. The room is used for storage and the door is often kept closed, so the bat may have been trapped inside. A live bat was roosting in one of the rooms in the upper storey of the building, but was disturbed by human presence and flew into the attic space. A cluster of fresh pipistrelle droppings were recorded in the attic of the structure under the ridge beam. Some of the original burnt roof timbers were present in this area alongside the new roof timbers (installed approx. ten years ago), and it appears that the bats were roosting between these timbers.

No signs of bats were found within the stables or dovecotes.

Bat surveys

First bat survey (dusk, 25 August)

Conditions were ideal for a bat survey, with air temperatures of 12 – 14 °C, cloudy skies and light winds. Three surveyors were present, covering the buildings from a range of angle.

Leisler's bat were frequently recorded feeding overhead, starting approx. 10 minutes before sunset, and continuing until approx. 30 minutes after sunset. All were seen in flight foraging at approximately 20 – 30 m above ground level. None emerged from any of the buildings, nor were they observed flying close to any buildings.

Approx. 30 minutes after sunset a common pipistrelle was observed flying rapidly from Barnhall House towards the stables. It was considered likely to have emerged from the south-eastern gable of Barnhall House, although the point of emergence was not observed.

After that time, common pipistrelles and a single soprano pipistrelle were frequently recorded feeding within the courtyard to the east of Barnhall House. Activity levels were moderate overall. No other bats were observed emerging from any buildings.

Second bat survey (dawn, 16 September)

Air temperatures were cold (ranging from 7 – 10 °C), with clear skies and no wind. Three surveyors were present, covering all of the buildings. No bats were recorded during the survey.

Third bat survey (dusk, 27 September)

Air temperatures were mild (10 - 11 °C), with clear skies and light wind. Three surveyors were present, covering all of the buildings.

As before, there was occasional Leisler's activity high above the Site around sunset. Approx. 30 minutes after sunset two common pipistrelles were observed emerging from the south-eastern gable of Barnhall House; the exact emergence point could not be seen because it was above a flat-roofed extension. There were a number of social calls immediately after emergence, and considering that the survey was at the end of September it is likely that the two bats were engaged in courtship behaviour.

The bats foraging briefly around the buildings and then flew off in a north-easterly direction. No further bat activity was recorded during the survey.

Fourth bat survey (dawn, 28 September)

Air temperatures were mild (10 – 11 °C), with clear skies and no wind. No bats were recorded during the survey.

Foraging / commuting habitat

The surrounding parkland is considered to be high-quality foraging habitat, particularly the mature hedgerows / treelines and the wetlands (swales and the detention basin). Common pipistrelle, soprano pipistrelle and Leisler's bats would forage in most areas, along with smaller numbers of brown long-eared bats and *Myotis* species. At present there is very little lighting within the Site, other than some external floodlighting of the Wonderful Barn structure. The Site is considered to be of Local importance for foraging / commuting bats.

Conclusion

A small roost of 1 – 2 common pipistrelle bats was recorded in Barnhall House, likely a day roost during mid-summer months and a mating roost in autumn. It appears that the bats roost between roof timbers in the attic of the structure (fresh droppings were recorded in the area), and emerge from the south-eastern side of the building. No roosting bats were

recorded in any other structures. Overall, the roost in Barnhall House is of Local importance. The surrounding parkland represents a foraging / commuting habitat of Local importance.

The low number of roosting bats is surprising given the age and suitability of the buildings. The reason is almost certainly due to a series of fires at the structures: Barnhall House was subject to a major fire approx. 10 years ago, and there has been a series of small fires throughout the stables. It is likely that the buildings previously supported larger numbers of roosting bats, but that the fire killed them or caused them to move elsewhere. If the buildings are renovated and protected in the future, it is expected that larger numbers of bats will roost there in the future.

4.4.3 *Birds*

There are no Special Protection Areas in the surrounding area, so there is no risk that any associated bird species could the Site.

A range of common countryside birds were observed during the surveys, including buzzard, rook, magpie, jackdaw, woodpigeon, blackbird, robin, wren, chaffinch, bullfinch, great tit, blue tit and coal tit. Many of these species are likely to nest within the parklands.

Swallows and house martins were observed around the Site, and swallow nests were observed within the Wonderful Barn and stables. Swift were seen overhead during the first bat survey but no birds were observed landing on the buildings. This species is known to nest at Castletown House and in Leixlip town.

The derelict buildings were searched for signs of barn owl, but none were found. As noted previously, the series of fires at these structures are likely to have reduced their suitability for this species.

Great spotted woodpecker are known to breed within the Castletown Estate and appear to be spreading in the surrounding area. They are expected to colonise the Site as the woodland matures.

Overall, the Site is of Local importance for birds.

4.4.4 *Fish and aquatic fauna*

There are no significant waterbodies in the vicinity of the Site, so it is of no importance for fish or other aquatic fauna.

4.4.5 *Reptiles and amphibians*

No reptiles or amphibians were observed during the survey. The detention basin in the south of the Site appears to retain some water in the base and may be suitable as a spawning site

for frogs and newts, but this was not confirmed. Swales are likely to dry out in periods of dry weather, so they would not be suitable for spawning.

On a precautionary basis the Site is considered to be of Local importance for amphibians, but of Negligible importance for reptiles.

4.4.6 *Terrestrial invertebrates*

The habitats within the Site are common in rural / suburban landscapes in Ireland, so it is considered to be of Negligible importance for invertebrates.

4.5 Potential limitations and information gaps

The site inspections were carried out in the ideal survey season for all key ecological receptors, so the baseline assessment is not considered to have any information gaps.

As noted in Section 2.2, the bat survey methods were developed using *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Bat Conservation Trust, 3rd edition, 2016). The 4th edition of the guidance was published in October 2023, but all surveys had already been completed by that time. This does not provide any limitation to the survey, as the 3rd edition guidance represented best practice guidance at the time the surveys were carried out.

4.6 Identification of important ecological features

Table 3 provides a summary of all ecological features identified on the Site, including their importance and legal status. For the purposes of this impact assessment, any features that are of Local ecological importance, or that receive legal protection, are considered to be 'important ecological features', and will be addressed in the impact assessment.

Ecological feature	Importance	Legal status	Important feature
Designated sites	N.A.	-	No
Broadleaved woodland (WD1)	Local	-	Yes
Treelines (WL2)	Local	-	Yes
Hedgerows (WL1)	Local	-	Yes
Amenity grassland (GA2)	Negligible	-	No
Dry meadows and grassy verges (GS2)	Local	-	Yes
Wet grassland (GS4) and other wetlands	Local	-	Yes
Horticultural land (BC2)	Negligible	-	No
Rare / protected flora	N.A.	-	No

Ecological feature	Importance	Legal status	Important feature
Invasive plant species	N.A.	-	No
Small mammals (hedgehog, stoat, pygmy shrew)	Local	WA	Yes
All other terrestrial mammals	Negligible	-	No
Bats	Local	HR, WA	Yes
Birds (including nesting habitat)	Local	WA	Yes
Fish and aquatic fauna	N.A.	-	No
Reptiles and amphibians	Local	WA	Yes
Invertebrates	Negligible	-	No

* HR – EC (*Birds and Natural Habitats*) Regulations 2011; WA – Wildlife Act 1976

In summary, the important ecological features identified in this assessment are woodlands (broadleaved woodland, treelines, hedgerows), semi-natural grasslands (dry meadow and wet grassland), small mammals, bats, birds and amphibians. Potential impacts on these features are considered in Section 5.

All other ecological features discussed in Section 4 are considered to be of Negligible ecological importance, so they are not listed as Important Ecological Features.

5 Predicted Impacts of the Proposed Development

5.1 Habitats

The buildings will be conserved and renovated for use as a tourism / amenity resource, and the parkland will be managed for public amenity. A Landscape Concept Plan for the Site has been prepared by AECOM, which includes a range of features for public amenity (pedestrian / cycle routes, playground, skate park, informal kickabout area, etc) and biodiversity (tree planting, meadows).

Existing woodlands, treelines and hedgerows will be retained and incorporated into the landscape scheme. Large numbers of native trees will be planted throughout the remainder of the parkland, resulting in a significant increase quantity and quality of the woodland resource.

Amenity grassland (referred to as manicured lawn on the Landscape Concept Plan) will be retained around buildings and in areas of high public footfall, but the remainder of the grassland areas will be managed as meadows. This will substantially increase the extent and quality of semi-natural grasslands within the Site.

Surface water from hard-surfaced areas will be channelled to a number of infiltration areas within the Site. These will increase the extent of wet grassland and other wetland habitats within the Site.

In summary, the Landscape Concept Plan will result in a significant increase in the extent of woodland, semi-natural grassland and wetland habitats within the Site.

5.2 Disturbance of breeding birds and mammals

A range of birds nest within the Site in buildings, woodlands, treelines and hedgerows. It is also likely that small mammals (e.g. hedgehog) breed in some of the hedgerows.

The proposed development will involve extensive restoration and renovation of all buildings, and may block access to some areas currently used by nesting birds. The vast majority of woodland, treeline and hedgerows will be retained, but it may be necessary to clear small numbers of trees or shrubs that are in close proximity to buildings or to facilitate access.

If buildings were renovated or trees and shrubs were cut during the bird nesting season (usually between March and August, inclusive), it is possible that active nests could be destroyed. The breeding season for small mammals is approximately the same. The killing of any birds or small mammals, or the disturbance of their breeding / resting places, would constitute an offence under the *Wildlife Act 1976* (as amended).

5.3 Disturbance of bats

A small roost of 1 – 2 common pipistrelle bats was recorded in Barnhall House. The proposed development will involve extensive renovations to Barnhall House, including the replacement of the roof, demolition of some extensions and wall openings, construction of new extensions, and full internal and external re-rendering. If these works were undertaken without mitigation, they could potentially kill bats or disturb a breeding / resting place, which would be an offence under the *European Communities (Birds and Natural Habitats) Regulations 2011* (as amended).

It will be necessary to install lights in some areas to ensure safe access for future users of the Site, notably the new car park and the main pedestrian / cycle routes through the Site. Bats typically avoid areas with artificial lighting, so lighting could act as a barrier to the movement of bats through the Site. This could have a significant negative impact on foraging / commuting bats.

5.4 Amphibians

The detention basin in the south of the Site appears to retain some water in the base and may be suitable as a spawning site for frogs and newts. There are no proposals to change the detention basin as part of this project, so there will be no impact on amphibians.

5.5 Potential cumulative / in-combination impacts

Some other large-scale developments to the north and south of the Site were identified in Section 3.2, as follows:

- A major development at the Kildare Innovation Campus (Kildare County Council planning reference 2360047), including a new pedestrian / cycle bridge across the M4 motorway that will connect to the Site.
- The Barnhall Meadows strategic housing development, which is now complete

Neither of these development will increase the magnitude or extent of any of the impacts identified above. The only shared impact is the risk of disturbing nesting birds or small mammals during site clearance, but this can be avoided using best-practice mitigation measures, as outlined in Section 6. On this basis, we conclude that there is no risk of cumulative impacts.

6 Proposed mitigation measures

6.1 Protection of birds and small mammals during site clearance works

Under Sections 22 and 23 of the *Wildlife Act 1976* (as amended), it is an offence to kill or injure a protected bird or mammal, or to disturb their breeding / resting places. Most birds nest between March and August (inclusive), and the breeding season for most small mammals is similar. Therefore, it is strongly recommended that building renovation (and any associated vegetation clearance) commences between September and February (inclusive), i.e. outside the nesting season. If this is not possible, an ecologist will survey the affected areas in advance in order to assess whether any breeding birds or mammals are present. If any are encountered, renovation or vegetation clearance will be delayed in that area until the breeding attempt has been completed, i.e. after chicks have fledged and a nest has been abandoned.

6.2 Protection of bats

Temporary protection of bats during renovation / conversion works

A range of conservation and renovation works are proposed at Barnhall House, including the replacement of the roof. This will inevitably cause the disturbance of the 1 – 2 common pipistrelles found roosting within the building. It is proposed that bats are excluded from the building during works, provided with temporary alternative roost space, and subsequently allowed to return to the building when works are complete. Procedures will be as follows:

- An updated bat survey will be completed before the commencement of works. The ecologist will determine how many bats are present, and whether or not breeding bats are present

- If breeding bats are present, all works to the roof and attic will be delayed until the end of the breeding season (May to August, inclusive). If no breeding bats are present, the works can take place at any time of the year
- Bat boxes of crevice design will be installed in an undisturbed location as close as possible to Barnhall House, e.g. within the Walled Garden. Two boxes will be installed: one in a location exposed to the sun, and a second in a shaded location that receives no direct sunlight
- An ecologist will supervise the dismantling of the roof. If any bats are uncovered, they will be collected by hand (by an ecologist experienced in bat handling), placed temporarily in a cotton holding bag, and transferred to one of the bat boxes

As the measures outlined above will involve the disturbance of a bat roost, it will be necessary to obtain a derogation licence from the Department of Housing, Local Government and Heritage.

Long-term provision of roost spaces for bats

The attic space of Barnhall House will be reserved as a dedicated roost space for bats. The existing access point at the eastern corner of the building will be retained, and bat access slates will be incorporated into the new roof. A hatch will be provided in the ceiling of the upper storey to allow access to the roost space for cleaning and monitoring.

Additional dedicated roost spaces will also be provided in the stables if possible. It will incorporate a combination of open space for brown long-eared bats and crevices suitable for pipistrelles and *Myotis* species.

10 no. crevice-style bat boxes will also be installed on mature trees throughout the parkland to provide roosting opportunities away from the buildings.

Bat-sensitive lighting

A dark corridor of 5 m width will be provided from the south-eastern corner of Barnhall House along the walled garden into the parkland. This will ensure that the exit / entry points to Barnhall House are not illuminated, and that bats can disperse to and from their foraging habitats.

Bollard-style lighting will be installed along the main cycle routes through the Site to minimise impacts on foraging bats. The bollards will be approx. 1 m in height and will not project light above the horizontal.

Lights in the car park will be on 4 – 6 m standards, but will be directed down onto the parking area to avoid light spill.

These measures will avoid or minimise impacts of lighting on foraging and commuting bats.

6.3 Swift nest boxes

Swifts are in decline in Ireland due to a lack of suitable nesting sites in modern buildings. A standard conservation measure for this species is to install pre-fabricated nest boxes in suitable buildings. Different designs are available; some can be incorporated into the external masonry / render of a building, while others can be strapped to an external wall.

A minimum of 10 swift nest boxes will be installed on the north-eastern sides of Barnhall House and the north-eastern end of the stables building. They will be installed at least 5 m above ground level, in areas unobstructed by vegetation, and in locations that do not receive direct sunlight.

7 Residual Impacts

The Landscape Concept Plan for the proposed development will increase the diversity and extent of woodland, meadow and wetland habitats within the Site. This will have a significant positive effect on the biodiversity value of the Site.

Building renovation and site clearance works will commence outside the season of peak breeding activity in birds and mammals, or the area will be surveyed by an ecologist to confirm that no protected fauna are present. This will avoid any direct impacts on breeding birds or small mammals, and prevent a legal offence under the *Wildlife Act 1976* (as amended).

Swift nest boxes may allow swifts to nest at the Site in the future, which would have a positive effect on this species.

Measures will be taken to avoid impacts on roosting bats during the renovation of Barnhall House, and to enhance the suitability of the building for bats in the long term. Bat-sensitive lighting will avoid or minimise effects on foraging and commuting bats. These measures will prevent a legal offence under the *EC (Birds and Natural Habitats) Regulations 2011* (as amended).

Subject to the successful implementation of these measures, it can be concluded that the proposed development will not cause any significant negative impacts on designated sites, habitats, legally protected species, or any other features of ecological importance.

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